Beechcraft®

Debonair®

35-A33 *and* 35-B33

Pilot's Operating Handbook
and
FAA Approved Airplane Flight Manual

FAA Approved in Utility Category based on CAR 3. This document must be carried in the airplane at all times, and be kept within reach of the pilot during all flight operations.

This handbook includes the material required to be furnished to the pilot by CAR 3.

Airplane Serial Number: ______________________

Airplane Registration Number: ______________________

FAA Approved: ______________________

A. C. Jackson
Beech Aircraft Corporation
DOA CE-2

This handbook supersedes all BEECH published owner's manuals and check lists issued for this airplane with the exception of FAA Approved Airplane Flight Manual Supplements.

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35-A33 & 35-B33
Log of Temporary Changes
to the
Pilot's Operating Handbook
and
FAA Approved Airplane Flight Manual
P/N 33-590000-17B

Changes to this Pilot's Operating Handbook and FAA Approved Airplane Flight Manual must be in the airplane for all flight operations.

Part Number	Subject	Date
33-590000-17BTC1	Fuel Selector Placard Installation	8/26/97

Note: This page should be filed in the front of the *Pilot's Operating Handbook and FAA Approved Airplane Flight Manual* immediately following the *Title* page. This page replaces any *Log of Temporary Changes* page dated prior to the date in the lower right corner of this page.

DEBONAIR
35-A33 AND 35-B33
PILOT'S OPERATING HANDBOOK
AND
FAA APPROVED AIRPLANE FLIGHT MANUAL
P/N 33-590000-17

"B2" Revision . . . . January, 1996

LOG OF REVISIONS

Page	Description
Title Page	Updated
Page A (B2)	New
10-1 thru 10-48	Revised Section X, Safety Information (May, 1994)
	B2

DEBONAIR
35-A33 AND 35-B33

PILOT'S OPERATING HANDBOOK
AND
FAA APPROVED AIRPLANE FLIGHT MANUAL

B1 Revision . . . . October, 1990

LOG OF REVISIONS

Page	Description
Title Page	Updated
Page A (B1)	New
10-1 thru 10-48	Revised Section X, Safety Information (October, 1990)
	B1

Debonair A33, B33

PILOT'S OPERATING HANDBOOK

and

FAA APPROVED AIRPLANE FLIGHT MANUAL

LOG OF REVISIONS

ORIGINAL (A) . . . . JULY 1977
REISSUE (B) . . . . AUGUST 1979

PAGE	DESCRIPTION
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10-1 thru 10-67
Revised Safety Section
Dated March 1981

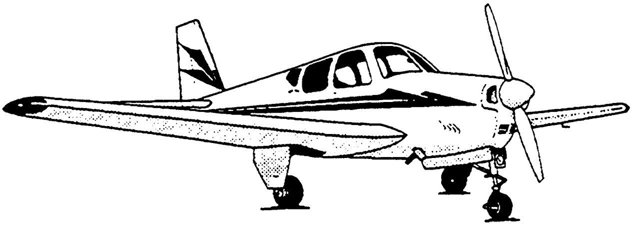
B

INTRODUCTION

This Pilot's Operating Handbook and FAA Approved Airplane Flight Manual is in the format and contains data recommended in the GAMA (General Aviation Manufacturers Association) Handbook Specification Number 1. Use of this specification by all manufacturers will provide the pilot the same type data in the same place in all of the handbooks.

In recent years BEECHCRAFT handbooks contained most of the data now provided, however, the new handbooks contain more detailed data and some entirely new data.

For example, attention is called to Section X SAFETY INFORMATION. While little of the information is new and every pilot has been exposed to the basic fundamentals, BEECHCRAFT feels it is highly important to have SAFETY INFORMATION in a condensed form in the hands of the pilots. The SAFETY INFORMATION should be read and studied. Periodic review will serve as a reminder of good piloting techniques.



Debonair A33, B33

PILOT'S OPERATING HANDBOOK

and

FAA APPROVED AIRPLANE FLIGHT MANUAL

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SECTION I

GENERAL

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THANK YOU . . . for displaying confidence in us by selecting a BEECHCRAFT airplane. Our design engineers, assemblers and inspectors have utilized their skills and years of experience to ensure that the BEECHCRAFT Debonair meets the high standards of quality and performance for which BEECHCRAFT airplanes have become famous throughout the world.

IMPORTANT NOTICE

This handbook must be read carefully by the owner and operator in order to become familiar with the operation of the BEECHCRAFT Debonair. The handbook presents suggestions and recommendations to help obtain safe and maximum performance without sacrificing economy. The BEECHCRAFT Debonair must be operated according to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual, and/or placards located in the airplane.

As a further reminder, the owner and operator of this airplane should also be familiar with the applicable Federal Aviation Regulations concerning operation and maintenance of the airplane and FAR Part 91 General Operating and Flight Rules. Likewise this airplane must be operated and maintained in accordance with FAA Airworthiness Directives which may be issued against it.

The Federal Aviation Regulations place the responsibility for the maintenance of this airplane on the owner and the operator who must ensure that all maintenance is done by qualified mechanics in conformity with all airworthiness requirements established for this airplane.

All limits, procedures, safety practices, time limits, servicing, and maintenance requirements contained in this handbook are considered mandatory for the continued airworthiness of this airplane, in a condition equal to that of its original manufacture.

Authorized BEECHCRAFT Aero or Aviation Centers or International Distributors or Dealers can provide recommended modification, service, and operating procedures issued by both FAA and Beech Aircraft Corporation, designed to get maximum utility and safety from this airplane.

USE OF THE HANDBOOK

The Pilot's Operating Handbook is designed so that necessary documents may be maintained for the safe and efficient operation of the BEECHCRAFT Debonair. The handbook has been prepared in loose leaf form for ease in maintenance and in a convenient size for storage. The handbook has been arranged with quick reference tabs imprinted with the title of each section and contains ten basic divisions:

Section 1 General

Section 2 Limitations

Section 3 Emergency Procedures

Section 4 Normal Procedures

Section 5 Performance

Section 6 Weight and Balance/Equipment List

Section 7 Systems Description

Section 8 Handling, Servicing and Maintenance

Section 9 Supplements

Section 10 Safety Information

NOTE

Except as noted, all airspeeds quoted in this handbook are Indicated Airspeeds (IAS) and assume zero instrument error.

In an effort to provide as complete coverage as possible, applicable to any configuration of the airplane, some optional equipment has been included in the scope of the handbook. However, due to the variety of airplane appointments and arrangements available, optional equipment described and depicted herein may not be designated as such in every case.

Neither Service Publications, Reissues, nor Revisions are automatically provided to the holder of this handbook. For information on how to obtain "Revision Service" applicable to this handbook, consult any BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer or refer to the latest revision of BEECHCRAFT Service Instructions No. 0250-010.

BEECH AIRCRAFT CORPORATION EXPRESSLY RESERVES THE RIGHT TO SUPERSEDE, CANCEL, AND/OR DECLARE OBSOLETE, WITHOUT PRIOR NOTICE, ANY PART, PART NUMBER, KIT, OR PUBLICATION REFERENCED IN THIS HANDBOOK.

REVISING THE HANDBOOK

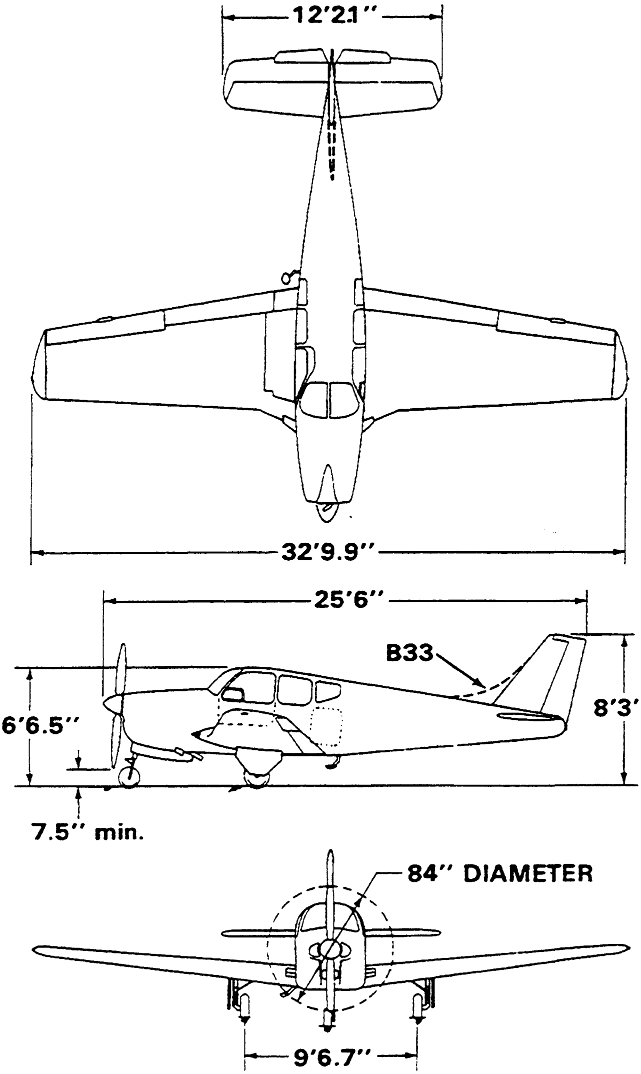
Immediately following the title page is the "Log of Revisions" page(s). The Log of Revisions pages are used for maintaining a listing of all effective pages in the handbook (except the SUPPLEMENTS section), and as a record of revisions to these pages. In the lower right corner of the outlined portion of the Log of Revisions is a box containing a capital letter which denotes the issue or reissue of the handbook. This letter may be suffixed by a number which indicates the numerical revision. When a revision to any information in the handbook is made, a new Log of Revisions will be issued. All Logs of Revisions must be retained in the handbook to provide a current record of material status until a reissue is made.

WARNING

When this handbook is used for airplane operational purpose it is the pilot's responsibility to maintain it in current status.

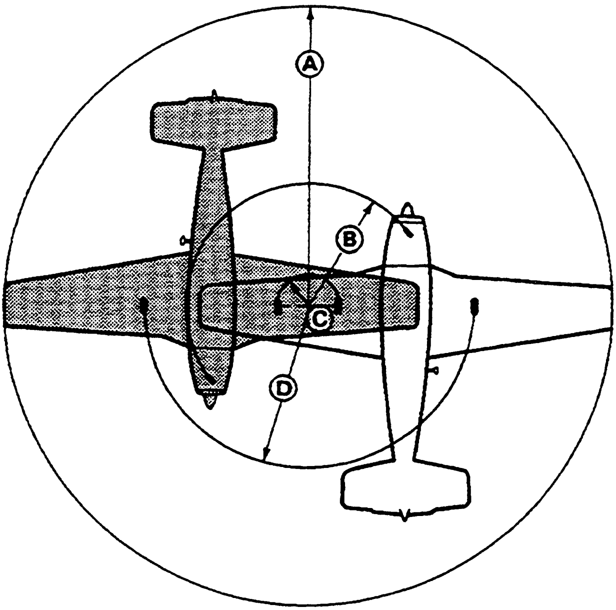
SUPPLEMENTS REVISION RECORD

Section IX contains supplements and a Log of Supplements page. On the "Log" page is a listing of supplemental equipment available for installation on the BEECHCRAFT Debonair. When new supplements are received or existing supplements revised, a new "Log" page will replace the previous one. Be sure to check and retain the "Log" page with the latest date that is shown at the bottom of the page. The supplemental material will be added to the grouping in accordance with the descriptive listing.



AIRPLANE THREE VIEW

GROUND TURNING CLEARANCE



(A)	Radius for Wing Tip	26 ft. 4 in.
(B)	Radius for Nose Wheel	12 ft. 2 in.
(C)	Radius for Inside Gear	5 ft. 1 in.
(D)	Radius for Outside Gear	14 ft. 8 in.

TURNING RADII ARE CALCULATED USING FULL STEERING, ONE BRAKE AND PARTIAL POWER.

DESCRIPTIVE DATA

ENGINE

The BEECHCRAFT Debonair A33 and B33 are both powered by a Continental six-cylinder, horizontally-opposed engine. The IO-470-J (installed on 33 series airplanes, serials prior to CD-301 and including CD-386 and CD-387) is a wet sump, fuel-injection engine, rated at 225 hp at 2600 rpm for take-off and maximum continuous operation. The IO-470-K (CD-301 through CD-813 except CD-386 and CD-387) is identically rated but not directly interchangeable with the IO-470-J engine.

PROPELLER

(A33 and B33)

Hartzell constant speed, two blade, 84 inch diameter propeller using a Hartzell BHC-92ZF-1D1 hub with 8447 blades.

or

Flottorp constant speed, two blade, 84 inch diameter propeller using a Flottorp F12A series hub with 8400-0 blades.

(B33 ONLY)

McCauley constant speed, two blade, 84 inch diameter propeller using a McCauley 2A36C23 hub with 84B-0 blades.

NOTE

Other propellers are approved but not installed as original equipment. These are listed in the FAA Aircraft Specification 3A15 or approved by Supplemental Type Certificate.

FUEL

Aviation Gasoline 80/87 (red) minimum grade or alternate grades 100LL (blue) or 100 (green). See Engine Manufacturer's Bulletin.

STANDARD SYSTEM

Total Capacity .... 50 gal.
Total Usable .... 44 gal.

OPTIONAL SYSTEM (A33)

Total Capacity .... 70 gal.
Total Usable .... 63 gal.

OPTIONAL SYSTEM (B33)

Total Capacity .... 80 gal.
Total Usable .... 74 gal.

OIL CAPACITY

The oil capacity is 10 quarts.

WEIGHTS

Maximum Ramp Weight .... 3010 lbs
Maximum Take-Off Weight .... 3000 lbs
Maximum Landing Weight .... 3000 lbs
Maximum Zero Fuel Weight ...... No Structural Limit
Maximum Weight in
Baggage Compartment .... 270 lbs.

CABIN AND ENTRY DIMENSIONS

Length .... 6 ft 11 in.
Height .... 4 ft 2 in.
Width .... 3 ft 6 in.
Cabin Door .... 37 in. wide by 36 in. high

BAGGAGE SPACE AND ENTRY DIMENSIONS

Compartment Volume	16.5 cu ft
With Utility Shelf	22.4 cu ft
Door Width (Minimum)	18.5 in.
Door Height (Minimum)	22.5 in.

SPECIFIC LOADINGS (Maximum Take-Off Weight)

Wing Loading at gross weight	16.9 lbs/sq ft
Power Loading at gross weight	13.3 lbs/hp

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

CAS Calibrated Airspeed is the indicated speed of an airplane, corrected for position and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.

GS Ground Speed is the speed of an airplane relative to the ground.

IAS Indicated Airspeed is the speed of an airplane as shown on the airspeed indicator when corrected for instrument error. IAS values published in this handbook assume zero instrument error.

KCAS Calibrated Airspeed expressed in "knots".

KIAS Indicated Airspeed expressed in "knots".

TAS True Airspeed is the airspeed of an airplane relative to undisturbed air which is the CAS corrected for altitude, temperature, and compressibility.

V_A Maneuvering Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane.

V_{FE} Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.

V_{LE} Maximum Landing Gear Extended Speed is the maximum speed at which an airplane can be safely flown with the landing gear extended.

V_{LO} Maximum Landing Gear Operating Speed is the maximum speed at which the landing gear can be safely extended or retracted.

V_{NE} Never Exceed Speed is the speed limit that may not be exceeded at any time.

V_{NO} or V_C Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air and then only with caution.

V_S Stalling Speed or the minimum steady flight speed at which the airplane is controllable.

V_{SO} Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration.

V_X Best Angle-of-Climb Speed is the airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance.

V_Y Best Rate-of-Climb Speed is the airspeed which delivers the greatest gain in altitude in the shortest possible time.

METEOROLOGICAL TERMINOLOGY

ISA International Standard Atmosphere in which
(1) The air is a dry perfect gas;
(2) The temperature at sea level is 15° Celsius (59° Fahrenheit);
(3) The pressure at sea level is 29.92 in Hg. (1013.2 millibars);
(4) The temperature gradient from sea level to the altitude at which the temperature is -56.5° C (-69.7° F) is -0.00198° C (-0.003566° F) per foot and zero above that altitude.

OAT Outside Air Temperature is the free air static temperature, obtained either from inflight temperature indications adjusted for instrument error and compressibility effects, or ground meteorological sources.

Indicated Pressure Altitude	The number actually read from an altimeter when the barometric sub-scale has been set to 29.92 in Hg. (1013.2 millibars).
Pressure Altitude	Altitude measured from standard sea-level pressure (29.92 in. Hg) by a pressure or barometric altimeter. It is the indicated pressure altitude corrected for position and instrument error. In this Handbook, altimeter instrument errors are assumed to be zero. Position errors may be obtained from the Altimeter Correction Graph.
Station Pressure	Actual atmospheric pressure at field elevation.
Wind	The wind velocities recorded as variables on the charts of this hand-book are to be understood as the head-wind or tailwind components of the reported winds.

POWER TERMINOLOGY

Take off and Maximum Continuous	Highest power rating not limited by time.
Cruise Climb	Power recommended for cruise climb.

ENGINE CONTROLS AND INSTRUMENTS

Throttle Control	Used to control power by introducing fuel-air mixture into the intake passages of the engine. Settings are reflected by readings on the manifold pressure gage.
Propeller Control	This control requests the propeller governor to maintain engine/propeller rpm at a selected value by controlling propeller blade angle.
Mixture Control	This control is used to set fuel pressure (flow) in all modes of operation and cuts off fuel completely for engine shut down.
EGT (Exhaust Gas Temperature Indicator)	This indicator is used to identify the lean and best power fuel pressure (flow) for various power settings.
Tachometer	Indicates the rpm of the engine/propeller.
Propeller Governor	Regulates the rpm of the engine/propeller by increasing or decreasing the propeller pitch through a pitch change mechanism in the propeller hub.

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Climb Gradient	The ratio of the change in height during a portion of a climb, to the horizontal distance traversed in the same time interval.
Demonstrated Crosswind Velocity	The demonstrated crosswind velocity is the velocity of the crosswind component for which adequate control of the airplane during take-off and landing was actually demonstrated during certification tests. The value shown is considered to be limiting.
MEA	Minimum enroute IFR altitude.
Route Segment	A part of a route. Each end of that part is identified by: (1) a geographical location; or (2) a point at which a definite radio fix can be established.
GPH	U.S. Gallons per hour.
PPH	Pounds per hour.

WEIGHT AND BALANCE TERMINOLOGY

Reference Datum	An imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	A location along the airplane fuselage usually given in terms of distance from the reference datum.

Arm	The horizontal distance from the reference datum to the center of gravity (C.G.) of an item.
Moment	The product of the weight of an item multiplied by its arm. (Moment divided by a constant is used to simplify balance calculations by reducing the number of digits.)
Airplane Center of Gravity (C.G.)	The point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.
C.G. Arm	The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.
C.G. Limits	The extreme center of gravity locations within which the airplane must be operated at a given weight.
Usable Fuel	Fuel available for flight planning.
Unusable Fuel	Fuel remaining after a runout test has been completed in accordance with governmental regulations.
Standard Empty Weight	Weight of a standard airplane including unusable fuel, full operating fluids and full oil.
Basic Empty Weight	Standard empty weight plus optional equipment.

Payload	Weight of occupants, cargo and baggage.
Useful Load	Difference between take-off weight, or ramp weight if applicable, and basic empty weight.
Maximum Ramp Weight	Maximum weight approved for ground maneuvering. (It includes weight of start, taxi, and run-up fuel).
Maximum Take-off Weight	Maximum weight approved for the start of the take-off run.
Maximum Landing Weight	Maximum weight approved for the landing touchdown.
Zero Fuel Weight	Weight exclusive of usable fuel.
Tare	The weight of chocks, blocks, stands, etc., used on the scales when weighing an airplane.
Leveling Points	Those points which are used during the weighing process to level the airplane.
Jack Points	Points on the airplane identified by the manufacturer as suitable for supporting the airplane for weighing or other purposes.

SECTION II

LIMITATIONS

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The limitations included in this section have been approved by the Federal Aviation Administration.

The following limitations must be observed in the operation of this airplane.

AIRSPEED LIMITATIONS

SPEED	CAS KNOTS	CAS MPH	IAS KNOTS	IAS MPH	REMARKS
Never Exceed V_{NE}	195	225	197	227	Do not exceed this speed in any operation
Maximum Structural Cruising V_{NO} or V_C	161	185	162	186	Do not exceed this speed except in smooth air and then only with caution
Maneuvering V_A	128	147	129	148	Do not make full or abrupt control movements above this speed
Maximum Flap Extension/ Extended V_{FE}	104	120	106	122	Do not extend flaps or operate with flaps extended above this speed
Maximum Landing Gear Operating/ Extended V_{LO} and V_{LE}	A33 122	140	122	140	Do not extend, retract or operate with landing gear extended above this speed except in emergency
	B33 143	165	144	166	

*AIRSPEED INDICATOR MARKINGS

MARKING	CAS		IAS		SIGNIFICANCE
	KNOTS	MPH	KNOTS	MPH	
White Arc	52-104	60-120	52-106	60-122	Full Flap Operating Range
Green Arc	62-161	71-185	61-162	70-186	Normal Operating Range
Yellow Arc	161-195	185-225	162-197	186-227	Operate with caution only in smooth air
Red Line	195	225	197	227	Maximum speed for ALL operations

*The Airspeed Indicator is marked in CAS values

POWER PLANT LIMITATIONS

ENGINE

Continental IO-470-J or IO-470-K (A33) or IO-470-K (B33) fuel injected engine.

OPERATING LIMITATIONS

Engine Speed .... 2600 rpm
Cylinder Head Temperature .... 460°F/238°C
Oil Temperature .... 225°F/107°C
Oil Pressure
    Minimum .... 30 psi
    Maximum .... 80 psi
Fuel Pressure
    Minimum .... 1.5 psi
    Maximum .... 17.5 psi
    Mixture - Set per leaning instructions on performance charts.

FUEL GRADES

Aviation Gasoline 80/87 (red) minimum grade or alternate grades 100LL (blue) or 100 (green). See Engine Manufacturer's Bulletin.

OIL SPECIFICATIONS

Ashless dispersant oils must meet Teledyne Continental Motors Corporation Specification MHS-24B. Refer to APPROVED ENGINE OILS in the Handling, Servicing, and Maintenance section

PROPELLER SPECIFICATIONS

(A33 and B33)

Hartzell constant speed propeller
- Hub: BHC-92ZF-1D1
- Blades: 8447
- Diameter: Maximum 84 in., Minimum 82 in.
- Pitch settings at 33 in. sta.:
  - Low 11°, High not under 26°

or

Flottorp constant speed, two blade propeller
- Hub: Flottorp F12A-4
- Blades: 8400-0
- Diameter: Maximum 84 in.., Minimum 82 in.
- Pitch Settings at 33 in.. sta.:
  - Low - 11.7° ± 0.2° each blade within 0.2° of each other
  - High - not under 30°

(B33 ONLY)

Flottorp constant speed, two blade propeller
- Hub: Flottorp F12A-5
- Blades: 8400-0
- Diameter: Maximum 84 in.., Minimum 82 in.
- Pitch Settings at 33 in.. sta.:
  - Low - 11.7° ± 0.2° each blade within 0.2° of each other
  - High - not under 30°

or

McCauley constant speed, two blade propeller
- Hub: 2A36C23
- Blades: 84B-0
- Diameter: Maximum 84 in., Minimum 82 in.
- Pitch settings at 30 in. sta.:
  - Low 12°, High - not under 29.2°

NOTE

Other propellers are approved but not installed as original equipment. These are listed in the FAA Aircraft Specification 3A15 or approved by Supplemental Type Certificate.

POWER PLANT INSTRUMENT MARKINGS

OIL TEMPERATURE
- Caution (Yellow Radial) .... 100°F/38°C
- Operating Range (Green Arc) .... 100° to 225°F/38° to 107°C
- Maximum (Red Radial) .... 225°F/107°C

OIL PRESSURE
- Minimum Pressure (Red Radial) .... 30 psi
- Operating Range (Green Arc) .... 30 to 60 psi
- Maximum Pressure (Red Radial) .... 80 psi

TACHOMETER
- Operating Range (Green Arc) ... 2000 to 2600 rpm
- Maximum RPM (Red Radial) .... 2600 rpm

FUEL PRESSURE (A33)
- Minimum (Red Radial) .... 1.5 psi
- Operating Range (Green Arc) .... 4.25 to 17 psi
- Maximum (Red Radial) .... 17.5 psi

FUEL FLOW (B33)
- Minimum (Red Radial) .... 1.5 psi
- Operating Range (Green Arc) .... 6.9 to 21.6 gph
- Maximum (Red Radial) .... 17.5 psi

CYLINDER HEAD TEMPERATURE
Operating Range
(Green Arc) .... 200° to 460°F/93° to 238°C
Maximum Temperature
(Red Radial) .... 460°F/238°C

MANIFOLD PRESSURE
Operating Range
(Green Arc) .... 15 to 29.6 in. Hg
Maximum (Red Radial) .... 29.6 in. Hg

MISCELLANEOUS INSTRUMENT MARKINGS

INSTRUMENT VACUUM
A33 With Autopilot
Minimum (Red Radial) .... 3.75 in. Hg
Operating Range (Green Arc) .. 3.75 to 4.25 in. Hg
Maximum (Red Radial) .... 4.6 in. Hg
Without Autopilot
Minimum (Red Radial) .... 4.4 in. Hg
Operating Range (Green Arc) ..... 4.8 to 5.2 in. Hg
Maximum (Red Radial) .... 5.5 in. Hg
B33
Minimum (Red Radial) .... 3.75 in. Hg
Operating Range (Green Arc) .. 3.75 to 5.25 in. Hg
Maximum (Red Radial) .... 5.25 in. Hg

FUEL QUANTITY
Yellow Band (44-gallon system) ...... E to 1/2 full
Yellow Band (63-gal sys, main tanks) . E to 1/2 full
Yellow Band (74-gallon system) ...... E to 3/8 full

WEIGHT LIMITS

Maximum Ramp Weight .... 3010 lbs
Maximum Take-off
and Landing Weight .... 3000 lbs
Zero Fuel Weight .... No Structural Limitation
Maximum Baggage Compartment
Load .... 270 lbs.

CENTER OF GRAVITY LIMITS (Gear Down)

Forward: 77.0 inches aft of datum to 2500 lbs (A33)/2600 lbs (B33) with straight line variation to 82.1 inches at 3000 lbs.

Aft: 86.7 inches aft of datum at all weights.

REFERENCE DATUM

Datum is 83.1 inches forward of center line through forward jack points.

MAC leading edge is 66.7 inches aft of datum.
MAC length is 65.3 inches.

MANEUVER LIMITS

This is a utility category airplane. Spins are prohibited. No acrobatic maneuvers are approved except those listed below. Maximum slip duration is 30 seconds for airplanes with baffled main fuel cells in both wings and 20 seconds for airplanes with unbaffled main fuel cells in either wing.

APPROVED MANEUVERS (3000 POUNDS)

MANEUVER	ENTRY SPEED (CAS)
Chandelle	128 kts/147 mph
Steep Turn	128 kts/147 mph
Lazy Eight	128 kts/147 mph
Stall (Except Whip)	Use slow deceleration

Minimum fuel for above maneuvers - 10 gallons each main tank.

Spins are prohibited.

FLIGHT LOAD FACTORS (3000 POUNDS)

Positive Maneuvering Load Factors

Flaps Up	4.4G
Flaps Down	2.0G

MINIMUM FLIGHT CREW

One (1) Pilot

KINDS OF OPERATION LIMITS

1. VFR day and night
2. IFR day and night

REQUIRED EQUIPMENT FOR VARIOUS CONDITIONS OF FLIGHT

Federal Aviation Regulations (91.3(a), 91.24, 91.25, 91.32, 91.33, 91.52, 91.90, 91.97, 91.170) 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, and IFR night.

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 temporarily.

For the sake of brevity, the Required Equipment Listing does not include obviously required items such as wings, rudders, flaps, engine, landing gear, etc. Also the list does not include items which do not affect the airworthiness of the airplane such as 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.

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 on his airplane, will limit the conditions under which he may operate the airplane.

WARNING

FLIGHT IN KNOWN ICING CONDITIONS PROHIBITED.

LEGEND

(-) Indicates that the item may be inoperative for the specified condition.
(*) Refer to the REMARKS AND/OR EXCEPTIONS column for explicit information or reference.

SYSTEM and/or COMPONENT	*VFR Day*	*VFR Night*	*IFR Day*	*IFR Night*	*Remarks and/or Exceptions*
GENERAL					
Overwater flight	*	*	*	*	-*Per FAR 91.33
ATA 100 CHAPTER 23 COMMUNICATIONS					
VHF communications system	*	*	*	*	-*Per FAR 91.33
ATA 100 CHAPTER 24 ELECTRICAL POWER					
Battery	1	1	1	1	
DC alternator/generator	1	1	1	1	

ATA 100 CHAPTER 25 EQUIPMENT AND FURNISHING					
Seat belts	1	1	1	1	- Per Person or Per FAR 91.33
Shoulder harness	*	*	*	*	-*Pilot and copilot if installed
Emergency locator transmitter	1	1	1	1	- Per FAR 91.52
ATA 100 CHAPTER 26 FIRE PROTECTION					
Portable fire extinguisher	*	*	*	*	-*Optional
ATA 100 CHAPTER 27 FLIGHT CONTROLS					
Elevator trim tab indicator	1	1	1	1	- May be inoperative for ferry flight provided tabs are visually checked in the neutral position prior to take-off and checked for full range of operation.

SYSTEM and/or COMPONENT	*VFR Day*	*VFR Night*	*IFR Day*	*IFR Night*	*Remarks and/or Exceptions*
Flap position indication lights	2	2	2	2	- May be inoperative providing flap travel is visually inspected prior to take-off.
Stall warning	1	1	1	1	
ATA 100 CHAPTER 28 FUEL EQUIPMENT					
Auxiliary fuel pump	1	1	1	1	
Engine driven fuel pump	1	1	1	1	
Fuel quantity indicator	2	2	2	2	- One may be inoperative provided other side is operational and amount of fuel on board can be established to be adequate for the intended flight.
Fuel pressure (flow) indicator	1	1	1	1	

ATA 100 CHAPTER 30 ICE AND RAIN PROTECTION					
Pitot heater	*	*	1	1	-*Optional
ATA 100 CHAPTER 32 LANDING GEAR					
Landing gear motor	1	1	1	1	- May be inoperative provided operations are continued only to a point where repairs can be accomplished. Gear must be left down. Do not retract gear with hand crank.
Landing gear position indication lights	2	2	2	2	
Landing gear aural warning horn	1	1	1	1	

SYSTEM and/or COMPONENT	*VFR Day*	*VFR Night*	*IFR Day*	*IFR Night*	*Remarks and/or Exceptions*
ATA 100 CHAPTER 33 LIGHTS					
Cockpit and instrument lights	-	*	-	*	-*Lights must be operative.
Landing light	-	*	-	*	-*Per FAR 91.33
Rotating beacon	-	1	-	1	
Position light	-	3	-	3	
ATA 100 CHAPTER 34 NAVIGATION INSTRUMENTS					
Altimeter	1	1	1	1	
Airspeed indicator	1	1	1	1	

Vertical speed	*	*	*	*	-*Optional
Magnetic compass	1	1	1	1	
Attitude indicator	-	-	1	1	
Turn and slip indicator	-	-	1	1	
Directional gyro	-	-	1	1	
Clock	-	-	1	1	
Transponder	*	*	*	*	-*Per FAR 91.24, 91.90, 91.97
Navigation equipment	-	-	*	*	-*Per FAR 91.33
ATA 100 CHAPTER 35 OXYGEN					
Oxygen system	*	*	*	*	-*Per FAR 91.32
ATA 100 CHAPTER 37 VACUUM					
Vacuum system for instrument air	-	-	1	1	
Vacuum gage	-	-	1	1	

SYSTEM and/or COMPONENT	*VFR Day*	*VFR Night*	*IFR Day*	*IFR Night*	*Remarks and/or Exceptions*
ATA 100 CHAPTER 77 ENGINE INDICATING INSTRUMENTS					
Engine tachometer indicator	1	1	1	1	
Manifold pressure indicator	1	1	1	1	
ATA 100 CHAPTER 79 ENGINE OIL INSTRUMENTS					
Oil pressure indicator	1	1	1	1	
Oil temperature indicator	1	1	1	1	

FUEL

STANDARD SYSTEM

Total Capacity	50 gal.
Total Usable	44 gal.

OPTIONAL SYSTEM (A33)

Total Capacity	70 gal.
Total Usable	63 gal.

OPTIONAL SYSTEM (B33)

Total Capacity	80 gal.
Total Usable	74 gal.

FUEL MANAGEMENT

Take-off on left main tank. (A33)

Use auxiliary fuel in level flight only and do not use for take off or landing. Use at least 10 gallons from left main tank before use of auxiliary fuel.

Take off on main tank that is more nearly full. (B33)

When operating fuel selector, feel for detent position.

Do not take off when Fuel Quantity Gages indicate in Yellow Band or with less than 13 gallons in each main tank.

Maximum slip duration:

30 seconds for airplanes with baffled main fuel cells in both wings.

20 seconds for airplanes with unbaffled main fuel cells in either wing.

SEATING

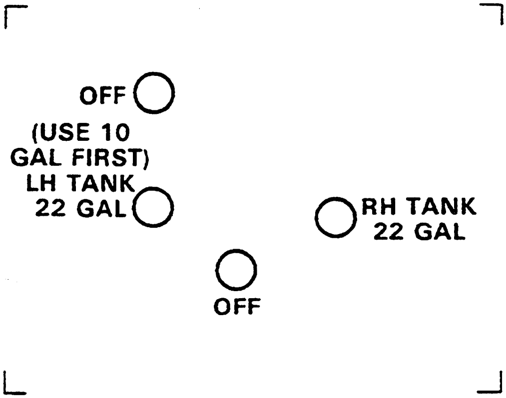
All seats must be in the upright position for take-off and landing.

PLACARDS

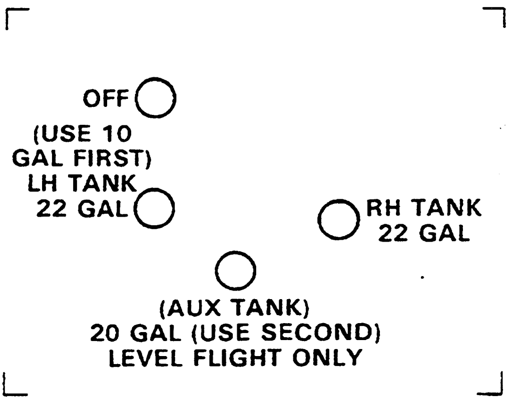
On Fuel Selector Panel: (A33)

DO NOT TAKE OFF IF FUEL QUANTITY GAGES INDICATE IN YELLOW BAND OR WITH LESS THAN 13 GALLONS IN EACH MAIN TANK

Standard 44 Gallon (Usable) System: (A33)



Optional 63 Gallon (Usable) Fuel System: (A33)



Temporary Change to the Pilot's Operating Handbook *and* FAA Approved Airplane Flight Manual

P/N 33-590000-17BTC1

Publication Affected	35-A33 & 35-B33 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual (P/N 33-590000-17B, Reissued August, 1979 or Subsequent)
Airplane Serial Numbers Affected	CD-225 thru CD-232, CD-235, CD-237 thru CD-240, CD-242 thru CD-245 and CD-251 thru CD-813
Description of Change	The addition of a placard to the fuel selector to warn of the no-flow condition that exists between the fuel selector detents.
Filing Instructions	Insert this temporary change into the 35-A33 & 35-B33 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual immediately following page 2-20 (Section II, LIMITATIONS) and retain until rescinded or replaced.

LIMITATIONS

PLACARDS

Located On The Face Of The Fuel Selector Valve, For Those Airplanes In Compliance With S.B. 2670:

WARNING - POSITION SELECTOR IN DETENTS ONLY - NO FUEL FLOW TO ENGINE BETWEEN DETENTS

Approved:

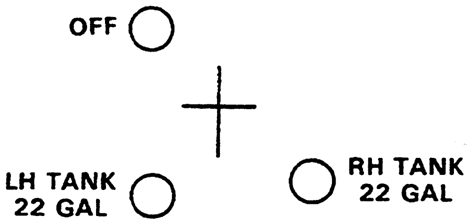
A.C. Jackson

A.C. Jackson
Raytheon Aircraft Company
DOA CE-2

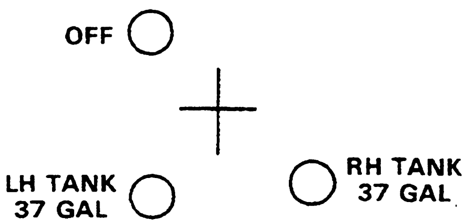
On Fuel Selector Panel: (B33)

DO NOT TAKE OFF IF FUEL QUANTITY GAGES INDICATE IN YELLOW BAND OR WITH LESS THAN 13 GALLONS IN EACH MAIN TANK

Standard 44 Gallon (Usable) System: (B33)



Optional 74 Gallon (Usable) Fuel System: (B33)



PLACARDS

*Above Emergency Landing Gear Extension Handle:
(A33 & B33)*

EMERGENCY LANDING GEAR
INSTRUCTIONS TO EXTEND
ENGAGE HANDLE IN REAR OF FRONT SEAT AND TURN COUNTERCLOCKWISE AS FAR AS POSSIBLE (50 TURNS)

Above Landing Gear Mechanical Position Indicator When Winter Baffles Are Installed: (A33 & B33)

NOTICE
REMOVE WINTER BAFFLES WHEN OAT EXCEEDS 70° F

On Right Hand Subpanel: (A33)

FIRE DOOR
PULL TO CLOSE

On Left Subpanel: (B33)

VENT SHUTOFF

PULL TO CLOSE

On Inner Side Of Baggage Compartment Door: (A33 & B33)

BAGGAGE COMPARTMENT
LOAD IN ACCORDANCE WITH
AIRPLANE FLIGHT MANUAL
MAXIMUM STRUCTURAL CAPACITY — 270 POUNDS

On Storm Window: (A33 & B33)

CAUTION

DO NOT OPEN ABOVE
145 MPH (126 KNOTS)

PLACARDS

In Full View of Pilot:

(A33)

UTILITY CATEGORY AIRPLANE

OPERATE IN ACCORDANCE WITH FAA
APPROVED AIRPLANE FLIGHT MANUAL

INTENTIONAL SPINS PROHIBITED

NO ACROBATIC MANEUVERS APPROVED
EXCEPT THOSE LISTED IN THE AIRPLANE
FLIGHT MANUAL

(B33)

AIR SPEED LIMITATION

MAXIMUM SPEED WITH LANDING GEAR EXTENDED (NORMAL) 165 MPH. (143 KTS) MAXIMUM DESIGN MANEUVERING SPEED 147 MPH. (128 KTS)

UTILITY CATEGORY AIRPLANE

OPERATE IN ACCORDANCE WITH FAA APPROVED AIRPLANE FLIGHT MANUAL.

INTENTIONAL SPINS PROHIBITED

NO ACROBATIC MANEUVERS APPROVED EXCEPT THOSE LISTED IN THE AIRPLANE FLIGHT MANUAL.

(A33 & B33)

AUX FUEL PUMP OPERATION
TAKE-OFF AND LAND WITH AUX FUEL PUMP OFF EXCEPT IN CASE OF LOSS OF FUEL PRESSURE

(A33)

AIRSPEED LIMITATION
MAXIMUM SPEED WITH LANDING GEAR EXTENDED (NORMAL) 140 MPH MAXIMUM DESIGN MANEUVERING SPEED 147 MPH.

Above Inside Door Handle:

(A33)

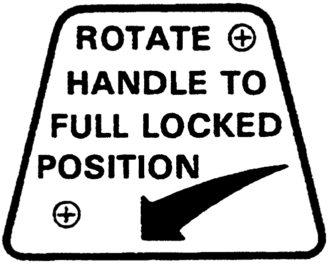
CAUTION

AFTER CLOSING
DOOR ROTATE
HANDLE TO FULL
LOCKED POSITION

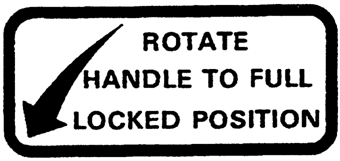
PLACARDS (CONT)

Above Inside Door Handle: (Cont)

(B33)



or



In Full View Of The Pilot:
(Unless baffled main fuel cells are installed in both wings)

TURNING TYPE TAKEOFFS, AND TAKEOFF IMMEDIATELY FOLLOWING FAST TAXI TURN PROHIBITED. AVOID PROLONGED SLIPS (20 SECONDS OR MORE) WITH FUEL TANKS LESS THAN HALF FULL.

SECTION III

EMERGENCY PROCEDURES

TABLE OF CONTENTS

SUBJECT *PAGE*

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EMERGENCY AIRSPEEDS

Emergency Descent	144 kts/166 mph
Glide	105 kts/121 mph
Emergency Landing Approach	79 kts/91 mph

CAUTION

The approach airspeed is higher than normal to assure the availability of control during flare without power.

All airspeeds quoted in this section are indicated airspeeds (IAS).

The following information is presented to enable the pilot to form, in advance, a definite plan of action for coping with the most probable emergency situations which could occur in the operation of the airplane. Where practicable, the emergencies requiring immediate corrective action are treated in check list form for easy reference and familiarization. Other situations, in which more time is usually permitted to decide on and execute a plan of action, are discussed at some length.

ENGINE FAILURE

DURING TAKE-OFF GROUND ROLL

1. Throttle - CLOSED
2. Braking - MAXIMUM
3. Fuel Selector Valve - OFF
4. Battery and Generator Switches - OFF

AFTER LIFTOFF AND IN FLIGHT

Landing straight ahead is usually advisable. If sufficient altitude is available for maneuvering, accomplish the following:

1. Fuel Selector Valve - SELECT OTHER MAIN TANK (Check to feel detent)
2. Auxiliary Fuel Pump - ON
3. Mixture - FULL RICH, then LEAN as required
4. Magnetos - CHECK LEFT and RIGHT, then BOTH

NOTE

The most probable cause of engine failure would be loss of fuel flow or improper functioning of the ignition system.

If No Restart

1. Select most favorable landing site.
2. See EMERGENCY LANDING procedure.
3. The use of landing gear is dependent on the terrain where landing must be made.

ENGINE DISCREPANCY CHECKS

CONDITION: ROUGH RUNNING ENGINE

1. Mixture - FULL RICH, then LEAN as required
2. Ignition Switch - CHECK LEFT and RIGHT, then BOTH

CONDITION: LOSS OF ENGINE POWER

1. Fuel Pressure/Flow Gage - CHECK

If fuel pressure is abnormally low:

a. Mixture - FULL RICH
b. Auxiliary Fuel Pump - ON (Lean as required)
c. Auxiliary Fuel Pump - OFF if performance does not improve in a few moments.

2. Fuel Quantity Indicator - CHECK for fuel supply in tank being used.

If tank being used is empty:

Fuel Tank Selector Valve - SELECT ANOTHER FUEL TANK (feel for detent)

AIR START PROCEDURE

a. Fuel Selector Valve - SELECT MAIN TANK MORE NEARLY FULL (check to feel detent)
b. Throttle - RETARD
c. Mixture - FULL RICH
d. Auxiliary Fuel Pump - ON until power is regained, then OFF. (Leave on if engine driven fuel pump is inoperative.)
e. Throttle - ADVANCE to desired power
f. Mixture - LEAN as required

ENGINE FIRE

IN FLIGHT

The red FIRE DOOR control on the outboard side of the right lower subpanel (A33) or red VENT SHUTOFF control on the outboard side of the left lower subpanel (B33) is used to close off all heating system outlets so that smoke and fumes will not enter the cabin. In the event of engine fire, shut down the engine as follows and make a landing:

1. Fire Door/Vent Shutoff Control - PULL TO CLOSE
2. Mixture - IDLE CUT-OFF
3. Fuel Selector Valve - OFF
4. Battery and Generator Switches - OFF (Extending the landing gear can be accomplished manually if desired.)
5. Do not attempt to restart engine.

ON THE GROUND

1. Mixture - IDLE CUT-OFF
2. Fuel Selector Valve - OFF
3. Battery, Generator and Ignition Switches - OFF
4. Extinguish with Fire Extinguisher.

MAXIMUM GLIDE CONFIGURATION

1. Landing Gear - UP
2. Flaps - UP
3. Propeller - PULL for LOW RPM
4. Airspeed - 105 kts/121 mph

Glide distance is approximately 1.7 nautical miles (2 statute miles) per 1000 feet of altitude above the terrain.

EMERGENCY DESCENT

1. Power - IDLE
2. Propeller - HIGH RPM
3. Landing Gear - DOWN
4. Airspeed - ESTABLISH 144 kts/166 mph

LANDING EMERGENCIES

LANDING WITHOUT POWER

The approach speed is higher than normal to assure the availability of control during flare without power. When assured of reaching the landing site selected, and on final approach:

1. Airspeed - 79 kts/91 mph
2. Fuel Selector Valve - OFF
3. Mixture - IDLE CUT-OFF
4. Flaps - AS REQUIRED
5. Landing Gear - DOWN OR UP, DEPENDING ON TERRAIN
6. Battery and Generator Switches - OFF

LANDING GEAR RETRACTED - WITH POWER

If possible, choose firm sod or foamed runway. Make a normal approach, using flaps as necessary. When you are sure of making the selected landing spot:

1. Throttle - CLOSED
2. Mixture - IDLE CUT-OFF
3. Battery and Generator Switches - OFF
4. Fuel Selector Valve - OFF
5. Keep wings level during touchdown.
6. Get clear of the airplane as soon as possible after it stops.

SYSTEMS EMERGENCIES

PROPELLER OVERSPEED

1. Throttle - RETARD TO RED LINE
2. Airspeed - REDUCE
3. Oil Pressure - CHECK

WARNING

> If loss of oil pressure was the cause of overspeed, the engine will seize after a short period of operation.

4. Land - SELECT NEAREST SUITABLE SITE and follow LANDING EMERGENCIES procedure.

GENERATOR OUT PROCEDURE

A failure of the generator will place the entire electrical operation of the aircraft on the battery. Generator failure may be indicated by the ammeter. When a generator failure occurs in flight, all non-essential electrical load should be discontinued to conserve the battery life.

LANDING GEAR MANUAL EXTENSION

Manual extension of the landing gear can be facilitated by first reducing airspeed. Then proceed as follows:

1. LDG GEAR Circuit Breaker - OFF (PULL OUT)
2. Landing Gear Switch Handle - DOWN position
3. Handcrank Handle Cover (at rear of front seats) - REMOVE
4. Handcrank - ENGAGE and TURN COUNTERCLOCKWISE AS FAR AS POSSIBLE (approximately 50 turns)

CAUTION

The manual extension system is designed to lower the landing gear only. DO NOT ATTEMPT TO RETRACT THE GEAR MANUALLY.

5. If electrical system is operative, check landing gear position lights and warning horn (check LDG GEAR INDICATOR and LDG GEAR WARNING circuit breakers engaged).
6. Check mechanical landing gear indicator - DOWN
7. Handcrank - DISENGAGE. Always keep it stowed when not in use.

WARNING

Do not operate the landing gear electrically with the handcrank engaged, as damage to the mechanism could occur. After emergency landing gear extension, do not move any landing gear controls or reset any switches or circuit breakers until airplane is on jacks as failure may have been in the gear up circuit and gear might retract on the ground.

LANDING GEAR RETRACTION AFTER PRACTICE MANUAL EXTENSION

After practice manual extension of the landing gear, the gear may be retracted electrically, as follows:

1. Handcrank - CHECK, STOWED
2. Landing Gear Motor Circuit Breaker - IN
3. Landing Gear - RETRACT

UNLATCHED DOOR IN FLIGHT

If the cabin door is not locked it may come unlatched in flight. This may occur during or just after take-off. The door will trail in a position approximately 3 inches open, but the flight characteristics of the airplane will not be affected, except that rate of climb will be reduced. Return to the field in a normal manner. If practicable, during the landing flare-out have a passenger hold the door to prevent it from swinging open.

SPINS

Spins are prohibited. If a spin is entered inadvertently:

Immediately move the control column full forward and simultaneously apply full rudder opposite to the direction of the spin; continue to hold this control position until rotation stops and then neutralize all controls and execute a smooth pullout. Ailerons should be neutral and throttle in idle position at all times during recovery.

EMERGENCY SPEED REDUCTION

In an emergency, the landing gear may be used to create additional drag. Should disorientation occur under instrument conditions, the lowering of the landing gear will reduce the tendency for excessive speed build-up. This procedure would also be appropriate for a non-instrument rated pilot who unavoidably encounters instrument conditions or in other emergencies such as severe turbulence.

Should the landing gear be used at speeds higher than the maximum extension speed, a special inspection of the gear doors in accordance with shop manual procedures is required, with repair as necessary.

SECTION IV

NORMAL PROCEDURES

TABLE OF CONTENTS

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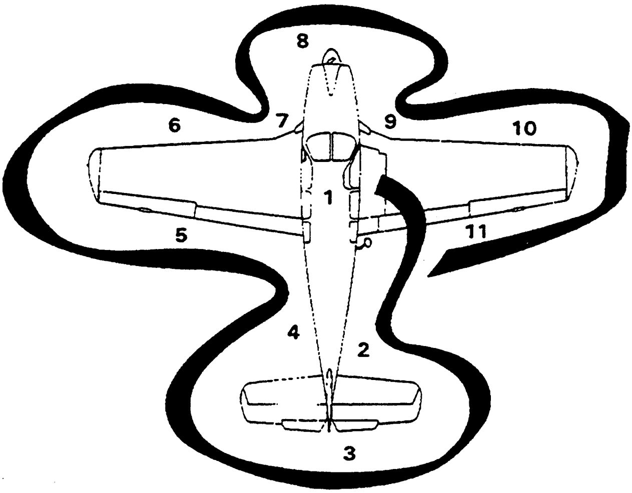
All airspeeds quoted in this section are indicated airspeeds (IAS)

SPEEDS FOR SAFE OPERATION

Take-off	
Lift-off	68 kts/78 mph
50 Ft.	74 kts/85 mph
Maximum Climb	
Best Rate (V_y)	90 kts/104 mph
Best Angle (V_x)	75 kts/86 mph
Cruise Climb	104 kts/120 mph
Maximum Turbulent Air Penetration	128 kts/147 mph
Balked Landing	61 kts/70 mph
Landing Approach	69 kts/79 mph
Maximum Demonstrated Crosswind	17 kts/20 mph

PREFLIGHT INSPECTION



Emergency Locator Transmitter - ARMED
Location may vary with individual airplanes

1. CABIN:
   a. Parking Brake - SET
   b. Control Lock - REMOVE
   c. All Switches - OFF

2. RIGHT FUSELAGE:
   a. Baggage Compartment Door - SECURE
   b. Static Pressure Button - UNOBSTRUCTED

3. EMPENNAGE:
   a. Control Surfaces - CHECK
   b. Tie Down - REMOVE
   c. Position Light - CHECK

4. LEFT FUSELAGE:
   a. Static Pressure Button - UNOBSTRUCTED
   b. All Antennas - CHECK

5. LEFT WING TRAILING EDGE:
   a. Flap - CHECK
   b. Aileron - CHECK
   c. Wing Tip - CHECK
   d. Position Light - CHECK

6. LEFT WING LEADING EDGE:
   a. Stall Warning - CHECK
   b. Pitot Tube - CHECK, (Remove Cover)
   c. Fuel Tank(s) - CHECK QUANTITY; Filler Cap(s) - SECURE.
   d. Cabin Air Intake - CHECK
   e. Tie Down and Chocks - REMOVE

7. LEFT LANDING GEAR:
   a. Wheel Well Door, Tire and Strut - CHECK
   b. Fuel Vent - CHECK
   c. Fuel Sump(s) - DRAIN
   d. Fuel Selector Valve Sump and Auxiliary Fuel Cell Interconnect Line - DRAIN (if installed); Cover - SECURE

8. NOSE SECTION:
   a. Engine Oil - CHECK (See Servicing, Section 8) Cap and Dipstick - SECURE
   b. Left Cowl - SECURE
   c. Propeller - CHECK, General Condition, Nicks, etc.
   d. Landing Light - CHECK
   e. Wheel Well Doors, Tire and Strut - CHECK
   f. Induction Air Intake - CLEAR
   g. Engine - CHECK GENERAL CONDITION
   h. Right Cowl - SECURE
   i. Chocks - REMOVE

9. RIGHT LANDING GEAR:
   a. Fuel Vent - CHECK
   b. Fuel Sump(s) - DRAIN
   c. Wheel Well Door, Tire and Strut - CHECK

10. RIGHT WING LEADING EDGE:
   a. Tie Down and Chocks - REMOVE
   b. Fuel Tank(s) - CHECK QUANTITY; Filler Cap(s) - SECURE

11. RIGHT WING TRAILING EDGE:
   a. Position Light - CHECK
   b. Wing Tip - CHECK
   c. Aileron - CHECK
   d. Flap - CHECK

CAUTION

NEVER TAXI IF ANY STRUT IS FLAT.

BEFORE STARTING

1. Seats - POSITION AND LOCK; Seat Backs - UPRIGHT
2. Seat Belts - FASTEN
3. Parking Brake - SET
4. All Avionics - OFF
5. Circuit Breakers - IN
6. Landing Gear Handle - DOWN
7. Flaps - UP
8. Light Switches - As Required
9. Fuel Selector Valve - CHECK OPERATION; SELECT LEFT MAIN TANK (A33) or TANK MORE NEARLY FULL (B33).
10. Battery and Generator Switches - ON (If external power is used, turn Generator Switch - OFF) (See Section 7)
11. Fuel Quantity Indicators - CHECK QUANTITY

WARNING

Do not take off if gages indicate in yellow arc or with less than 13 gallons in each main tank.

EXTERNAL POWER

When using external power, it is very important that the following precautions be observed:

1. The airplane has a negative ground system. Exercise care to avoid reversed polarity. Be sure to connect the positive lead of the external power unit to the positive terminal of the airplane's external power receptacle and the negative lead to the negative terminal of the external power receptacle. A positive voltage must also be applied to the small guide pin.
2. To prevent arcing, make certain no power is being supplied when the connection is made.

3. Make certain that the battery switch is ON, all avionics and electrical switches OFF, and a battery is in the system before connecting an external power unit. This protects the voltage regulators and associated electrical equipment from voltage transients (power fluctuations).

STARTING ENGINE USING AUXILIARY POWER UNIT

1. Battery Switch - ON
2. Generator/Alternator, Electrical, and Avionics Equipment - OFF
3. Auxiliary Power Unit - CONNECT
4. Auxiliary Power Unit - SET OUTPUT (13.5 to 14.25 volts)
5. Auxiliary Power Unit - ON
6. Engine - START using normal procedures
7. Auxiliary Power Unit - OFF (after engine has been started)
8. Auxiliary Power Unit - DISCONNECT
9. Generator/Alternator Switch - ON

STARTING (A33)

CAUTION

Vernier-type engine controls should not be rotated clockwise after being advanced to the full forward position.

1. Mixture - FULL RICH
2. Propeller - HIGH RPM
3. Throttle - Approximately 1/2 inch open
4. Ignition Switch - BOTH
5. Auxiliary Fuel Pump - ON (until fuel pressure stabilizes then OFF).

6. Starter Button - Press until engine starts.
7. In the Event of Overprime Condition:
   a. Mixture - IDLE CUT-OFF
   b. Throttle - OPEN
   c. Starter Button - PRESS
   d. As engine starts reduce throttle to IDLE and advance mixture to FULL RICH

NOTE

During hot starts, if there is an indication of vapor in the fuel system (fluctuating fuel pressure), switch the auxiliary fuel pump to ON to purge the system. Then turn it OFF.

8. Throttle - 1000 to 1200 rpm.
9. Oil Pressure - CHECK
10. External Power (if used) - DISCONNECT. Battery and Generator/Alternator Switches ON
11. All Engine Indicators - CHECK

STARTING (B33)

CAUTION

Vernier-type engine controls should not be rotated clockwise after being advanced to the full forward position.

1. Mixture - FULL RICH
2. Propeller - HIGH RPM
3. Throttle - Approximately 1/2 inch open
4. Ignition Switch - BOTH
5. Auxiliary Fuel Pump - On until fuel pressure (flow) peaks then OFF

6. Throttle - Approximately 1/4 inch open.
7. Ignition Switch - START position; release to BOTH position when engine fires
8. In Event of Overprime Condition:
   a. Mixture - IDLE CUT-OFF
   b. Throttle - OPEN
   c. Ignition Switch - START position
   d. As engine fires, reduce throttle to IDLE and advance the mixture control to FULL RICH

NOTE

During hot starts, the Auxiliary Fuel Pump is turned on momentarily after starting to purge system, then turned off.

9. Throttle - 1000 to 1200 rpm.
10. Oil Pressure - CHECK
11. External Power (if used) - DISCONNECT. Battery and Generator Switches ON.
12. All Engine Indicators - CHECK

AFTER STARTING, AND TAXI

1. Brakes - RELEASE AND CHECK
2. Avionics Equipment - ON, AS REQUIRED
3. Lights - AS REQUIRED

CAUTION

Do not operate engine above 1200 RPM until oil temperature reaches 75°F (24°C).

BEFORE TAKEOFF

1. Seat Belts - CHECK

NOTE

> All reclining seats must be in the upright position during take-off.

2. Parking Brake - SET
3. Radios - CHECK
4. Engine Instruments - CHECK
5. Flight Instruments - CHECK AND SET
6. Auxiliary Fuel Pump - CHECK OFF
7. Throttle - 1900 RPM
8. Propeller - EXERCISE to obtain 300 to 400 rpm drop; return to high rpm
9. Magnetos - CHECK at 1900 rpm on each magneto, variance between individual magnetos should not exceed 50 rpm, maximum drop not to exceed 100 rpm.
10. Trim - SET
    a. Aileron - NEUTRAL
    b. Elevator - 0° (3° nose up if only front seats are occupied)
11. Flaps - UP
12. Door and Window - SECURE
13. Controls - CHECK FREEDOM OF MOVEMENT
14. Mixture - FULL RICH (or as required by field elevation)
15. Brakes - RELEASED
16. Instruments - CHECK (Make final check of manifold pressure, fuel pressure (flow), and rpm at the start of the take-off run.)

TAKE-OFF

Take-Off Power .... Full Throttle, 2600 rpm

1. Power - SET TAKE-OFF POWER (Mixture - SET as required by field elevation)
2. Brakes - RELEASE THEN ACCELERATE to recommended speeds
3. Landing Gear - RETRACT (when positive rate of climb is established and insufficient runway remains for landing)
4. Airspeed - ESTABLISH DESIRED CLIMB SPEED (when clear of obstacles)

CLIMB

Maximum Continuous .... Full throttle, 2600 rpm
Cruise Climb ..... 25 in. Hg (or full throttle) 2500 rpm

1. Engine Temperatures - MONITOR
2. Power - SET AS DESIRED.
3. Mixture - SET FUEL FLOW/PRESSURE

CRUISE

See Cruise Charts in PERFORMANCE Section.

1. Power - SET
2. Mixture - SET FUEL FLOW/PRESSURE

DESCENT

1. Altimeter - SET
2. Power - AS REQUIRED (avoid prolonged idle settings and low cylinder head temperatures)
3. Mixture - ENRICH AS REQUIRED

BEFORE LANDING

1. Seat Belts - SECURE

NOTE

All reclining seats must be in the upright position during landing.

2. Fuel Selector Valve - SELECT MAIN TANK MORE NEARLY FULL
3. Mixture - FULL RICH (or as required by field elevation)
4. Landing Gear - DOWN and CHECK. (Observe maximum extension speed)
5. Landing Light - AS REQUIRED
6. Flaps - DOWN (Observe maximum extension speed)
7. Airspeed - ESTABLISH LANDING APPROACH SPEED.
8. Propeller - HIGH RPM

BALKED LANDING

1. Power - FULL THROTTLE, 2600 RPM
2. Airspeed - 61 kts/70 mph until clear of obstacles, then trim to normal climb speed
3. Landing Gear - UP
4. Flaps - UP

AFTER LANDING

1. Landing Light - AS REQUIRED
2. Flaps - UP
3. Trim Tab - SET TO 0°

SHUTDOWN

1. Brakes - SET
2. Electrical and Radio Equipment - OFF
3. Throttle - CLOSE
4. Mixture - IDLE CUT-OFF
5. Ignition Switch - OFF, after engine stops
6. Battery and Generator Switches - OFF
7. Control Lock - INSTALL, if conditions warrant.
8. Install wheel chocks and release brakes if the airplane is to be left unattended.

ENVIRONMENTAL SYSTEMS

HEATING AND VENTILATION

Refer to the SYSTEMS DESCRIPTION Section for operation of heating and ventilation controls.

COLD WEATHER OPERATION

PREFLIGHT INSPECTION

All accumulations of ice, snow and frost must be removed from the wings, tail, control surfaces and hinges, propeller, windshield, fuel cell filler caps, crankcase vents, and fuel vents. If such accumulations are not removed completely, the airplane shall not be flown. The deposits will not blow off in flight. While an adverse weight factor is clearly involved in the case of heavy deposits, it is less obvious that even slight accumulations will disturb or completely destroy the designed aerodynamic properties of the airfoils.

The normal preflight procedures should then be completed, with particular attention given to check of flight controls for complete freedom of movement.

ENGINE

Use engine oil in accordance with Consumable Materials in the HANDLING, SERVICING AND MAINTENANCE Section. Always pull the propeller through by hand, opposite the direction of rotation, several times to clear the engine and "limber up" the cold, heavy oil before using the starter. This will also lessen the load on the battery if external power is not used.

Under very cold conditions, it may be necessary to preheat the engine prior to a start. Particular attention should be given to the oil cooler, engine sump and propeller hub to ensure proper preheat. A start with congealed oil in the system may produce an indication of normal pressure immediately after the start, but then the oil pressure may decrease when residual oil in the engine is pumped back with the congealed oil in the sump. If an engine heater capable of heating both the engine sump and cooler is not available, the oil should be drained while the engine is hot and stored in a warm area until the next flight.

If there is no oil pressure within the first 30 seconds of running, or if oil pressure drops after a few minutes of ground operation, shut down and check for broken oil lines, oil cooler leaks or the possibility of congealed oil.

NOTE

It is advisable to use external power for starting in cold weather.

During warm-up, monitor engine temperatures closely, since it is quite possible to exceed the cylinder head temperature limit in trying to bring up the oil temperature.

Exercise the propeller several times to remove cold oil from the pitch change mechanism. The propeller should also be cycled occasionally in flight.

During letdown and landing, give special attention to engine temperatures, since the engine will have a tendency toward overcooling.

ICING CONDITIONS

Flight in Known Icing Conditions Prohibited.

ENGINE BREAK-IN INFORMATION

See Systems Description section

SECTION V

PERFORMANCE

TABLE OF CONTENTS

SUBJECT *PAGE*

TABLE OF CONTENTS (Continued)

INTRODUCTION TO PERFORMANCE AND FLIGHT PLANNING

The graphs and tables in this section present performance information for flight planning at various parameters of weight, power, altitude and temperature. Examples have been presented on all performance graphs. In addition, the calculations for flight time, block speed and fuel required for a proposed flight are detailed below. All examples and calculations utilize the following conditions:

CONDITIONS

At Denver:

- Outside Air Temperature .... 15°C (59°F)
- Field Elevation .... 5330 ft
- Altimeter Setting .... 29.60 in. Hg
- Wind .... 270° at 10 kts
- Runway 26L length .... 10,010 ft

Route of Trip

*DEN-V81-AMA

For VFR Cruise at 11,500 feet

ROUTE SEGMENT	MAGNETIC COURSE	DIST NM	WIND 11500 FEET DIR/KTS	OAT 11500 FEET °C	ALT SETTING IN.HG
DEN-COS	161°	55	010/30	-5	29.60
COS-PUB	153°	40	010/30	-5	29.60
PUB-TBE	134°	74	100/20	0	29.56
TBE-DHT	132°	87	200/20	9	29.56
DHT-AMA	125°	65	200/20	10	29.56

*REFERENCE: Enroute Low Altitude Chart L-6

At Amarillo:

Outside Air Temperature	25°C (77°F)
Field Elevation	3605 ft
Altimeter Setting	29.56 in. Hg
Wind	180° at 10 kts
Runway 21 Length	13500 ft

To determine pressure altitude at origin and destination airports, add 100 feet to field elevation for each .1 in. Hg below 29.92, and subtract 100 feet from field elevation for each .1 in. Hg above 29.92.

Pressure Altitude at DEN:

29.92 - 29.60 = .32 in. Hg

The pressure altitude at DEN is 320 feet above the field elevation.

5330 + 320 = 5650 ft

Pressure Altitude at AMA:

29.92 - 29.56 = .36 in. Hg

The pressure altitude at AMA is 360 feet above the field elevation.

3605 + 360 = 3965 ft

NOTE

For flight planning, the difference between cruise altitude and cruise pressure altitude has been ignored.

Calculations for flight time, block speed and fuel requirement:

Cruise Climb:

Enter the graph for TIME, FUEL AND DISTANCE TO CLIMB at 15°C to 5650 ft and to 3000 lbs. Enter at -5°C to 11,500 ft and to 3000 lbs. Read:

Time to Climb = (21 - 8.5) = 12.5 min
Fuel Used to Climb = (5.8 - 2.4) = 3.4 gal
Distance Traveled = (39 - 15) = 24 NM

The cruise power setting is assumed to be at 2450 rpm. Since cruise at 11,500 feet requires full throttle, the manifold pressure and fuel flow should be read from either the cruise power setting table for 75 percent or 65 percent maximum continuous power.

The temperatures for cruise are presented for a standard day (ISA); 20°C (36°F) above a standard day (ISA + 20°C); and 20°C (36°F) below a standard day (ISA - 20°C). These should be used for flight planning. The IOAT values are true temperature values which have been adjusted for the compressibility effects. IOAT should be used for setting cruise power while enroute.

Enter the graph for ISA conversion at 11,500 feet and the temperature for the route segment:

DEN-PUB	OAT	=	-5°C
	ISA Condition	=	ISA + 3°C
PUB-TBE	OAT	=	0°C
	ISA Condition	=	ISA + 8°C
TBE-DHT	OAT	=	9°C
	ISA Condition	=	ISA + 17°C
DHT-AMA	OAT	=	10°C
	ISA Condition	=	ISA + 18°C

Enter the cruise power settings table for 75% maximum continuous power (or full throttle) at 10,000 ft, 12,000 ft, ISA and ISA + 20°C.

	TEMPERATURE					
	ISA			ISA + 20°C		
ALTITUDE FEET	MAN. PRESS. IN. HG	FUEL FLOW GPH	TAS KNOTS	MAN. PRESS. IN. HG	FUEL FLOW GPH	TAS KNOTS
10000	20.1	12.0	155	20.1	11.2	154
12000	18.6	11.1	152	18.6	10.5	151

Interpolate for 11,500 feet and the temperature for the appropriate route segment. Results of the interpolations are:

ROUTE SEGMENT	MAN. PRESS. IN. HG	FUEL FLOW GPH	TAS KNOTS
DEN-PUB	18.9	11.2	153
PUB-TBE	18.9	11.1	152
TBE-DHT	18.9	10.8	152
DHT-AMA	18.9	10.7	152

NOTE

The above are exact values for the assumed conditions.

Time and fuel used were calculated as follows:

$$\text{Time} = \frac{\text{Distance}}{\text{Ground Speed}}$$

Fuel Used = (Time) (Fuel Flow)

Results are:

ROUTE SEGMENT	DISTANCE NM	EST GROUND SPEED KNOTS	TIME AT CRUISE ALTITUDE HRS: MIN	FUEL USED FOR CRUISE GAL
DEN-COS	*31	181	0:10	1.9
COS-PUB	40	180	0:13	2.4
PUB-TBE	74	138	0:32	5.9
TBE-DHT	87	141	0:37	6.7
DHT-AMA	65	143	0:27	4.8

*Distance required to climb has been subtracted from segment distance.

TIME - FUEL - DISTANCE

ITEM	TIME HRS: MINS	FUEL GAL	DISTANCE NM
Start, Runup, Taxi and Take-off acceleration	0:00	1.7	0
Climb	0:13	3.4	24
Cruise	1:59	21.7	297
Total	2:12	26.8	321

Total Flight Time: 2 hours, 12 minutes

Block Speed: 321 NM ÷ 2 hours, 12 minutes = 146 knots

Reserve Fuel (45 minutes at 45% maximum continuous power)

Enter the cruise power settings table for 45% MCP (or full throttle). The fuel flow for 45% MCP is 8.3 gallons per hour.
Reserve fuel = (45 min) (8.3 GPH) = 6.2 gallons

Total Fuel = 26.8 + 6.2 = 33.0 gallons

The estimated landing weight is determined by subtracting the fuel required for the trip from the ramp weight:

Assumed ramp weight = 3010 lbs

Estimated fuel from DEN to AMA = (26.8 gal) (6 lbs/gal) = 161 lbs

Estimated landing weight = 3010 - 161 = 2849 lbs

Examples have been provided on the performance graphs. The above conditions have been used throughout. Rate of climb was determined for the initial cruise altitude conditions.

COMMENTS PERTINENT TO THE USE OF PERFORMANCE GRAPHS

1. The example, in addition to presenting an answer for a particular set of conditions, also presents the order in which the graphs should normally be used, i.e., if the first item in the example is OAT, then enter the graph at the known OAT.

2. The reference lines indicate where to begin following guide lines. Always project to the reference line first, then follow the guide lines to the next known item.

3. Indicated airspeeds (IAS) were obtained by using the AIRSPEED CALIBRATION NORMAL SYSTEM Graph.

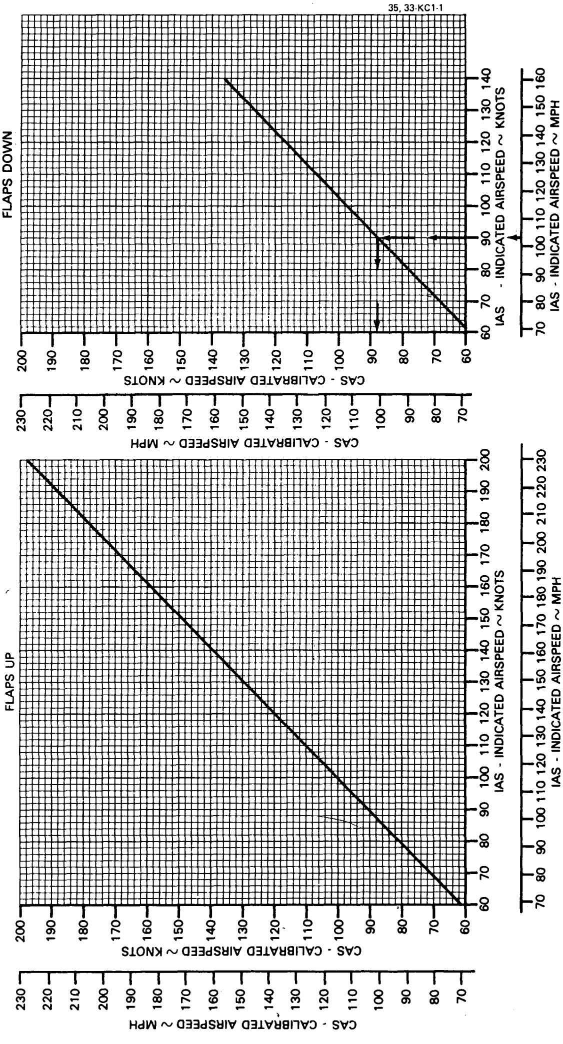
4. The associated conditions define the specific conditions from which performance parameters have been determined. They are not intended to be used as instructions, however, performance values determined from charts can only be achieved if specified conditions exist.

5. The full amount of usable fuel is available for all approved flight conditions.

AIRSPEED CALIBRATION - NORMAL SYSTEM

NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR

EXAMPLE:
IAS 90 KNOTS (104 MPH)
FLAPS DOWN
CAS 88 KNOTS (101 MPH)

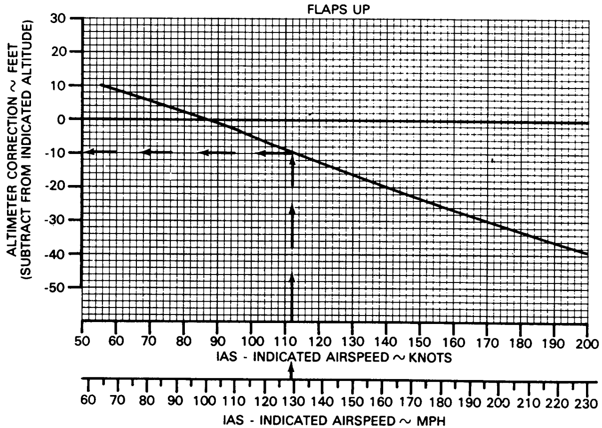


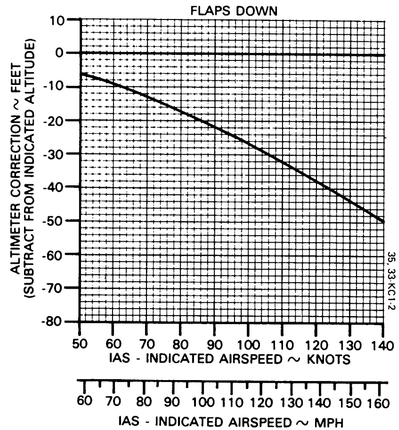
ALTIMETER CORRECTION - NORMAL SYSTEM

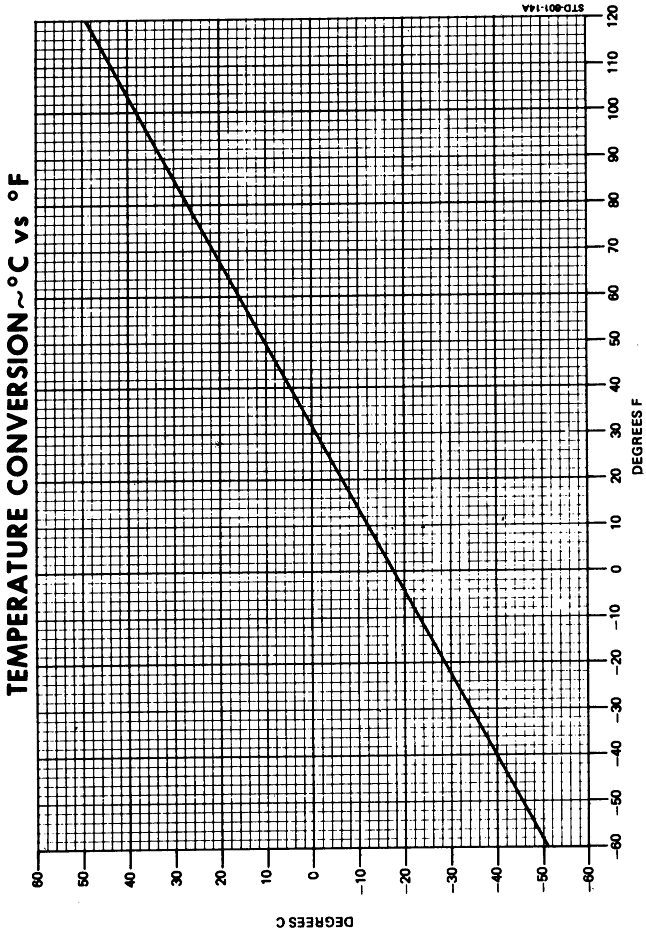
NOTE: INDICATED AIRSPEED AND INDICATED ALTITUDE ASSUME ZERO INSTRUMENT ERROR

EXAMPLE:

IAS	112 KNOTS
FLAPS	UP
INDICATED PRESSURE ALTITUDE	5000 FEET
ALTIMETER CORRECTION	-10 FEET
ACTUAL PRESSURE ALTITUDE:	= 5000 - 10 = 4990 FEET

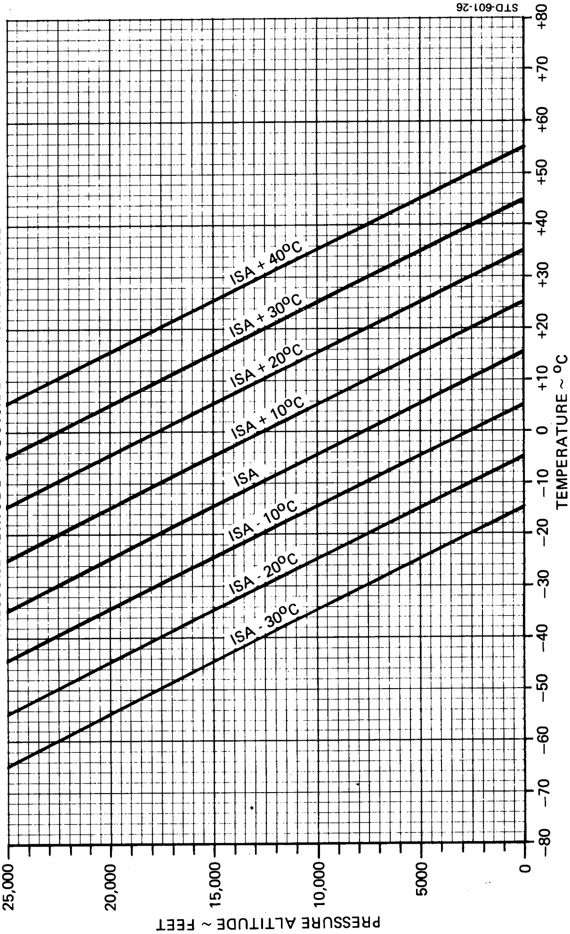





TEMPERATURE CONVERSION ~ °C vs °F
DEGREES F
120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60
DEGREES C
60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60
STD-601-14A

ISA CONVERSION

PRESSURE ALTITUDE vs OUTSIDE AIR TEMPERATURE

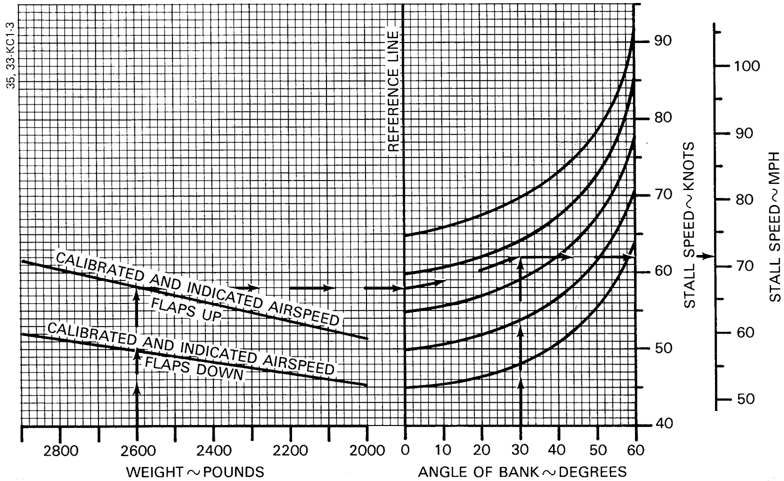


STALL SPEEDS - POWER IDLE

NOTES: 1. THE MAXIMUM ALTITUDE LOSS EXPERIENCED WHILE CONDUCTING STALLS IN ACCORDANCE WITH CAM 3.120 WAS 200 FT.

2. A NORMAL STALL RECOVERY TECHNIQUE MAY BE USED

EXAMPLE:	
WEIGHT	2600 LBS
FLAPS	UP
ANGLE OF BANK	30°
STALL SPEED	62 KNOTS 71 MPH

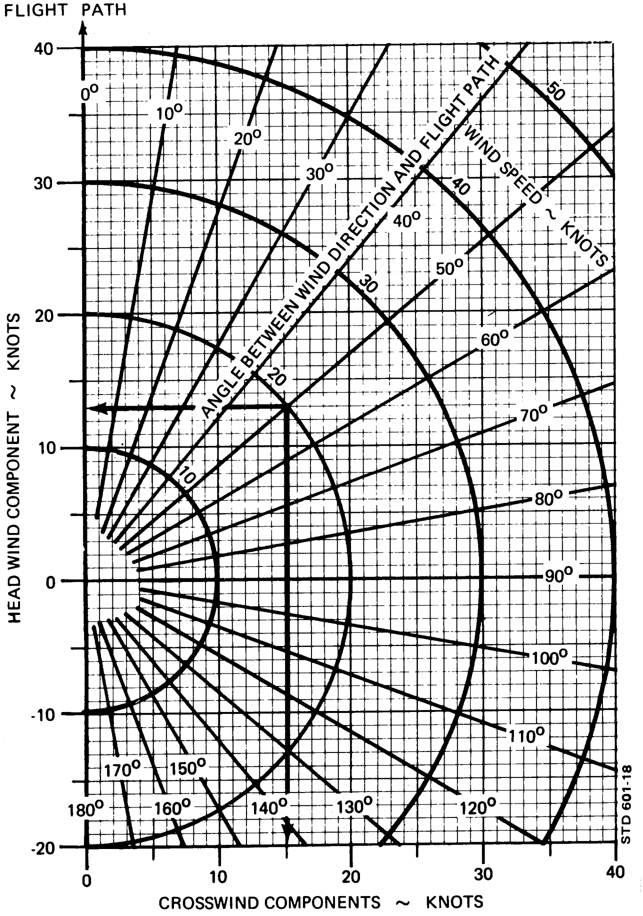


WIND COMPONENTS

Demonstrated Crosswind Component is 17 kts

EXAMPLE:

WIND SPEED	20 KTS
ANGLE BETWEEN WIND DIRECTION AND FLIGHT PATH	50°
HEADWIND COMPONENT	13 KTS
CROSSWIND COMPONENT	15 KTS



TAKE-OFF DISTANCE

ASSOCIATED CONDITIONS:

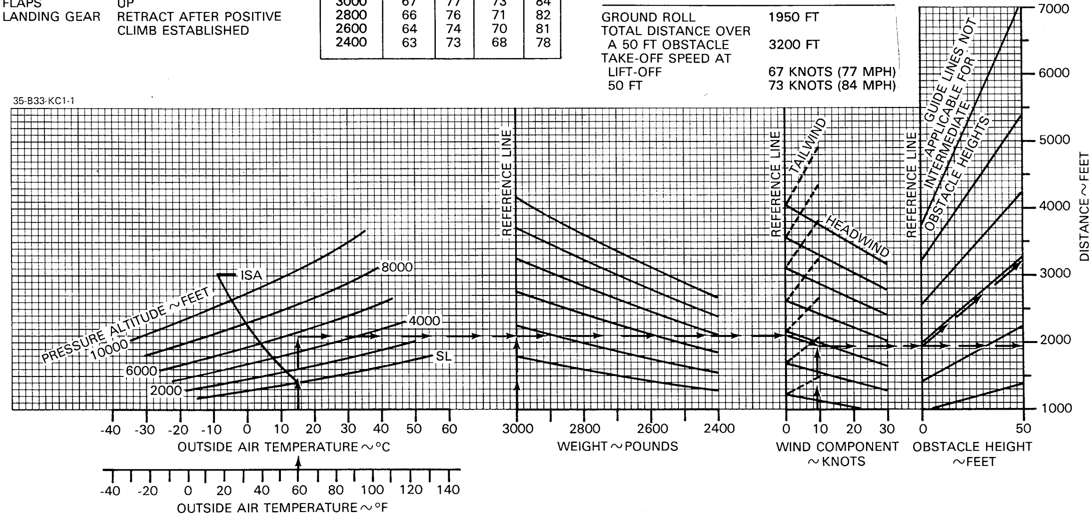
POWER	FULL THROTTLE 2600 RPM
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW
FLAPS	UP
LANDING GEAR	RETRACT AFTER POSITIVE CLIMB ESTABLISHED

WEIGHT ~ POUNDS	TAKE-OFF SPEED			
	LIFT-OFF		50 FT	
	KNOTS	MPH	KNOTS	MPH
3000	67	77	73	84
2800	66	76	71	82
2600	64	74	70	81
2400	63	73	68	78

EXAMPLE:

OAT	15°C (59°F)
PRESSURE ALTITUDE	5650 FT
TAKE-OFF WEIGHT	3000 LBS
HEAD WIND COMP.	9.5 KNOTS
GROUND ROLL	1950 FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	3200 FT
TAKE-OFF SPEED AT	
LIFT-OFF	67 KNOTS (77 MPH)
50 FT	73 KNOTS (84 MPH)

35-B33-KC1-1

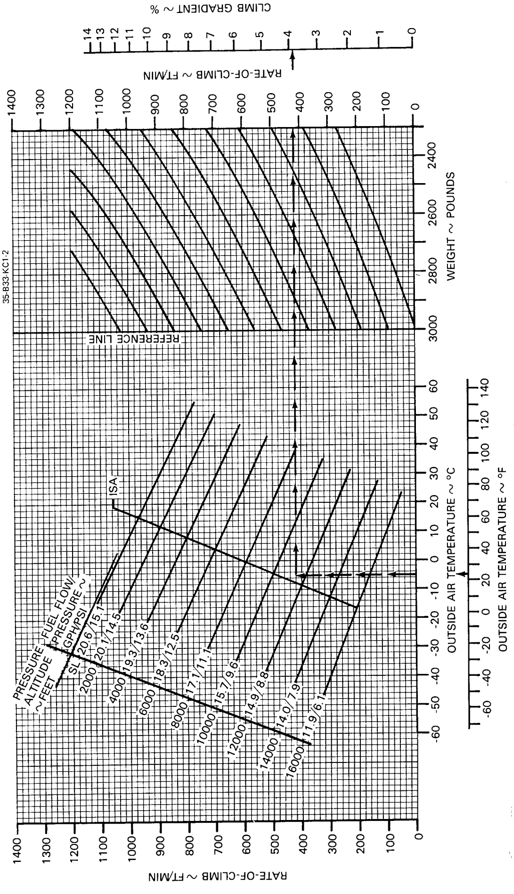


CLIMB

CLIMB SPEED 90 KNOTS IAS (ALL WEIGHTS)
104 MPH IAS

ASSOCIATED CONDITIONS:	
POWER	FULL THROTTLE AT 2600 RPM
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW/PRESSURE
FLAPS	UP
LANDING GEAR	UP

EXAMPLE:	
OAT	-5°C (23°F)
PRESSURE ALTITUDE	11500 FT
WEIGHT	3000 LBS
RATE-OF-CLIMB	420 FT/MIN
CLIMB GRADIENT	3.9%
CLIMB SPEED	90 KNOTS (104 MPH)



TIME, FUEL AND DISTANCE TO CLIMB

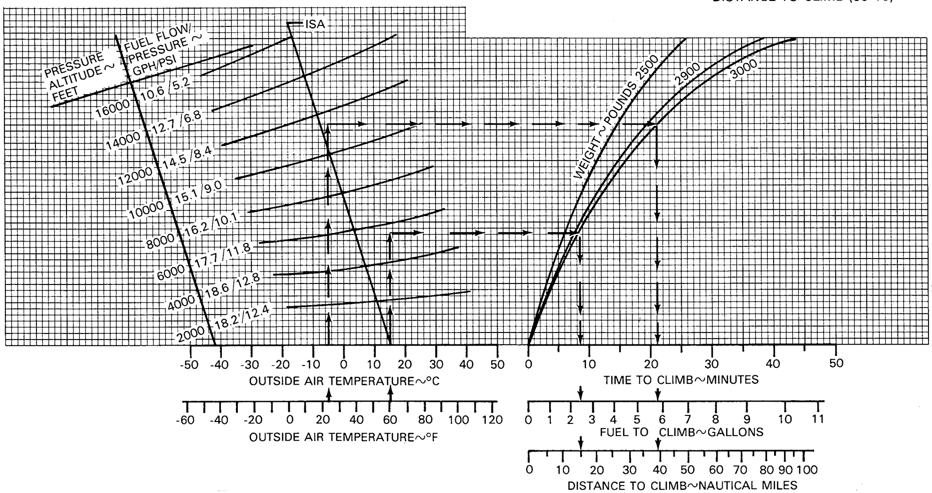
ASSOCIATED CONDITIONS:

POWER	25 IN. HG. OR FULL THROTTLE 2500 RPM
FUEL DENSITY	6.0 LB/GAL
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW/PRESSURE

CLIMB SPEED - 104 KNOTS
120 MPH

EXAMPLE:

OAT AT TAKE-OFF	15°C (59°F)
OAT AT CRUISE	-5°C (23°F)
AIRPORT PRESSURE ALTITUDE	5650 FT
CRUISE PRESSURE ALTITUDE	11500 FT
INITIAL CLIMB WEIGHT	3000 LBS
TIME TO CLIMB (21-8.5)	12.5 MIN
FUEL TO CLIMB (5.8-2.4)	3.4 GALS
DISTANCE TO CLIMB (39-15)	24 NM



CRUISE POWER SETTINGS

75% MAXIMUM CONTINUOUS POWER (OR FULL THROTTLE)
@ AVERAGE CRUISE WEIGHTS = 2800 LBS.

PRESS ALT.	ISA −36°F (−20°C)								STANDARD DAY (ISA)								ISA +36°F (+20°C)							
	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS		OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS		OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS	
FEET	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH
SL	26	−3	2450	23.4	7.4	13.4	145	167	63	17	2450	24.0	7.4	13.4	148	171	99	37	2450	24.5	7.4	13.4	152	174
2000	19	−7	2450	22.9	7.4	13.4	148	170	56	13	2450	23.4	7.4	13.4	151	174	92	33	2450	24.0	7.4	13.4	154	178
4000	12	−11	2450	22.4	7.4	13.4	151	173	49	9	2450	22.8	7.4	13.4	154	177	85	29	2450	23.5	7.4	13.4	157	181
6000	5	−15	2450	21.8	7.4	13.4	153	176	42	5	2450	22.2	7.4	13.4	157	180	78	25	2450	23.1	7.2	13.2	159	183
8000	−1	−19	2450	21.3	7.4	13.4	156	180	35	1	2450	21.6	6.9	12.9	157	181	71	21	2450	21.7	6.3	12.1	156	180
10000	−9	−23	2450	20.1	6.7	12.7	156	179	27	−3	2450	20.1	6.2	12.0	155	179	63	17	2450	20.1	5.6	11.2	154	177
12000	−16	−27	2450	18.6	6.0	11.8	153	177	20	−7	2450	18.6	5.5	11.1	152	175	56	13	2450	18.6	5.1	10.5	151	173
14000	−23	−31	2450	17.3	5.4	10.9	150	173	13	−11	2450	17.3	5.0	10.3	149	171	49	9	2450	17.3	4.7	9.7	146	168
16000	−31	−35	2450	16.0	4.9	10.1	146	168	5	−15	2450	16.0	4.6	9.6	144	166	41	5	2450	16.0	4.4	9.1	140	161

NOTES:
1. FULL THROTTLE MANIFOLD PRESSURE SETTINGS ARE APPROXIMATE.
2. SHADED AREA REPRESENTS OPERATION WITH FULL THROTTLE.

CRUISE POWER SETTINGS

65% MAXIMUM CONTINUOUS POWER (OR FULL THROTTLE)
@ AVERAGE CRUISE WEIGHT = 2800 LBS.

PRESS ALT.	ISA −36°F (−20°C)								STANDARD DAY (ISA)								ISA +36°F (+20°C)							
	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS		OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS		OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS	
FEET	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH
SL	26	−3	2450	21.2	5.8	11.5	136	157	62	17	2450	21.7	5.8	11.5	140	161	98	37	2450	22.3	5.8	11.5	143	164
2000	19	−7	2450	20.7	5.8	11.5	139	160	55	13	2450	21.3	5.8	11.5	142	164	91	33	2450	21.8	5.8	11.5	145	167
4000	12	−11	2450	20.3	5.8	11.5	142	163	48	9	2450	20.8	5.8	11.5	145	166	84	29	2450	21.4	5.8	11.5	148	170
6000	5	−15	2450	19.8	5.8	11.5	144	166	41	5	2450	20.4	5.8	11.5	147	169	77	25	2450	20.9	5.8	11.5	150	173
8000	−2	−19	2450	19.4	5.8	11.5	147	169	34	1	2450	19.9	5.8	11.5	150	172	70	21	2450	20.4	5.8	11.5	153	176
10000	−9	−23	2450	18.9	5.8	11.5	149	172	27	−3	2450	19.5	5.8	11.5	152	175	63	17	2450	20.0	5.6	11.2	154	177
12000	−16	−27	2450	18.5	5.8	11.5	152	175	20	−7	2450	18.6	5.5	11.1	152	175	56	13	2450	18.6	5.1	10.5	151	173
14000	−23	−31	2450	17.3	5.4	10.9	150	173	13	−11	2460	17.3	5.0	10.3	149	171	49	9	2450	17.3	4.7	9.7	146	168
16000	−31	−35	2450	16.0	4.9	10.1	146	168	5	−15	2450	16.0	4.6	9.6	144	166	41	5	2450	16.0	4.4	9.1	140	161

NOTES:
1. FULL THROTTLE MANIFOLD PRESSURE SETTINGS ARE APPROXIMATE.
2. SHADED AREA REPRESENTS OPERATION WITH FULL THROTTLE.

CRUISE POWER SETTINGS

55% MAXIMUM CONTINUOUS POWER (OR FULL THROTTLE)
@ AVERAGE CRUISE WEIGHT = 2800 LBS.

PRESS ALT.	ISA −36°F (−20°C)								STANDARD DAY (ISA)								ISA +36°F (+20°C)							
	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS		OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS		OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS	
FEET	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH
SL	26	−4	2300	20.2	4.7	9.8	127	146	62	17	2300	20.7	4.7	9.8	130	149	98	37	2300	21.1	4.7	9.8	132	152
2000	19	−7	2300	19.7	4.7	9.8	129	149	55	13	2300	20.3	4.7	9.8	132	152	91	33	2300	20.7	4.7	9.8	134	155
4000	12	−11	2300	19.2	4.7	9.8	131	151	48	9	2300	19.8	4.7	9.8	134	154	84	29	2300	20.2	4.7	9.8	136	157
6000	5	−15	2300	18.7	4.7	9.8	133	154	41	5	2300	19.3	4.7	9.8	136	157	77	25	2300	19.8	4.7	9.8	139	159
8000	−2	−19	2300	18.2	4.7	9.8	136	156	34	1	2300	18.8	4.7	9.8	138	159	70	21	2300	19.3	4.7	9.8	141	162
10000	−10	−23	2300	17.8	4.7	9.8	138	159	27	−3	2300	18.3	4.7	9.8	140	162	63	17	2300	18.8	4.7	9.8	143	164
12000	−17	−27	2300	17.3	4.7	9.8	140	161	20	−7	2300	17.9	4.7	9.8	142	164	56	13	2300	18.4	4.6	9.6	143	165
14000	−24	−31	2300	16.8	4.7	9.8	142	163	12	−11	2300	17.3	4.6	9.5	142	163	48	9	2300	17.3	4.3	9.0	138	159
16000	−31	−35	2300	16.2	4.4	9.2	138	159	5	−15	2300	16.2	4.3	8.9	136	157	41	5	2300	16.2	4.1	8.5	130	150

NOTES:
1. FULL THROTTLE MANIFOLD PRESSURE SETTINGS ARE APPROXIMATE.
2. SHADED AREA REPRESENTS OPERATION WITH FULL THROTTLE.

CRUISE POWER SETTINGS

45% MAXIMUM CONTINUOUS POWER (OR FULL THROTTLE)
@ AVERAGE CRUISE WEIGHT = 2800 LBS.

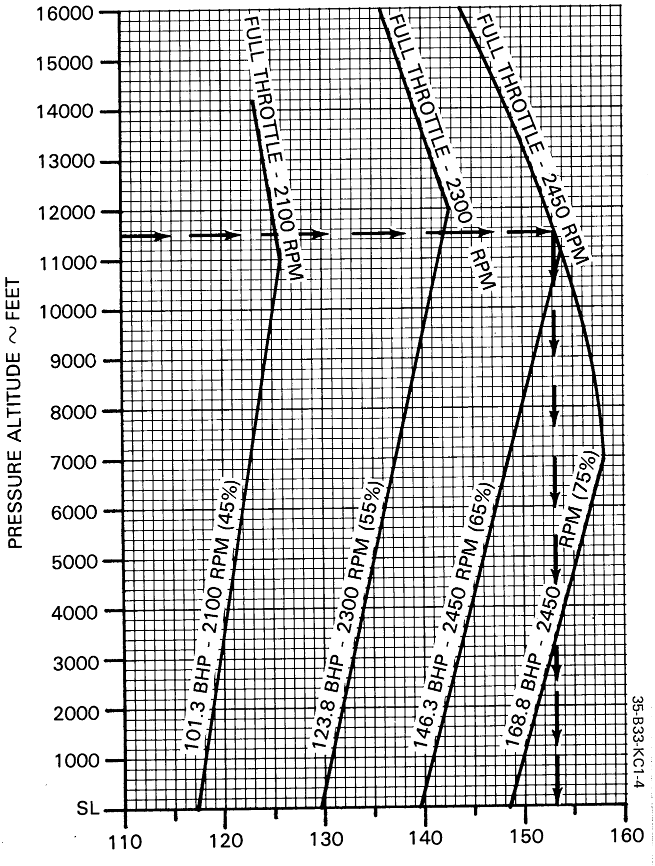
PRESS ALT.	ISA −36°F (−20°C)								STANDARD DAY (ISA)								ISA +36°F (+20°C)							
	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS		OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS		OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW		TAS	
FEET	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH	°F	°C	RPM	IN HG	PSI	GPH	KTS	MPH
SL	25	−4	2100	20.0	4.0	8.3	115	133	61	16	2100	20.4	4.0	8.3	117	135	97	36	2100	20.9	4.0	8.3	119	137
2000	18	−8	2100	19.5	4.0	8.3	117	134	54	12	2100	19.9	4.0	8.3	119	137	90	32	2100	20.5	4.0	8.3	121	139
4000	11	−12	2100	19.1	4.0	8.3	119	136	47	8	2100	19.5	4.0	8.3	121	139	83	28	2100	20.0	4.0	8.3	122	141
6000	4	−16	2100	18.6	4.0	8.3	120	138	40	4	2100	19.1	4.0	8.3	122	140	76	25	2100	19.5	4.0	8.3	124	142
8000	−3	−19	2100	18.2	4.0	8.3	122	140	33	1	2100	18.7	4.0	8.3	123	142	69	21	2100	19.1	4.0	8.3	125	144
10000	−10	−23	2100	17.7	4.0	8.3	123	142	26	−3	2100	18.2	4.0	8.3	125	143	62	17	2100	18.6	4.0	8.3	126	145
12000	−17	−27	2100	17.3	4.0	8.3	124	143	19	−7	2100	17.8	4.0	8.3	126	145	55	13	2100	18.2	4.0	8.3	126	145
14000	−24	−31	2100	16.8	4.0	8.3	125	144	12	−11	2100	17.3	4.0	8.2	124	143	47	9	2100	17.3	3.8	7.9	116	134
16000	−32	−35	2100	16.0	3.8	7.9	119	137	4	−16	2100	16.0	3.8	7.8	113	130	38	3	2100	16.0	3.7	7.5	—	—

NOTES:
1. FULL THROTTLE MANIFOLD PRESSURE SETTINGS ARE APPROXIMATE.
2. SHADED AREA REPRESENTS OPERATION WITH FULL THROTTLE.

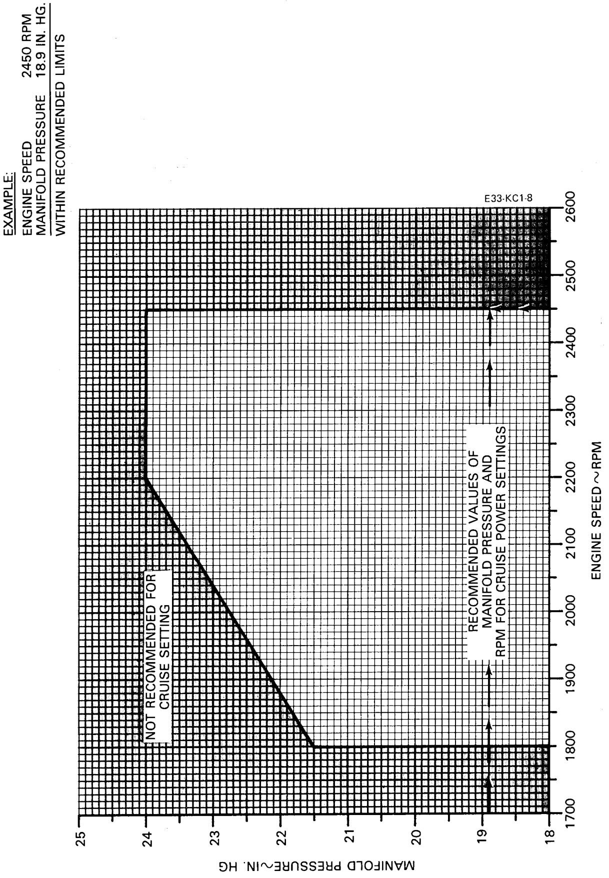
CRUISE SPEEDS

ASSOCIATED CONDITIONS:	
AVERAGE CRUISE WEIGHT	2800 LBS
TEMPERATURE	STANDARD DAY (ISA)

EXAMPLE:	
PRESSURE ALTITUDE	11500 FT
POWER SETTING	FULL THROTTLE 2450 RPM
TRUE AIRSPEED	153 KNOTS

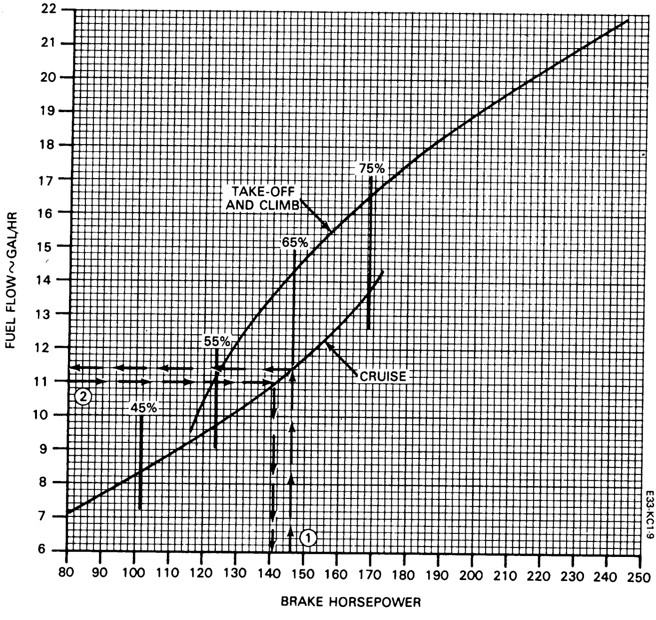


MANIFOLD PRESSURE vs RPM



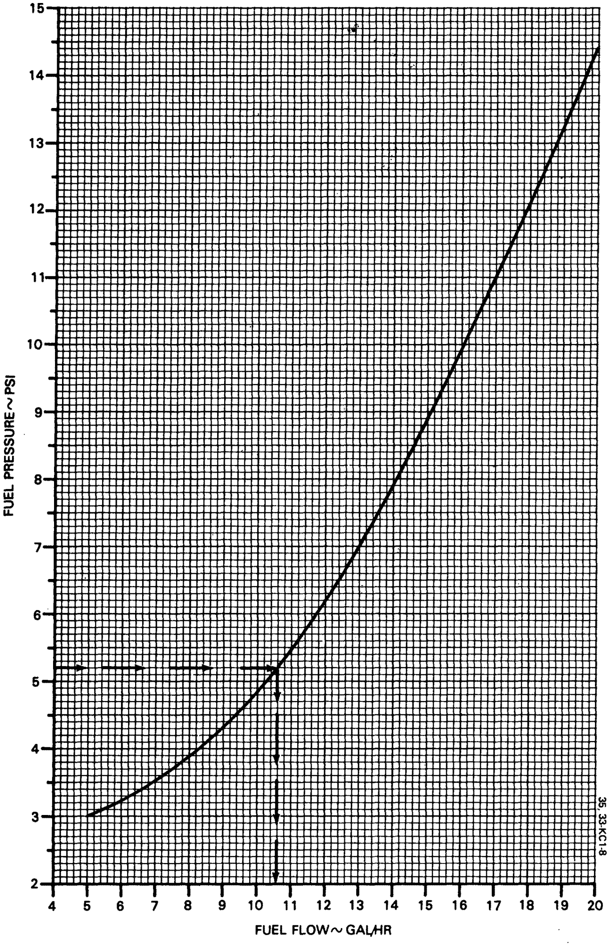
FUEL FLOW vs BRAKE HORSEPOWER

EXAMPLE:		
①	BRAKE HORSEPOWER	146.3 (65% MCP)
	CONDITION	LEVEL FLIGHT CRUISE LEAN
	FUEL FLOW	11.4 GAL/HR
②	FUEL FLOW	11.0 GAL/HR
	CONDITION	LEVEL FLIGHT CRUISE LEAN
	BRAKE HORSEPOWER	141



FUEL FLOW vs FUEL PRESSURE

EXAMPLE:	
FUEL PRESSURE	5.2 PSI
FUEL FLOW	10.6 GAL/HR



RANGE PROFILE - 74 GALLONS

STANDARD DAY (ISA)

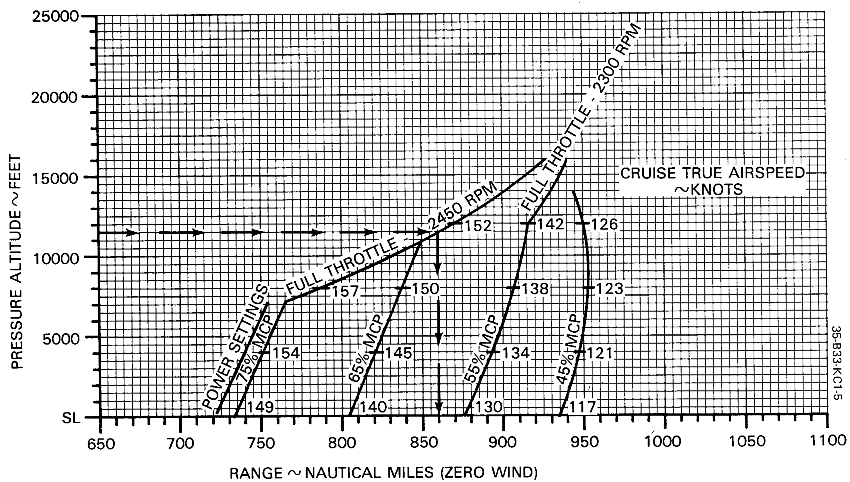
ASSOCIATED CONDITIONS:

WEIGHT	3010 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	74 U.S. GAL (444 LBS)

NOTE:
RANGE INCLUDES START, TAXI, AND CLIMB WITH 45 MINUTES RESERVE FUEL AT 45% MCP

EXAMPLE:

PRESSURE ALTITUDE	11500 FT
POWER SETTING	FULL THROTTLE 2450 RPM
RANGE	860 NM



RANGE PROFILE - 63 GALLONS

STANDARD DAY (ISA)

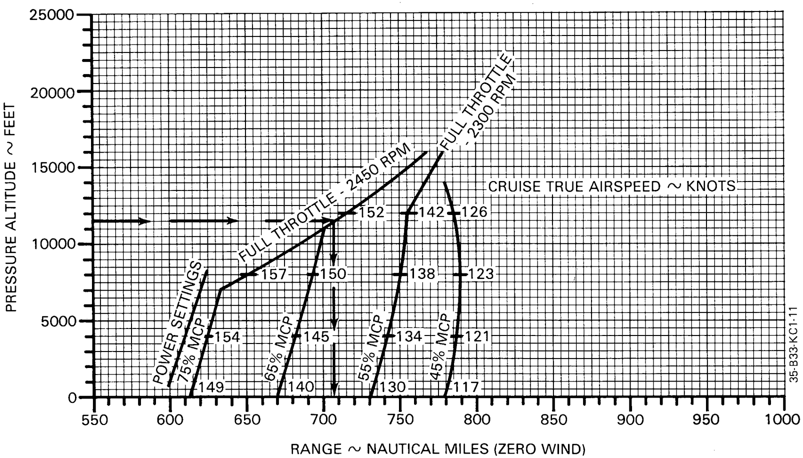
ASSOCIATED CONDITIONS:

WEIGHT	3010 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	63 U.S. GAL (378 LBS)

EXAMPLE:

PRESSURE ALTITUDE	11500 FT
POWER SETTING	FULL THROTTLE 2450 RPM
RANGE	707 NM

NOTE: RANGE INCLUDES START, TAXI AND CLIMB WITH 45 MINUTES RESERVE FUEL AT 45% MCP



RANGE PROFILE - 44 GALLONS

STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

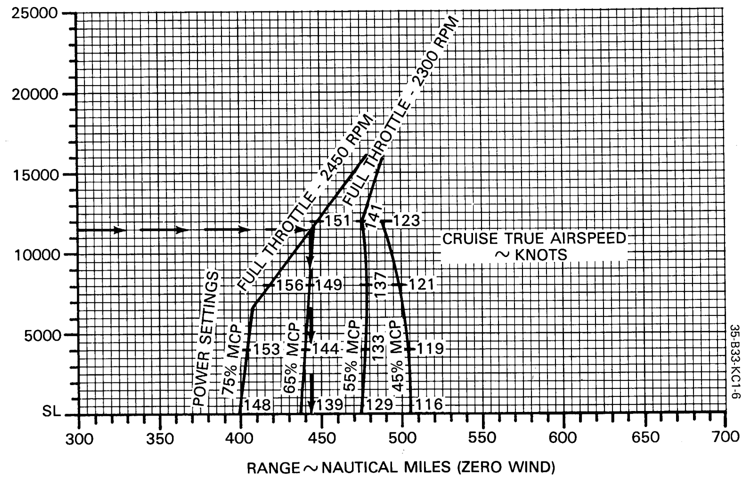
WEIGHT	3010 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	44 U.S. GAL (264 LBS)

NOTE:

RANGE INCLUDES START, TAXI AND CLIMB WITH 45 MINUTES RESERVE FUEL AT 45% MCP

EXAMPLE:

PRESSURE ALTITUDE	11500 FT
POWER SETTING	FULL THROTTLE 2450 RPM
RANGE	444 NM



ENDURANCE PROFILE - 74 GALLONS

STANDARD DAY (ISA)

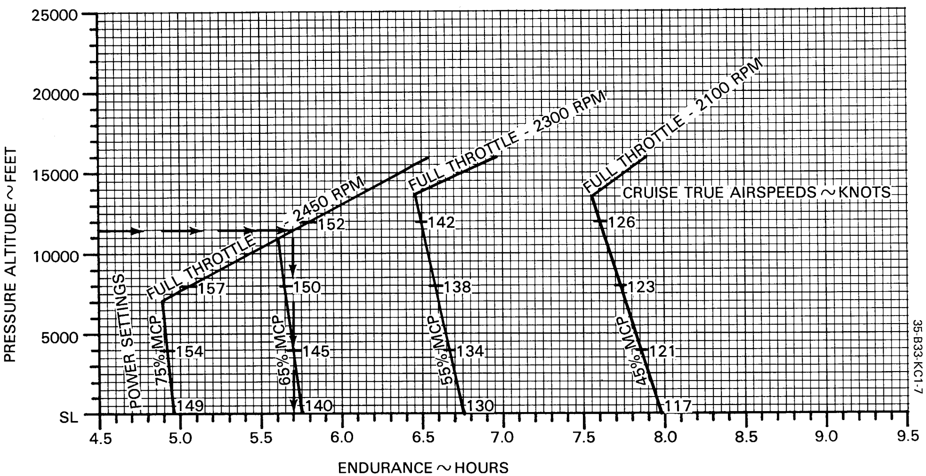
ASSOCIATED CONDITIONS:

WEIGHT	3010 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	74 U.S. GAL (444 LBS)

NOTE:
ENDURANCE INCLUDES START, TAXI, AND CLIMB WITH 45 MINUTES RESERVE FUEL AT 45% MCP

EXAMPLE:

PRESSURE ALTITUDE	11500 FT
POWER SETTING	FULL THROTTLE 2450 RPM
ENDURANCE	5.70 HRS (5 HRS 42 MIN)



ENDURANCE PROFILE - 63 GALLONS

STANDARD DAY (ISA)

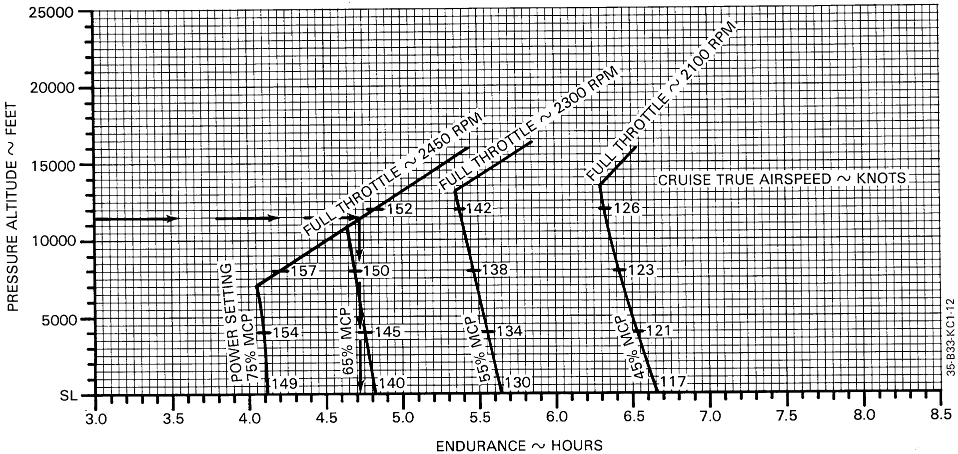
ASSOCIATED CONDITIONS:

WEIGHT	3010 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LB/GAL
INITIAL FUEL LOADING	63 U.S. GAL (378 LBS)

EXAMPLE:

PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2450 RPM
ENDURANCE	4.7 HOURS (4 HRS 42 MIN)
TOTAL ENDURANCE (4.7 HRS + .8 HRS)	5.5 HRS. (5 HRS 30 MIN)

NOTE: ENDURANCE INCLUDES START, TAXI, AND CLIMB WITH 45 MINUTES RESERVE FUEL AT 45% M.C.P.



ENDURANCE PROFILE - 44 GALLONS

STANDARD DAY (ISA)

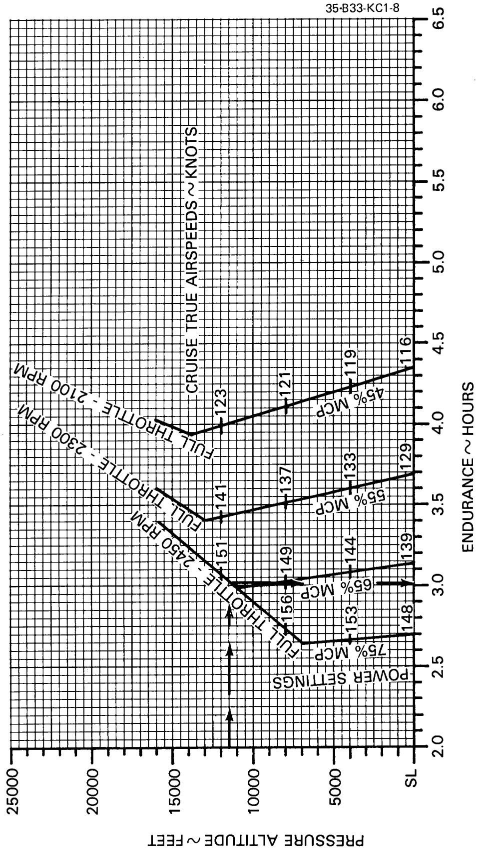
ASSOCIATED CONDITIONS:

WEIGHT	3010 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	44 U.S. GAL (264 LBS)

NOTE:
ENDURANCE INCLUDES START, TAXI, AND CLIMB WITH 45 MINUTES RESERVE FUEL AT 45% MCP

EXAMPLE:

PRESSURE ALTITUDE	11500 FT
POWER SETTING	FULL THROTTLE 2450 RPM
ENDURANCE	3.02 HRS (3 HRS 1 MIN)



LANDING DISTANCE

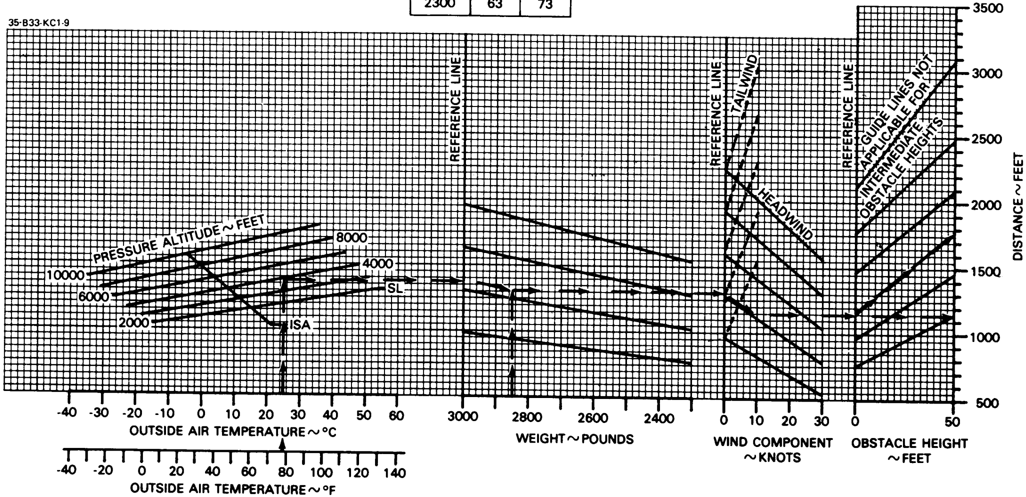
ASSOCIATED CONDITIONS:

POWER	RETARDED TO MAINTAIN 900 FT/MIN ON FINAL APPROACH
FLAPS	DOWN
LANDING GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
APPROACH SPEED	IAS AS TABULATED
BRAKING	MAXIMUM

WEIGHT ~ POUNDS	SPEED AT 50 FT	
	KNOTS	MPH
3000	69	79
2800	67	77
2600	65	75
2400	64	74
2300	63	73

EXAMPLE:

OAT	25°C (77°F)
PRESSURE ALTITUDE	3965 FT
WEIGHT	2849 LBS
WIND COMPONENT	9.0 KNOTS (HEADWIND)
GROUND ROLL	1150 FT
TOTAL OVER 50 FT OBSTACLE	1775 FT
APPROACH SPEED	67 KNOTS (77 MPH)



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SECTION VI

WEIGHT AND BALANCE/ EQUIPMENT LIST

TABLE OF CONTENTS

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WEIGHING INSTRUCTIONS

Periodic weighing of the airplane may be required to keep the Basic Empty Weight current. All changes to the airplane affecting weight and balance are the responsibility of the airplane's operator.

1. Three jack points are provided for weighing: two on the wing front spar at Fuselage Station 83.1 and one on the aft fuselage at Fuselage Station 271.0.

2. Fuel should be drained preparatory to weighing. Tanks are drained from the regular drain ports with the airplane in static ground attitude. When tanks are drained, 1.5 pounds of undrainable fuel remain in the airplane at Fuselage Station 76.0. The remainder of the unusable fuel to be added to a drained system is 34.5 pounds at Fuselage Station 79.1 and 5 pounds at Fuselage Station 94.0 for airplanes with auxiliary tanks installed.

3. Engine oil must be at the full level or completely drained. Total engine oil when full is 22 pounds at Fuselage Station 25.3. (Includes 3 pounds undrainable oil.)

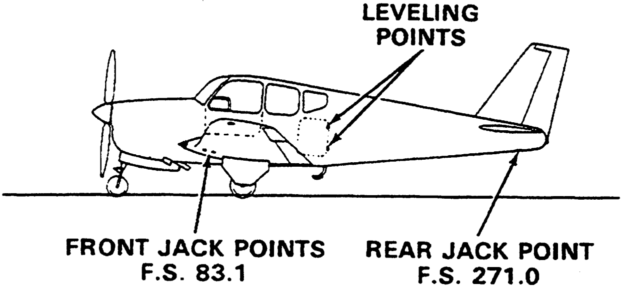
4. To determine airplane configuration at time of weighing, installed equipment is checked against the airplane equipment list or superseding forms. All installed equipment must be in its proper place during weighing.

5. At the time of weighing, the airplane must be level both longitudinally and laterally, and the landing gear must be fully extended. Leveling screws are located on the left side of the fuselage at approximately Fuselage Station 152.25. Longitudinally level attitude is determined with a plumb bob. Laterally level attitude is obtained when the vertical distance from each wing tip to the floor is equal.

6. Measurement of the reaction arms for a wheel weighing is made using a steel measuring tape. Measurements are taken, with the airplane level on the scales, from the reference (a plumb bob dropped from the center of either main jack point) to the axle center line of the main gear and then to the nose wheel axle center line. The main wheel axle center line is best located by stretching a string across from one main wheel to the other. All measurements are to be taken with the tape level with the hangar floor and parallel to the fuselage center line. The locations of the wheel reactions will be approximately at Fuselage Station 96.7 for main wheels and Fuselage Station 12.7 for the nose wheel.

7. Jack point weighings are accomplished by placing scales at the jack points specified in step 1 above. Since the center of gravity of the airplane is forward of Fuselage Station 83.1, the tail reaction of the airplane will be in an up direction. This can be measured on regular scales by placing ballast of approximately 200 pounds on the scales and attached to the aft weighing point by cable of adjustable length. The up reaction will then be total ballast weight minus the scale reading and is entered in the weighing form as a negative quantity.

8. Weighing should always be made in an enclosed area which is free from air currents. The scales used should be properly calibrated and certified.



BASIC EMPTY WEIGHT AND BALANCE

DEBONAIR SER. NO.________ REG. NO. ________ DATE ________

STRUT POSITION -	NOSE	MAIN	JACK POINT LOC.		PREPARED BY
EXTENDED	11.8	96	FORWARD	83.1	Company________
COMPRESSED	13.1	97	AFT	271.0	Signature________

REACTION WHEEL - JACK POINTS	SCALE READING	TARE	NET WEIGHT	ARM	MOMENT
LEFT MAIN					
RIGHT MAIN					
NOSE OR TAIL					
TOTAL (AS WEIGHED)					
Space below provided for additions and subtractions to as weighed condition					
EMPTY WEIGHT (DRY)					
ENGINE OIL			22	-	557
UNUSABLE FUEL			36	79	2844
WITH AUX. TANKS INSTALLED			5	94	470
BASIC EMPTY WEIGHT					

WEIGHT AND BALANCE RECORD

SERIAL NO. ________ REGISTRATION NO. ________ PAGE NO. ________

DATE	ITEM NO.		DESCRIPTION OF ARTICLE OR CHANGE	WEIGHT CHANGE ADDED (+) OR REMOVED (-)			RUNNING BASIC EMPTY WEIGHT	
	IN	OUT		WT (LBS)	ARM (IN.)	MOM / 100	WT (LBS)	MOM / 100

WEIGHT AND BALANCE RECORD

SERIAL NO. ______ REGISTRATION NO. ______ PAGE NO. ______

DATE	ITEM NO.		DESCRIPTION OF ARTICLE OR CHANGE	WEIGHT CHANGE ADDED (+) OR REMOVED (-)			RUNNING BASIC EMPTY WEIGHT	
	IN	OUT		WT (LBS)	ARM (IN.)	MOM 100	WT (LBS)	MOM 100

NOTE

Each new airplane is delivered with a completed sample loading, empty weight and center of gravity, and equipment list, all pertinent to that specific airplane. It is the owner's responsibility to ensure that changes in equipment are reflected in a new weight and balance and in an addendum to the equipment list. There are many ways of doing this; it is suggested that a running tally of equipment changes and their effect on empty weight and c.g. is a suitable means for meeting both requirements.

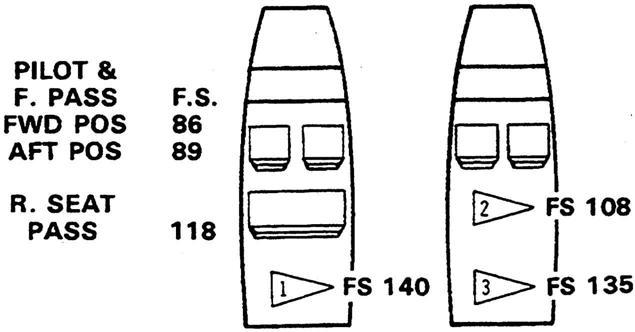
The current equipment list and empty weight and c.g. information must be retained with the airplane when it changes ownership. Beech Aircraft Corporation cannot maintain this information; the current status is known only to the owner. If these papers become lost, the FAA will require that the airplane be re-weighed to establish the empty weight and c.g. and that an inventory of installed equipment be conducted to create a new equipment list.

LOADING INSTRUCTIONS

It is the responsibility of the airplane operator to ensure that the airplane is properly loaded. At the time of delivery, Beech Aircraft Corporation provides the necessary weight and balance data to compute individual loadings. All subsequent changes in airplane weight and balance are the responsibility of the airplane owner and/or operator.

The empty weight and moment of the airplane at the time of delivery are shown on the airplane Empty Weight and Balance form. Useful load items which may be loaded into the airplane are shown on the Useful Load Weight and Moment tables. The minimum and maximum moments are indicated on the Moment Limits vs Weight table. These moments correspond to the forward and aft center of gravity flight limits for a particular weight. All moments are divided by 100 to simplify computations.

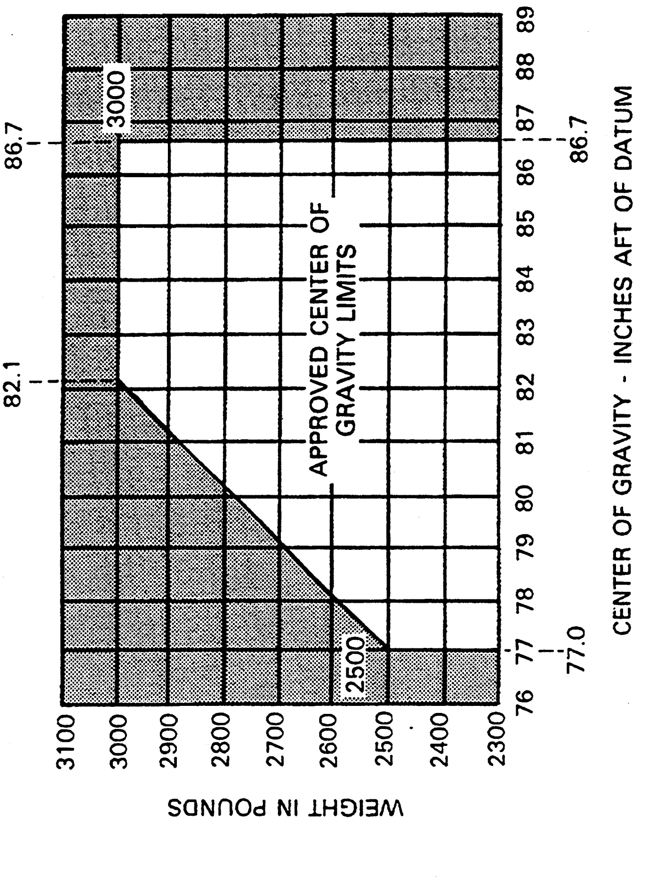
SEATING, BAGGAGE AND EQUIPMENT ARRANGEMENTS



1. MAXIMUM WEIGHT 270 POUNDS INCLUDING EQUIPMENT AND BAGGAGE.
2. MAXIMUM WEIGHT 200 POUNDS FORWARD OF REAR SPAR INCLUDING EQUIPMENT AND CARGO WITH REAR SEAT REMOVED.
3. MAXIMUM WEIGHT 270 POUNDS AFT OF REAR SPAR INCLUDING EQUIPMENT AND CARGO WITH REAR SEAT REMOVED.

ALL BAGGAGE/CARGO MUST BE SECURED

CENTER OF GRAVITY



MOMENT LIMITS vs WEIGHT

Moment limits are based on the following weight and center of gravity limit data (landing gear down).

WEIGHT CONDITION	FORWARD CG LIMIT	AFT CG LIMIT
3000 lb. (take-off or landing)	82.1	86.7
2500 lb. or less	77.0	86.7

Weight	Minimum Moment/100	Maximum Moment/100
2100	1617	1821
2110	1625	1829
2120	1632	1838
2130	1640	1847
2140	1648	1855
2150	1656	1864
2160	1663	1873
2170	1671	1881
2180	1679	1890
2190	1686	1899
2200	1694	1907
2210	1702	1916
2220	1709	1925
2230	1717	1933
2240	1725	1942
2250	1733	1951
2260	1740	1959
2270	1748	1968
2280	1756	1977
2290	1763	1985

Weight	Minimum Moment/100	Maximum Moment/100
2300	1771	1994
2310	1779	2003
2320	1786	2011
2330	1794	2020
2340	1802	2029
2350	1810	2037
2360	1817	2046
2370	1825	2055
2380	1833	2063
2390	1840	2072
2400	1848	2081
2410	1856	2089
2420	1863	2098
2430	1871	2107
2440	1879	2115
2450	1887	2124
2460	1894	2133
2470	1902	2141
2480	1910	2150
2490	1917	2159
2500	1925	2168
2510	1935	2176
2520	1946	2185
2530	1956	2194
2540	1966	2202
2550	1977	2211
2560	1987	2220
2570	1997	2228
2580	2008	2237
2590	2018	2246

MOMENT LIMITS vs WEIGHT (Continued)

Weight	Minimum Moment/100	Maximum Moment/100
2600	2029	2254
2610	2039	2263
2620	2049	2272
2630	2060	2280
2640	2070	2289
2650	2081	2298
2660	2092	2306
2670	2102	2315
2680	2113	2324
2690	2123	2332
2700	2134	2341
2710	2145	2350
2720	2155	2358
2730	2166	2367
2740	2177	2376
2750	2188	2384
2760	2198	2393
2770	2209	2402
2780	2220	2410
2790	2231	2419
2800	2242	2428
2810	2253	2436
2820	2263	2445
2830	2274	2454
2840	2285	2462
2850	2296	2471
2860	2307	2480
2870	2318	2488
2880	2329	2497
2890	2340	2506

Weight	Minimum Moment / 100	Maximum Moment / 100
2900	2351	2514
2910	2362	2523
2920	2373	2532
2930	2385	2540
2940	2396	2549
2950	2407	2558
2960	2418	2566
2970	2429	2575
2980	2441	2584
2990	2452	2592
3000	2463	2601

COMPUTING PROCEDURE

1. Record the *Basic Empty Weight and Moment from the Basic Empty Weight and Balance form (or from the latest superseding form) under the Basic Empty Condition block. The moment must be divided by 100 to correspond to Useful Load Weights and Moments tables.

2. Record the weight and corresponding moment from the appropriate table of each of the useful load items (except fuel) to be carried in the airplane.

3. Total the weight column and moment column. The SUB-TOTAL is the Zero Fuel Condition.

4. Determine the weight and corresponding moment for the fuel loading to be used. This fuel loading includes fuel for the flight, plus that required for start, taxi, and take-off. Add the Fuel to Zero Fuel Condition to obtain the SUB-TOTAL Ramp Condition.

5. Subtract the fuel to be used for start, taxi, and take-off to arrive at the SUB-TOTAL Take-off Condition.

6. Subtract the weight and moment of the fuel in the incremental sequence in which it is to be used from the take-off weight and moment. The Zero Fuel Condition, the Take-Off Condition, and the Landing Condition moment must be within the minimum and maximum moments shown on the Moment Limit 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 total moment is greater than the maximum moment allowed, useful load items must be shifted forward or aft load items reduced. If the quantity or location of load items is changed, the calculations must be revised and the moments rechecked.

* The Empty Weight for the airplane may be converted to Basic Empty Weight by adding the weight and moment for full oil. (19 lbs. and 494 lb. in.)

The following Sample Loading chart is presented to depict the sample method of computing a load. Weights used DO NOT reflect an actual airplane loading.

WEIGHT AND BALANCE LOADING FORM

DEBONAIR A33 DATE ______

SERIAL NO. CD-XXX REG NO. NXXX

SAMPLE

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION	1907	1486
2. FRONT SEAT OCCUPANTS	340	292
3. REAR SEAT OCCUPANTS	340	402
4. BAGGAGE	45	63
5. CARGO		-
6. CARGO		-
7. SUB TOTAL ZERO FUEL CONDITION	2632	2243
8. FUEL - MAIN (44 GAL) FUEL - AUX. (19 GAL)	264 114	198 107
9. SUB TOTAL RAMP CONDITION	3010	2548
10. *LESS FUEL FOR START, TAXI, AND TAKE-OFF	-10	-8
11. SUB TOTAL TAKE-OFF CONDITION	3000	2540
12. LESS FUEL - LEFT MAIN (15 GAL)	-90	-68
13. SUB TOTAL	2910	2472
14. LESS FUEL - AUX (19 GAL)	-114	-107
15. SUB TOTAL	2796	2365
16. LESS FUEL - MAIN (20 GAL)	-120	-90
17. LANDING CONDITION	2676	2275

*Fuel for start, taxi and take-off is normally 10 lbs at an average mom/100 of 8.

WEIGHT AND BALANCE LOADING FORM

DEBONAIR ____________________ DATE ____________________

SERIAL NO. ____________________ REG NO. NXXX

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION		
2. FRONT SEAT OCCUPANTS		
3. REAR SEAT OCCUPANTS		
4. BAGGAGE		
5. CARGO		
6. CARGO		
7. SUB TOTAL ZERO FUEL CONDITION		
8. FUEL - MAIN (GAL) FUEL - AUX. (GAL)		
9. SUB TOTAL RAMP CONDITION		
10. *LESS FUEL FOR START, TAXI, AND TAKE-OFF		
11. SUB TOTAL TAKE-OFF CONDITION		
12. LESS FUEL - LEFT MAIN (GAL)		
13. SUB TOTAL		
14. LESS FUEL - AUX (GAL)		
15. SUB TOTAL		
16. LESS FUEL - MAIN (GAL)		
17. LANDING CONDITION		

*Fuel for start, taxi and take-off is normally 10 lbs at an average mom/100 of 8.

USEFUL LOAD WEIGHTS AND MOMENTS

OCCUPANTS

	Front Seats		Rear Seat
	Fwd Position	Aft Position	
	ARM 86	ARM 89	ARM 118
WEIGHT	MOM/100	MOM/100	MOM/100
120	103	107	142
130	112	116	153
140	120	125	165
150	129	134	177
160	138	142	189
170	146	151	201
180	155	160	212
190	163	169	224
200	172	178	236

NOTE: OCCUPANT POSITIONS FOR ADJUSTABLE SEATS ARE SHOWN AT THEIR EXTREME POSITIONS. INTERMEDIATE POSITIONS WILL REQUIRE INTERPOLATION OF THE MOMENT/100 VALUES.

BAGGAGE
ARM 140

Weight	Moment/100	Weight	Moment/100
10	14	70	98
20	28	80	112
30	42	90	126
40	56	100	140
50	70	110	154
60	84	120	168

BAGGAGE (Continued)
ARM 140

Weight	Moment/100	Weight	Moment/100
130	182	210	294
140	196	220	308
150	210	230	322
160	224	240	336
170	238	250	350
180	252	260	364
190	266	270	378
200	280		

CARGO (With Rear Seat Removed)

AHEAD OF SPAR ARM 108		AFT OF SPAR ARM 135	
Weight	Moment/100	Weight	Moment/100
20	22	20	27
40	43	40	54
60	65	60	81
80	86	80	108
100	108	100	135
120	130	120	162
140	151	140	189
160	173	160	216
180	194	180	243
200	216	200	270
		220	297
		240	324
		260	351
		270	364

USABLE FUEL

MAIN WING TANKS
ARM 75

Gallons	Weight	Moment/100
5	30	22
10	60	45
15	90	68
20	120	90
25	150	112
30	180	135
35	210	158
40	240	180
44	264	198

AUXILIARY WING TANKS
ARM 94

Gallons	Weight	Moment/100
5	30	28
10	60	56
15	90	85
19	114	107

*OIL

Quarts	Weight	Moment/100
10	19	5

*Included in Basic Empty Weight

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SECTION VI

WEIGHT AND BALANCE/ EQUIPMENT LIST

TABLE OF CONTENTS

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WEIGHING INSTRUCTIONS

Periodic weighing of the airplane may be required to keep the Basic Empty Weight current. All changes to the airplane affecting weight and balance are the responsibility of the airplane's operator.

1. Three jack points are provided for weighing: two on the wing front spar at Fuselage Station 83.1 and one on the aft fuselage at Fuselage Station 271.0.

2. Fuel should be drained preparatory to weighing. Tanks are drained from the regular drain ports with the airplane in static ground attitude. When tanks are drained, 1.5 pounds of undrainable fuel remain in the airplane at Fuselage Station 76.0. The remainder of the unusable fuel to be added to a drained system is 34.5 pounds at Fuselage Station 79.1.

3. Engine oil must be at the full level or completely drained. Total engine oil when full is 22 pounds at Fuselage Station 25.3. (Includes 3 pounds undrainable oil.)

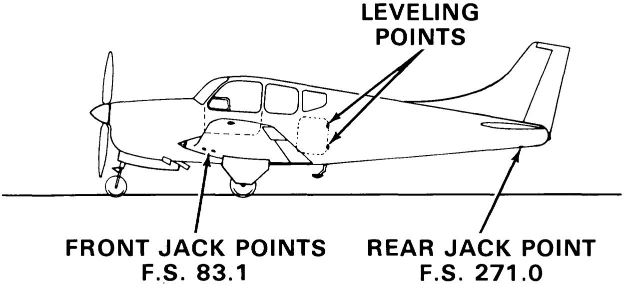
4. To determine airplane configuration at time of weighing, installed equipment is checked against the airplane equipment list or superseding forms. All installed equipment must be in its proper place during weighing.

5. At the time of weighing, the airplane must be level both longitudinally and laterally, and the landing gear must be fully extended. Leveling screws are located on the left side of the fuselage at approximately Fuselage Station 152.25. Longitudinally level attitude is determined with a plumb bob. Laterally level attitude is obtained when the vertical distance from each wing tip to the floor is equal.

6. Measurement of the reaction arms for a wheel weighing is made using a steel measuring tape. Measurements are taken, with the airplane level on the scales, from the reference (a plumb bob dropped from the center of either main jack point) to the axle center line of the main gear and then to the nose wheel axle center line. The main wheel axle center line is best located by stretching a string across from one main wheel to the other. All measurements are to be taken with the tape level with the hangar floor and parallel to the fuselage center line. The locations of the wheel reactions will be approximately at Fuselage Station 96.7 for main wheels and Fuselage Station 12.7 for the nose wheel.

7. Jack point weighings are accomplished by placing scales at the jack points specified in step 1 above. Since the center of gravity of the airplane is forward of Fuselage Station 83.1, the tail reaction of the airplane will be in an up direction. This can be measured on regular scales by placing ballast of approximately 200 pounds on the scales and attached to the aft weighing point by cable of adjustable length. The up reaction will then be total ballast weight minus the scale reading and is entered in the weighing form as a negative quantity.

8. Weighing should always be made in an enclosed area which is free from air currents. The scales used should be properly calibrated and certified.



BASIC EMPTY WEIGHT AND BALANCE

DEBONAIR SER. NO.____________ REG. NO.____________ DATE____________

STRUT POSITION - NOSE		**MAIN**	**JACK POINT LOC.**		**PREPARED BY**
EXTENDED	11.8	96	FORWARD	83.1	Company____________
COMPRESSED	13.1	97	AFT	271.0	Signature____________

REACTION WHEEL - JACK POINTS	SCALE READING	TARE	NET WEIGHT	ARM	MOMENT
LEFT MAIN					
RIGHT MAIN					
NOSE OR TAIL					
TOTAL (AS WEIGHED)					
Space below provided for additions and subtractions to as weighed condition					
EMPTY WEIGHT (DRY)					
ENGINE OIL			22	-	557
UNUSABLE FUEL			36	79	2844
BASIC EMPTY WEIGHT					

WEIGHT AND BALANCE RECORD

SERIAL NO. ______ REGISTRATION NO. ______ PAGE NO. ______

DATE	ITEM NO.		DESCRIPTION OF ARTICLE OR CHANGE	WEIGHT CHANGE ADDED (+) OR REMOVED (-)			RUNNING BASIC EMPTY WEIGHT	
	IN	OUT		WT (LBS)	ARM (IN.)	MOM 100	WT (LBS)	MOM 100

WEIGHT AND BALANCE RECORD

SERIAL NO. ________ REGISTRATION NO. ________ PAGE NO. ________

DATE	ITEM NO.		DESCRIPTION OF ARTICLE OR CHANGE	WEIGHT CHANGE ADDED (+) OR REMOVED (-)			RUNNING BASIC EMPTY WEIGHT	
	IN	OUT		WT (LBS)	ARM (IN.)	MOM 100	WT (LBS)	MOM 100

NOTE

Each new airplane is delivered with a completed sample loading, empty weight and center of gravity, and equipment list, all pertinent to that specific airplane. It is the owner's responsibility to ensure that changes in equipment are reflected in a new weight and balance and in an addendum to the equipment list. There are many ways of doing this; it is suggested that a running tally of equipment changes and their effect on empty weight and c.g. is a suitable means for meeting both requirements.

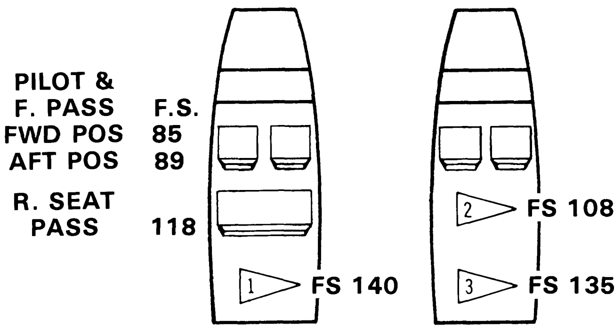
The current equipment list and empty weight and c.g. information must be retained with the airplane when it changes ownership. Beech Aircraft Corporation cannot maintain this information; the current status is known only to the owner. If these papers become lost, the FAA will require that the airplane be re-weighed to establish the empty weight and c.g. and that an inventory of installed equipment be conducted to create a new equipment list.

LOADING INSTRUCTIONS

It is the responsibility of the airplane operator to ensure that the airplane is properly loaded. At the time of delivery, Beech Aircraft Corporation provides the necessary weight and balance data to compute individual loadings. All subsequent changes in airplane weight and balance are the responsibility of the airplane owner and/or operator.

The empty weight and moment of the airplane at the time of delivery are shown on the airplane Empty Weight and Balance form. Useful load items which may be loaded into the airplane are shown on the Useful Load Weight and Moment tables. The minimum and maximum moments are indicated on the Moment Limits vs Weight table. These moments correspond to the forward and aft center of gravity flight limits for a particular weight. All moments are divided by 100 to simplify computations.

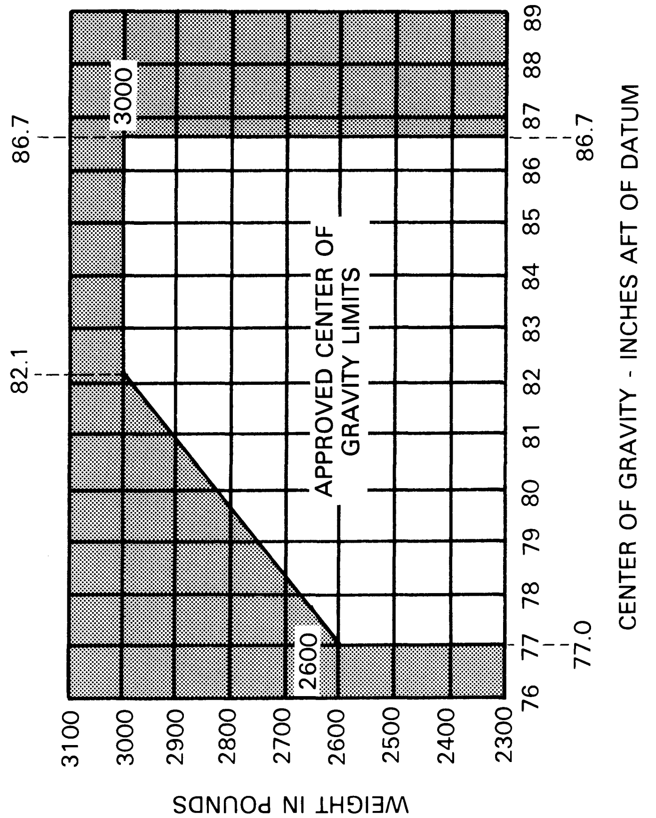
SEATING, BAGGAGE AND EQUIPMENT ARRANGEMENTS



1. MAXIMUM WEIGHT 270 POUNDS INCLUDING EQUIPMENT AND BAGGAGE.
2. MAXIMUM WEIGHT 200 POUNDS FORWARD OF REAR SPAR INCLUDING EQUIPMENT AND CARGO WITH REAR SEAT REMOVED.
3. MAXIMUM WEIGHT 270 POUNDS AFT OF REAR SPAR INCLUDING EQUIPMENT AND CARGO WITH REAR SEAT REMOVED.

ALL BAGGAGE/CARGO MUST BE SECURED

CENTER OF GRAVITY



MOMENT LIMITS vs WEIGHT

Moment limits are based on the following weight and center of gravity limit data (landing gear down).

WEIGHT CONDITION	FORWARD CG LIMIT	AFT CG LIMIT
3000 lb. (take-off or landing)	82.1	86.7
2600 lb. or less	77.0	86.7

Weight	Minimum Moment/100	Maximum Moment/100
2100	1617	1821
2110	1625	1829
2120	1632	1838
2130	1640	1847
2140	1648	1855
2150	1656	1864
2160	1663	1873
2170	1671	1881
2180	1679	1890
2190	1686	1899
2200	1694	1907
2210	1702	1916
2220	1709	1925
2230	1717	1933
2240	1725	1942
2250	1733	1951
2260	1740	1959
2270	1748	1968
2280	1756	1977
2290	1763	1985

Weight	Minimum Moment / 100	Maximum Moment / 100
2300	1771	1994
2310	1779	2003
2320	1786	2011
2330	1794	2020
2340	1802	2029
2350	1810	2037
2360	1817	2046
2370	1825	2055
2380	1833	2063
2390	1840	2072
2400	1848	2081
2410	1856	2089
2420	1863	2098
2430	1871	2107
2440	1879	2115
2450	1887	2124
2460	1894	2133
2470	1902	2141
2480	1910	2150
2490	1917	2159
2500	1925	2168
2510	1933	2176
2520	1940	2185
2530	1948	2194
2540	1956	2202
2550	1964	2211
2560	1971	2220
2570	1979	2228
2580	1987	2237
2590	1994	2246

MOMENT LIMITS vs WEIGHT (Continued)

Weight	Minimum Moment/100	Maximum Moment/100
2600	2002	2254
2610	2013	2263
2620	2024	2272
2630	2035	2280
2640	2046	2289
2650	2057	2298
2660	2069	2306
2670	2080	2315
2680	2091	2324
2690	2102	2332
2700	2113	2341
2710	2125	2350
2720	2136	2358
2730	2147	2367
2740	2159	2376
2750	2170	2384
2760	2182	2393
2770	2193	2402
2780	2204	2410
2790	2216	2419
2800	2227	2428
2810	2239	2436
2820	2251	2445
2830	2262	2454
2840	2274	2462
2850	2285	2471
2860	2297	2480
2870	2309	2488
2880	2320	2497
2890	2332	2506

Weight	Minimum Moment/100	Maximum Moment/100
2900	2344	2514
2910	2356	2523
2920	2368	2532
2930	2379	2540
2940	2391	2549
2950	2403	2558
2960	2415	2566
2970	2427	2575
2980	2439	2584
2990	2451	2592
3000	2463	2601

COMPUTING PROCEDURE

1. Record the *Basic Empty Weight and Moment from the Basic Empty Weight and Balance form (or from the latest superseding form) under the Basic Empty Condition block. The moment must be divided by 100 to correspond to Useful Load Weights and Moments tables.

2. Record the weight and corresponding moment from the appropriate table of each of the useful load items (except fuel) to be carried in the airplane.

3. Total the weight column and moment column. The SUB-TOTAL is the Zero Fuel Condition.

4. Determine the weight and corresponding moment for the fuel loading to be used. This fuel loading includes fuel for the flight, plus that required for start, taxi, and take-off. Add the Fuel to Zero Fuel Condition to obtain the SUB-TOTAL Ramp Condition.

5. Subtract the fuel to be used for start, taxi, and take-off to arrive at the SUB-TOTAL Take-off Condition.

6. Subtract the weight and moment of the fuel in the incremental sequence in which it is to be used from the take-off weight and moment. The Zero Fuel Condition, the Take-Off Condition, and the Landing Condition moment must be within the minimum and maximum moments shown on the Moment Limit 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 total moment is greater than the maximum moment allowed, useful load items must be shifted forward or aft load items reduced. If the quantity or location of load items is changed, the calculations must be revised and the moments rechecked.

* The Empty Weight for the airplane may be converted to Basic Empty Weight by adding the weight and moment for full oil. (19 lbs. and 494 lb. in.)

The following Sample Loading chart is presented to depict the sample method of computing a load. Weights used DO NOT reflect an actual airplane loading.

WEIGHT AND BALANCE LOADING FORM

DEBONAIR B33 DATE ______

SERIAL NO. CD-XXX REG NO. NXXX

SAMPLE

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION	1913	1490
2. FRONT SEAT OCCUPANTS	340	288
3. REAR SEAT OCCUPANTS	340	402
4. BAGGAGE	33	46
5. CARGO		-
6. CARGO		-
7. SUB TOTAL ZERO FUEL CONDITION	2626	2226
8. FUEL LOADING (64 GAL)	384	288
9. SUB TOTAL RAMP CONDITION	3010	2514
10. *LESS FUEL FOR START, TAXI, AND TAKE-OFF	-10	-8
11. SUB TOTAL TAKE-OFF CONDITION	3000	2506
12. LESS FUEL TO DESTINATION (55 GAL)	-330	-248
13. LANDING CONDITION	2670	2258

*Fuel for start, taxi and take-off is normally 10 lbs at an average mom/100 of 8.

WEIGHT AND BALANCE LOADING FORM

DEBONAIR ______________ DATE ______________

SERIAL NO. ______________ REG NO. NXXX

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION		
2. FRONT SEAT OCCUPANTS		
3. REAR SEAT OCCUPANTS		
4. BAGGAGE		
5. CARGO		
6. CARGO		
7. SUB TOTAL ZERO FUEL CONDITION		
8. FUEL LOADING (GAL)		
9. SUB TOTAL RAMP CONDITION		
10. *LESS FUEL FOR START, TAXI, AND TAKE-OFF		
11. SUB TOTAL TAKE-OFF CONDITION		
12. LESS FUEL TO DESTINATION (GAL)		
13. LANDING CONDITION		

*Fuel for start, taxi and take-off is normally 10 lbs at an average mom/100 of 8.

USEFUL LOAD WEIGHTS AND MOMENTS

OCCUPANTS

	Front Seats		Rear Seat
	Fwd Position	Aft Position	
	ARM 85	ARM 89	ARM 118
WEIGHT	MOM/100	MOM/100	MOM/100
120	102	107	142
130	110	116	153
140	119	125	165
150	128	134	177
160	136	142	189
170	144	151	201
180	153	160	212
190	162	169	224
200	170	178	236

NOTE: OCCUPANT POSITIONS FOR ADJUSTABLE SEATS ARE SHOWN AT THEIR EXTREME POSITIONS. INTERMEDIATE POSITIONS WILL REQUIRE INTERPOLATION OF THE MOMENT/100 VALUES.

BAGGAGE
ARM 140

Weight	Moment/100	Weight	Moment/100
10	14	70	98
20	28	80	112
30	42	90	126
40	56	100	140
50	70	110	154
60	84	120	168

BAGGAGE (Continued)
ARM 140

Weight	Moment/100	Weight	Moment/100
130	182	210	294
140	196	220	308
150	210	230	322
160	224	240	336
170	238	250	350
180	252	260	364
190	266	270	378
200	280		

CARGO (With Rear Seat Removed)

AHEAD OF SPAR ARM 108		AFT OF SPAR ARM 135	
Weight	Moment/100	Weight	Moment/100
20	22	20	27
40	43	40	54
60	65	60	81
80	86	80	108
100	108	100	135
120	130	120	162
140	151	140	189
160	173	160	216
180	194	180	243
200	216	200	270
		220	297
		240	324
		260	351
		270	364

*USABLE FUEL

LEADING EDGE TANKS ARM 75		
Gallons	Weight	Moment/100
5	30	23
10	60	45
15	90	68
20	120	90
25	150	113
30	180	135
35	210	158
40	240	180
44	264	198
50	300	225
55	330	248
60	360	270
65	390	293
70	420	315
74	444	333

*Optional Fuel System Included

*OIL

Quarts	Weight	Moment/100
10	19	5

*Included in Basic Empty Weight

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SECTION VII

SYSTEMS DESCRIPTION

TABLE OF CONTENTS

SUBJECT *PAGE*

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

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AIRFRAME

The BEECHCRAFT A33 and B33 Debonairs are 4-place, all-metal, low-wing, single-engine airplanes with retractable tricycle landing gear and conventional horizontal and vertical stabilizers.

FLIGHT CONTROLS

CONTROL SURFACES

Control surfaces are operated through push-pull rods and conventional cable systems terminating in bellcranks.

CONTROL COLUMN

The throw-over type control column for elevator and aileron control can be placed in front of either front seat. Pull the T-handle latch at the back of the control arm and position the control wheel as desired. The aileron trimmer on the control column hub should be held until the column is repositioned. Check for full freedom of movement after repositioning the control.

The optional dual control column is required for flight instruction.

RUDDER PEDALS

To adjust the rudder pedals, press the spring-loaded lever on each pedal arm and move the pedal forward or aft. The adjustment lever can also be used to place the right set of rudder pedals against the floor when not in use.

TRIM CONTROLS

Elevator trim is controlled by a handwheel located to the left of the throttle. An elevator tab indicator dial is located near the control column.

The aileron trimmer on the control column hub displaces the ailerons; displacement is maintained by cable loads imposed by the trimmer.

INSTRUMENT PANEL

The instrument panel for the A33 Debonair consists of fixed and floating panels, an engine instrument cluster on the center of the instrument panel above the control column, a radio grouping on the left side of the instrument panel, and subpanels which provide a compact circuit breaker group on the right side, and switch panels on both sides.

The instrument panel for the B33 Debonair consists of fixed and floating panels, an engine instrument cluster on the left subpanel, a radio grouping on the right side of the instrument panel and subpanels which provide a compact circuit breaker group across the base of the instrument panel.

FLIGHT INSTRUMENTS

Standard flight instrumentation on the Debonair includes an airspeed indicator and altimeter mounted in the instrument panel and a magnetic compass mounted on the windshield divider.

In addition to several radio-navigation combinations, optional instruments for which openings are provided in the instrument panel include vertical speed and turn and bank indicators, a vacuum operated directional gyro and attitude gyro, and the suction gage necessary when these instruments are installed. An outside air temperature indicator and clock are also included as optional equipment.

POWER PLANT INSTRUMENTS

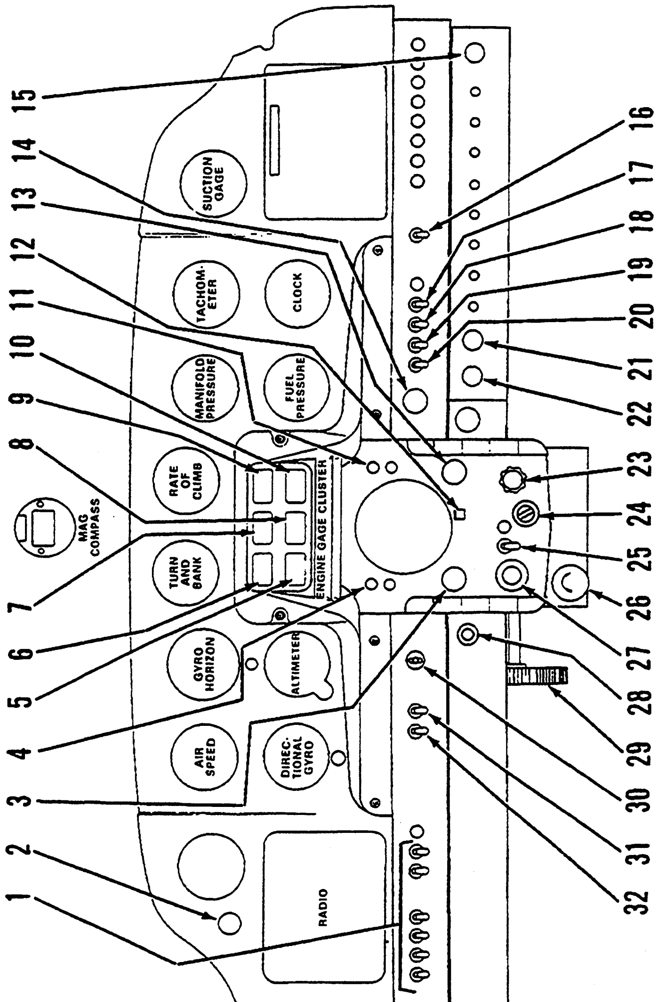
The engine instruments include: cylinder head temperature, oil temperature, oil pressure indicators, tachometer, manifold pressure, fuel pressure (flow), fuel quantity indicators, and an ammeter.

CLUSTER TYPE POWER PLANT INSTRUMENTS

Except for the tachometer, manifold pressure gage and fuel pressure (flow) gage, the power plant instruments are grouped together in a cluster. The engine gage cluster includes the fuel quantity gages, oil pressure gage, the oil temperature and cylinder head temperature indicators and ammeter. Each fuel quantity gage gives an instantaneous and continuous indication of fuel quantity in the particular cell.

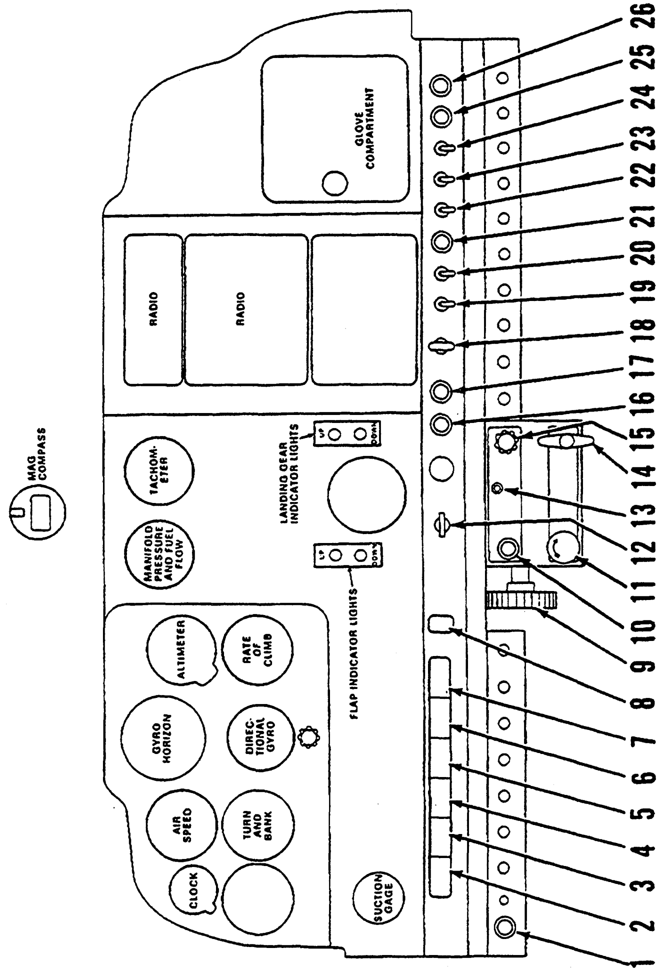
The cylinder head temperature sensor is installed in the engine cylinder which, because of location in the compartment, has the highest temperature reading. Monitor cylinder head temperature after power setting adjustments are made, to assure that the engine operating temperature remains in the desired range.

The oil pressure normal operating range is 30 to 60 psi. The oil pressure should be checked when starting the engine and with extra attention when starting during cold weather. The oil temperature operating range is 100°F to 240°F. Monitor the oil temperature after starting to assure temperature is above minimum before advancing the throttle above warm-up rpm and on descent with power reduced to avoid overcooling.


SUCTION GAGE
TACHOM-ETER
CLOCK
MANIFOLD PRESSURE
FUEL PRESSURE
RATE OF CLIMB
MAG COMPASS
TURN AND BANK
ENGINE GAGE CLUSTER
GYRO HORIZON
ALTIMETER
AIR SPEED
DIREC-TIONAL GYRO
RADIO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32

A33
TYPICAL INSTRUMENT PANEL

1. Radio Switches
2. Stall Warning Indicator
3. Radio Lights
4. Flap Indicator Lights
5. Aux Fuel
6. Main Fuel
7. Oil Temperature
8. Cylinder Head Temperature
9. Ammeter
10. Oil Pressure
11. Landing Gear Indicator Lights
12. Elevator Tab Position Indicator
13. Instrument Lights
14. Landing Gear Switch
15. Fire Door Control
16. Beacon Switch
17. Generator Switch
18. Battery Switch
19. Nav Lights Switch
20. Landing Light Switch
21. Cabin Heat Control
22. Parking Brake Control
23. Propeller Control
24. Ignition Key Switch
25. Aux Fuel Pump Switch
26. Mixture Control
27. Throttle
28. Starter Switch
29. Elevator Trim Tab Control
30. Flap Switch
31. Aux Fuel Gage Switch
32. Main Fuel Gage Switch


MAG COMPASS
TACHOMETER
MANIFOLD PRESSURE AND FUEL FLOW
ALTIMETER
RATE OF CLIMB
GYRO HORIZON
DIRECTIONAL GYRO
AIR SPEED
TURN AND BANK
CLOCK
SUCTION GAGE
FLAP INDICATOR LIGHTS
LANDING GEAR INDICATOR LIGHTS
UP
DOWN
UP
DOWN
RADIO
RADIO
GLOVE COMPARTMENT
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

B33
TYPICAL INSTRUMENT PANEL

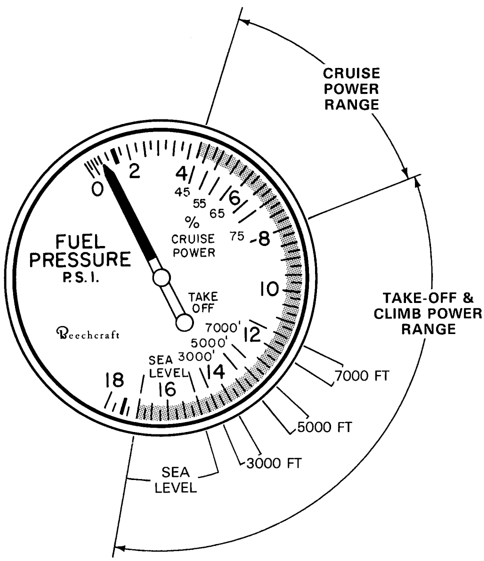
1. Vent Shutoff Control
2. Left Fuel Gage
3. Oil Pressure Gage
4. Cylinder Head Temperature Gage
5. Oil Temperature Gage
6. Ammeter
7. Right Fuel Gage
8. Elevator Tab Indicator
9. Elevator Trim Tab Control
10. Throttle
11. Mixture Control
12. Flap Position Switch
13. Auxiliary Fuel Pump Switch
14. Alternate Air Control (If Installed)
15. Propeller Control
16. Radio Lights Rheostat
17. Instrument Lights Rheostat
18. Landing Gear Position Switch
19. Lower Landing Light Switch
20. Upper Landing Light Switch
21. Parking Brake Control
22. Rotating Beacon Switch
23. Navigation Lights Switch
24. Pitot Heat Switch
25. Cabin Heat Control
26. Defrost Control

TACHOMETER, MANIFOLD PRESSURE AND FUEL PRESSURE (FLOW) GAGE

The manifold pressure gage, fuel pressure (flow) gage and tachometer are mounted in the instrument panel proper.

The tachometer is driven by a flexible shaft from the engine accessory section. Incorporated in the tachometer is an engine hour meter which automatically records the total engine operating time.

The manifold pressure instrument indicates the pressure of the fuel-air mixture entering the engine cylinders and is calibrated in inches of mercury. By observing the manifold pressure indications and adjusting the propeller and throttle controls, the power output of the engine can be regulated. To avoid excessive cylinder pressures during

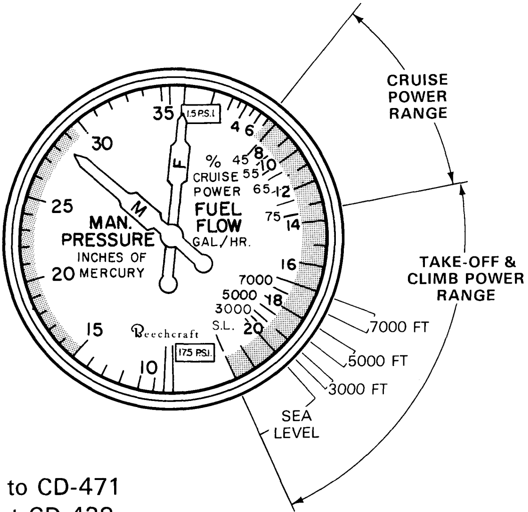


A33 FUEL PRESSURE INDICATOR

cruise operations, observe the maximum recommended rpm and manifold pressure as indicated on the Manifold Pressure vs RPM graph in the PERFORMANCE Section.

(A33)

The fuel pressure indicator is calibrated in psi, the green arc indicating fuel pressure for normal operating limits. Red radials are placed at the minimum and maximum allowable fuel pressures.

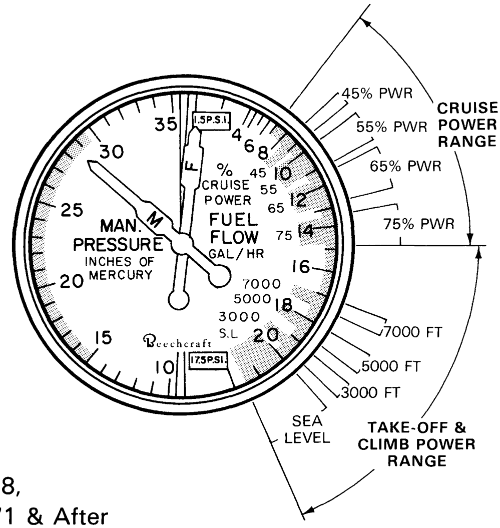


Prior to CD-471
except CD-438

B33 FUEL FLOW INDICATOR

(B33)

The fuel flow indicator is calibrated in gallons per hour, the green arc indicating fuel flow for normal operating limits. Red radials are placed at the minimum and maximum allowable fuel pressures.



CD-438,
CD-471 & After

B33 FUEL FLOW INDICATOR

In the cruise power range, the green sectors cover the fuel pressure (flow) required from 45% to 75% power. The lowest value of a given sector is the cruise-lean setting, and the highest value of the sector is the best-power setting for that particular power range.

The take-off and climb range is covered by green sectors for full power at various altitudes. The high side of each green sector represents the fuel pressure (flow) setting required to achieve maximum power at the specified altitude when operating full throttle at 2600 rpm. These values should correspond to the fuel pressure (flow) values on the Climb graph in the PERFORMANCE Section.

SWITCHES (A33)

The battery master switch and generator switch are located on the inboard side of the right subpanel. The auxiliary fuel pump and key operated ignition switch are located below the control column and the push button starter switch to the left of the control column.

Switches on the right and left subpanels operate landing gear, flaps, exterior lighting, and radios. Attached to the lower center section of the subpanel are the powerplant controls and interior lighting rheostats. Flap indicator lights are to the left of the control column and landing gear indicator lights to the right.

SWITCHES (B33)

The battery master switch, generator switch and key operated magneto/start switch are located on an escutcheon assembly at the left side of the instrument panel.

Switches on the upper subpanel operate the landing gear, flaps, and interior and exterior lighting. Attached to the lower center section of the subpanel are the powerplant controls and auxiliary fuel pump switch. Flap indicator lights are to the left of the control column and landing gear indicator lights to the right.

GROUND CONTROL

Steering is accomplished by use of the rudder pedals through a linkage arrangement which connects the nose strut to the rudder pedal shaft. Nose wheel straightening is accomplished by engagement of a roller with a track as the nose wheel is retracted. The steering link attaches to the steering mechanism on the nose strut with a swivel connection which permits the mechanism to disengage when the nose gear is retracted and operation of the rudder pedals will have no tendency to turn the nose wheel with the gear retracted.

The minimum wing tip turning radius, using full steering, one brake and partial power, is 26 feet 4 inches.

WING FLAPS

The wing flaps are controlled by a three-position switch, UP, OFF and DOWN, located on the subpanel to the left of the center console. The control must be pulled out of detent before it can be repositioned.

The flap position lights on the left side of the control console show green for the up position and red for the full-down landing position— intermediate 20-degree and 10-degree positions are indicated by lines painted on the leading edge of the left flap. The intermediate positions are reached when the marks are aligned with the trailing edge of the wing.

Limit switches automatically turn off the electric motor when the flaps reach the extremes of travel. Intermediate flap positions can be obtained by placing the switch in the OFF position as the flaps reach the desired position during flap extension or retraction.

LANDING GEAR SYSTEM

CAUTION

Never taxi with a flat strut.

The landing gears are operated through adjustable linkage connected to an actuator assembly mounted beneath the front seats. The actuator assembly is driven by an electric motor. The landing gears may be electrically retracted and extended, and in an emergency may be extended manually.

CONTROL SWITCH

The landing gear is controlled by a two-position switch on the right side of the subpanel. The switch handle must be pulled out of the safety detent before it can be moved to the opposite position.

POSITION INDICATORS

Landing gear position indicator lights on the right side of the control console show red when the gear is up, or green when it is down, illuminating only when the actuator assembly reaches either extreme. In addition, a mechanical indicator on the floorboard beneath the control console shows the position of the nose gear. Its pointer is linked by a cable to the actuating mechanism and moves simultaneously with it. Limit switches and a dynamic brake automatically stop the retract mechanism when the gear reaches its full up or full down position.

CIRCUIT BREAKER

The landing gear circuit breaker is located on the (right - A33) (left - B33) subpanel. This circuit breaker is a pull-and-reset type breaker. The breaker will pop out under overload conditions.

SAFETY SWITCH

To prevent inadvertent retraction of the landing gear on the ground, a main strut safety switch opens the control circuit when the strut is compressed.

WARNING

> Never rely on the safety switch to keep the gear down during taxi or on take-off, landing roll, or in a static position. Always make certain that the landing gear switch is in the down position during these operations.

WARNING HORN

With the landing gear retracted, if the throttle is retarded below approximately 12 in. Hg manifold pressure, a warning horn will sound intermittently.

BRAKES

The brakes on the main landing gear wheels are operated by applying toe pressure to the rudder pedals.

CAUTION

> Continuous brake application of either the pilot's or copilot's brake pedals in conjunction with an overriding pumping action from the opposite brake pedals could result in the loss of braking action on the side which continuous pressure is being applied.

The parking brake push-pull control is located on the right subpanel. To set the parking brakes, pull control out and depress both toe pedals until firm. Push the control in to release the brakes.

CAUTION

> The parking brake should be left off and wheel chocks installed if the airplane is to be left unattended. Changes in ambient temperature can cause the brake to release or to exert excessive pressures.

MANUAL EXTENSION

The landing gear can be manually extended by operating a handcrank at the rear of the front seats. This procedure is described in the EMERGENCY PROCEDURES section.

BAGGAGE COMPARTMENT

The baggage compartment is accessible through the baggage door on the right side of the fuselage. Loading within the baggage compartment must be in accordance with the data in the WEIGHT AND BALANCE Section. All baggage must be secured.

WARNING

Do not carry hazardous material anywhere in the airplane.

Do not carry children in the baggage compartment.

SEATS AND SEAT BELTS

SEAT ADJUSTMENTS

Both of the individual front seats are adjustable fore-and-aft, by pulling up on the small lever in front of each seat cushion and pulling or pushing on the seat. In addition, the A33 front seat backs are adjustable by a set screw located on the inboard side of both seat backs. Moving the seat back forward and turning the set screw in or out regulates the position of the seat back either backward or forward. The B33 front seat backs are adjustable to any of four positions by operating a release lever on the inboard side of each seat.

Armrests for both front and rear seat passengers are built into the cabin sidewalls and the door. In addition, an armrest between the two front seats may be raised into position or lowered flush with the seat cushions.

Headrests are available for the B33 model.

DOORS, WINDOWS AND EXITS

CABIN DOOR

The outside cabin door handle is spring loaded to fit into a recess in the door to create a flat aerodynamically clean surface. To open the door from the outside, lift the handle from its recess and pull until the door opens.

To close the cabin door from the inside, observe that the door handle is in the unlocked position. In this position, the latch handle is free to move approximately one inch in either direction before engagement of the locking mechanism. Then grasp the door and firmly pull the door closed. Rotate the door handle fully counterclockwise into the locked position. When the door is properly locked, the door latch handle is free to move approximately one inch in either direction.

NOTE

When checking the door latch handle, do not move it far enough to engage the door latch release mechanism.

Press firmly outward at the top rear corner of the door. If any movement of the door is detected, completely open the door and close again following the above instructions.

To open the door from the inside, depress the lock button and rotate the handle clockwise.

CONTROL COLUMN LOCK PIN

1. Rotate control wheel and move column so the hole in the bracket and the column align to accept pin.

2. Push the control column lock pin through the hole provided in the control column hanger and into the hole in the control column tube assembly.

3. Ensure positive retention of the lock pin by positioning the attached red plate on top of the throttle and propeller controls.

WARNING

Before starting engine, remove the lock.

POWER PLANT

The BEECHCRAFT Debonair A33 and B33 are both powered by a Continental six-cylinder, horizontally-opposed engine. The IO-470-J (installed on 33 series airplanes, serials prior to CD-301 and including CD-386 and CD-387) is a wet sump, fuel-injection engine, rated at 225 hp at 2600 rpm for take-off and maximum continuous operation. The IO-470-K (CD-301 through CD-813 except CD-386 and CD-387) is identically rated but not directly interchangeable with the IO-470-J engine.

ENGINE CONTROLS

THROTTLE, PROPELLER, AND MIXTURE

The push-pull throttle, propeller and mixture controls are located on the control console. The throttle and propeller controls are released for repositioning by pushing a button on the knob. With the button extended, fine adjustments are accomplished by rotating the knob, clockwise to increase and counterclockwise to decrease. Do not rotate clockwise with control fully advanced. The mixture control may be repositioned by pushing or pulling and locked into position by rotating the knob clockwise.

INDUCTION SYSTEM ICING

The possibility of induction system icing is reduced by the non-icing characteristics of the fuel injected engine and the automatic alternate air source. Under certain conditions, however, impact ice can form at several points in the induction system. If the air intake or filter becomes clogged with ice, a spring-loaded door in the air intake duct will open automatically and the induction system will operate on alternate air.

LUBRICATION SYSTEM

The engine oil system is the full pressure, wet sump type and has a 10-quart capacity. Oil operating temperatures are controlled by an automatic thermostat bypass control. The bypass control will limit oil flow through the oil cooler when operating temperatures are below normal and will permit the oil to bypass the cooler if it should become blocked.

STARTER

The starter is relay-controlled to minimize the length of heavy cable required to carry the high amperage of the starter circuit.

The A33 starter is actuated by a push button type, momentary-on switch located on the left of the control column. To energize the circuit, rotate the magneto switch to the BOTH position, then press the starter button.

The B33 starter is actuated by a rotary type, momentary-on switch incorporated in the magneto/start switch. To energize the starter circuit, rotate the magneto/start switch beyond the BOTH position to START. After starting, release the switch and observe that it returns to the BOTH position.

PROPELLER

(A33 and B33)

Hartzell constant speed, two blade, 84 inch diameter propeller using a Hartzell BHC-92ZF-1D1 hub with 8447 blades.

or

Flottorp constant speed, two blade, 84 inch diameter propeller using a Flottorp F12A series hub with 8400-0 blades.

(B33 ONLY)

McCauley constant speed, two blade, 84 inch diameter propeller using a McCauley 2A36C23 hub with 84B-0 blades.

Propeller rpm is controlled by a governor which regulates hydraulic oil pressure to the blades. A push-pull knob on the control console allows the pilot to select the governor's rpm range.

If oil pressure is lost, the propeller will go to the full high rpm position. This is because propeller low rpm is obtained by governor boosted engine oil pressure working against the centrifugal twisting moment of the blades.

FUEL SYSTEM

The airplane is designed for operation on 80/87 grade (red) aviation gasoline. In the event this grade is not available only a higher rated fuel shall be used.

CAUTION

> Before refueling, make certain the airplane and fuel dispensing unit are properly grounded. Failure to do so creates a fire hazard.

FUEL CELLS (A33)

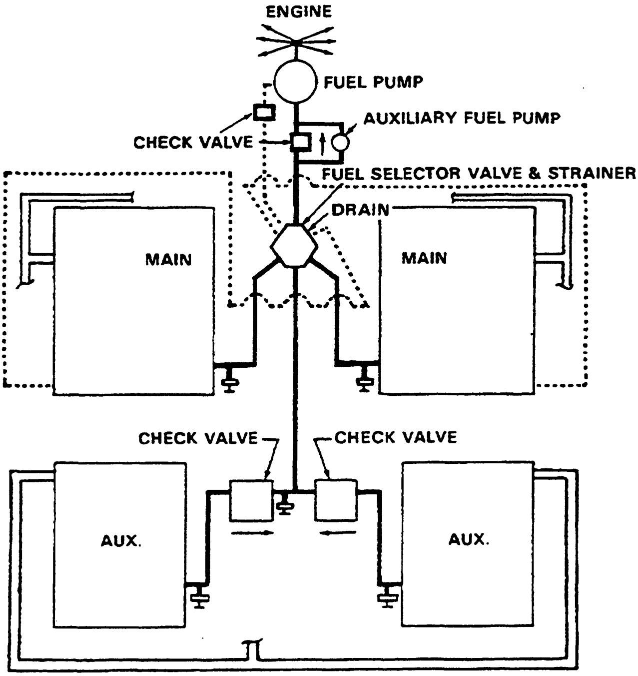
Either the 44-gallon usable (50-gallon capacity) standard system or the 63-gallon usable (70-gallon capacity) optional system is available. The standard system consists of a rubber fuel cell in each wing leading edge with a flush type filler cap. If installed an additional 19 gallons of usable fuel is available in two auxiliary 10-gallon fuel cells in the wings, outboard of the wheel wells. Both auxiliary cells are connected to a common port in the fuel selector valve, so that both feed simultaneously when the fuel selector is set to AUX.

The two optional 10-gallon auxiliary tanks may be filled after removing the pressure-type filler caps, located aft and outboard of the main tank filler caps. Do not overfill the tanks.

The fuel injection system returns about 10 gallons per hour of excess fuel. Fuel return lines are routed through the selector valve to each main cell. Except for the auxiliary cells, fuel is returned to the cell from which it is drawn. The auxiliary cells return fuel to the left main cell only. To provide space for the returned fuel from the auxiliary cells, the left main cell should be used to approximately half full before switching to auxiliary.

If the engine is allowed to stop firing, due to insufficient fuel, refer to the EMERGENCY PROCEDURES section for the Air Start procedures.

A33 FUEL SYSTEM SCHEMATIC



LEGEND

FUEL SUPPLY

FUEL RETURN

FUEL TANK VENT

FUEL CELLS (B33)

Either the 44-gallon usable (50-gallon capacity) standard fuel system or the 74-gallon usable (80-gallon capacity) optional fuel system is available. The fuel system consists of a rubber fuel cell in each wing leading edge with a flush type filler cap. On CD-514 and after, a visual measuring tab is attached to the filler neck of the optional system. The bottom of the tab indicates 27 gallons of usable fuel and the detent on the tab indicates 32 gallons of usable fuel in the tank.

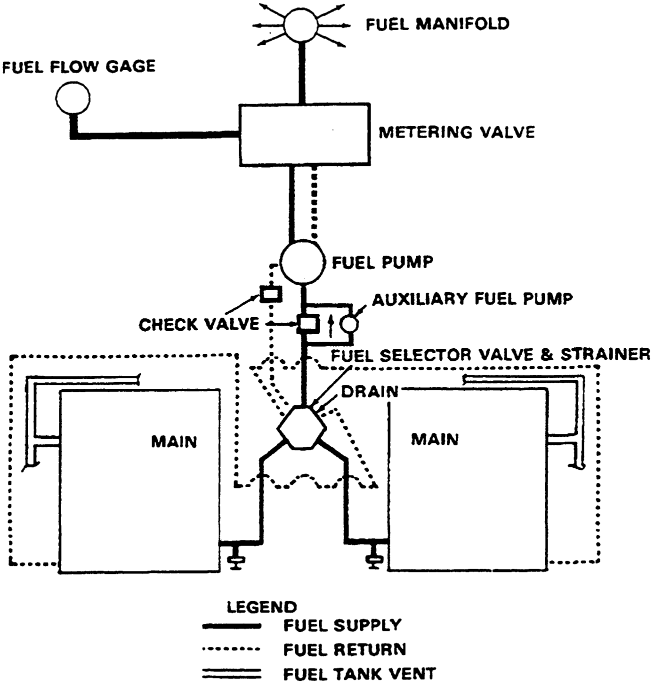
The engine driven fuel injector pump delivers approximately 10 gallons of excess fuel per hour, which bypasses the fuel control and returns to the tank being used. Three fuel drains are provided, one in each fuel sump on the underside of each wing and one in the fuel selector valve inboard of the left wing root. These points should be drained daily before the first flight.

FUEL QUANTITY INDICATION SYSTEM

Fuel quantity is measured by float operated sensors, located in each fuel tank. These transmit electrical signals to the individual indicators that indicate fuel remaining in the tank.

Individual main and auxiliary fuel quantity indicators for the A33 are located on the engine instrument cluster. Fuel quantity for each main or auxiliary tank may be read by positioning the fuel gage selector switches (located on the left subpanel) either RIGHT or LEFT. The B33 fuel quantity may be read directly from the two fuel indicators located on the left subpanel.

B33 FUEL SYSTEM SCHEMATIC



AUXILIARY FUEL PUMP

The electric auxiliary fuel pump is controlled by an ON-OFF toggle switch on the control console. It provides pressure for starting and emergency operation. Immediately after starting, the auxiliary fuel pump can be used to purge the system of vapor caused by an extremely high ambient temperature or a start with the engine hot. The auxiliary fuel pump provides for near maximum engine performance should the engine driven pump fail.

FUEL TANK SELECTION

The fuel selector unit handle is located forward and to the left of the pilot's seat. Take-offs should be made using the left main tank (A33), or tank more nearly full (B33). Landings should be made using the main tank that is more nearly full. In no case should a take-off be made if the fuel indicators show less than 13 gallons of fuel in each main tank.

If the engine stops because of insufficient fuel, refer to the EMERGENCY PROCEDURES Section for the Air Start procedures.

FUEL REQUIRED FOR FLIGHT

It is the pilot's responsibility to ascertain that the fuel quantity indicators are functioning and maintaining a reasonable degree of accuracy, and be certain of ample fuel for a flight. Takeoff is prohibited if the fuel quantity indicators do not indicate above the yellow arc. An inaccurate indicator could give an erroneous indication of fuel quantity. A minimum of 13 gallons of fuel is required in each main tank before takeoff.

The filler caps should be removed and fuel quantity checked to give the pilot an indication of fuel on board. The airplane must be approximately level for visual inspection of the tank. If the pilot is not sure that at least 13 gallons are in each tank, add necessary fuel so that the amount of fuel will be not less than 13 gallons per tank at takeoff. Plan for an ample margin of fuel for any flight.

ELECTRICAL SYSTEM

The system circuitry is the single-wire, ground-return type, in which the airplane structure itself is used as the ground return.

The battery ON-OFF switch and the generator ON-OFF switch are located on the right subpanel on the A33 and to the left of the instrument panel with the magneto/start key switch on the B33. The IGNITION key switch of the A33 is located below the control column. The circuit breaker panel is located on the right subpanel for the A33 and both subpanels for the B33 and contains the protective circuit breakers for the various electrical systems.

BATTERY

A 35 ampere-hour, 12-volt battery is located on the right (aft A33/forward B33) side of the firewall. Battery servicing procedures are described in the HANDLING, SERVICING AND MAINTENANCE section.

GENERATOR

Direct-current electric power is supplied by a 12-volt engine-driven generator of 35 ampere capacity, controlled by a voltage regulator which automatically adjusts generator output to its load, including recharging the battery. A 50 ampere generator is available.

The ammeter is of the conventional charge-discharge type, showing the rate of charge or discharge of the battery. A zero reading, which should be the normal condition in cruising flight, indicates that the battery is fully charged and the generator output has been adjusted by the regulator to balance the load of electrical equipment then in use.

EXTERNAL POWER RECEPTACLE

The external power receptacle accepts a standard AN type plug. Before connecting an external power unit turn generator/alternator switch and avionic equipment OFF.

CAUTION

> A negative ground external power source is required. Check polarity before using external power.

If the external power unit does not have a standard AN type plug, connect the positive lead from the external power source to the positive battery terminal and the negative lead to the negative battery terminal.

LIGHTING SYSTEM

INTERIOR LIGHTING

Lighting for the instrument panel is furnished by lights in the cabin ceiling. They are controlled by a rheostat control located below and to the right of the control column on the A33. The rheostat is located on the right subpanel on the B33.

On the A33 a control rheostat is located to the left of the instrument light rheostat. It controls the internal lights in the radio installation. The RADIO & POST LIGHTS rheostat for the B33 controls radio lights and individual post lights located next to each instrument.

The cabin dome light is operated by an ON-OFF switch next to the overhead light.

EXTERIOR LIGHTING

The switches for all of the exterior lights are located on the pilot's right subpanel.

The exterior lights consist of navigation lights on the wing tips and tail cone, rotating beacon (optional), and a landing light. For longer battery and lamp life, use the landing light sparingly; avoid prolonged operation which could cause overheating during ground maneuvering.

NOTE

> Particularly at night, reflections from anti-collision lights on clouds, dense haze or dust can produce optical illusions and intense vertigo. Such lights, when installed, should be turned off before entering an overcast; their use may not be advisable under instrument or limited VFR conditions.

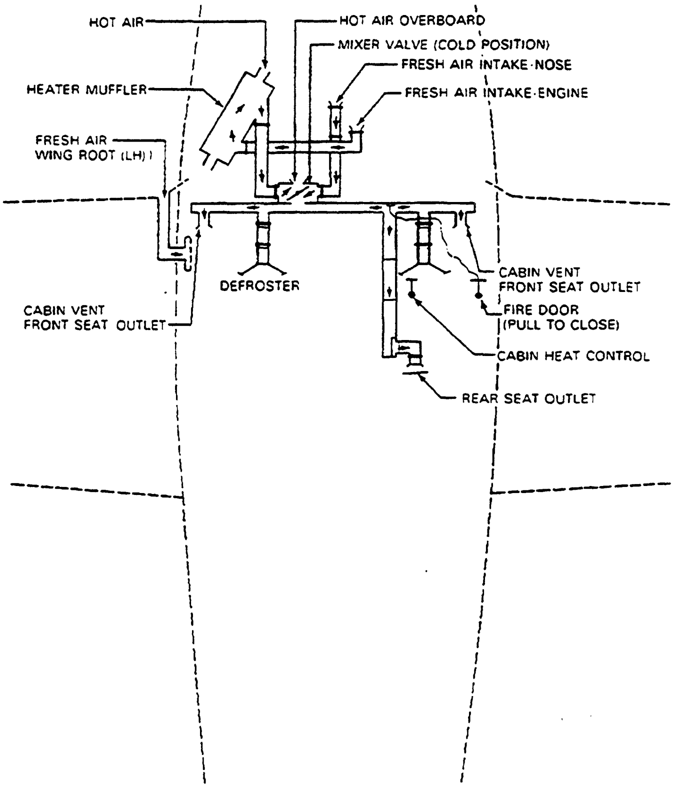
ENVIRONMENTAL SYSTEMS

CABIN HEATING

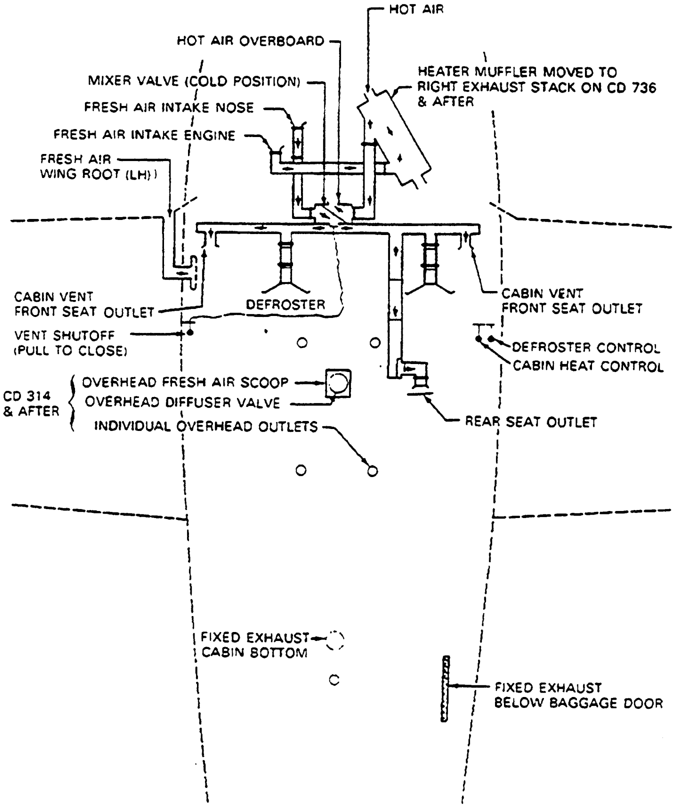
A heater muffler on the left (right on serial numbers CD-736 and after) exhaust stack provides for heated air to outlets in forward and aft areas of the cabin. Two forward outlets are located above and forward of each set of rudder pedals. One aft outlet is installed behind the right front seat. Heated air is also supplied to the windshield for defrosting.

In flight, ram air enters an intake on the left side of the nose, passes through the heater muffler, then into a mixer valve on the forward side of the firewall. In the mixer valve, the heated air is combined with a controlled quantity of unheated ram air. Air of the desired temperature is then ducted from the mixer valve to the outlets in the cabin.

A33 HEATING AND VENTILATION SYSTEM SCHEMATIC



B33 HEATING AND VENTILATION SYSTEM SCHEMATIC



HEATER AND DEFROSTER OPERATION

The cabin heat control is located on the lower right pilot's subpanel. To obtain heated air to the cabin outlets, pull the CABIN HEAT control. The control regulates the amount of cold air that is mixed with the air from the heater muff. When the control is pulled fully out, the cold air is shut off and only heated air enters the cabin. The control may be monitored at intermediate positions to obtain the desired cabin temperature.

The forward vents, located on the firewall forward of the rudder pedals, deliver heated air to the forward cabin when the CABIN HEAT control is pulled out. For maximum heat the control is pulled fully out.

To obtain heated air for defrosting the windshield, close the toe-pedal type valves on the front seat hot air outlets (A33) or pull the DEFROST control out (B33). The DEFROST control is on the subpanel. To close off all air from the heater system, pull the red FIREDOOR control (A33) or red VENT SHUT-OFF control (B33) located on the lower subpanel.

CABIN VENTILATION

In moderate temperatures, ventilation air can be obtained from the same outlets used for heating, by pushing the CABIN HEAT control full forward. However, in extremely high temperatures, it may be desirable to pull the FIREDOOR control (A33) or VENT SHUT-OFF control (B33) and use only the fresh air outlets described in the following paragraphs.

CABIN FRESH AIR OUTLETS

A duct in the left wing root is connected directly to an adjustable outlet in the upholstery panel, just below the instrument panel. The volume of air from the outlet is regulated, and the direction of airflow is controlled by rotating the louvered cover with the small knob on the rim. The large knob in the center of this outlet is a friction lock which may be tightened to hold the valve position selected.

Individual Overhead Fresh Air Outlets

An air scoop on top of the cabin conducts outside air to four individual fresh-air outlets in the overhead upholstery panel. The outlets can be manually adjusted to control both the quantity and direction of air flow. The air scoop on CD-314 and after may be closed by operating a push-pull control located on the overhead panel. On CD-314 and after, adjacent to the fresh air outlets in the overhead upholstery panel, a manually controlled diffuser valve admits fresh air to the cabin and distributes it in all directions.

EXHAUST VENTS

Air is exhausted from the cabin through two vents in the sides of the baggage compartment which flows to an exhaust vent in the belly.

PITOT AND STATIC SYSTEMS

PITOT SYSTEM

The pitot systems provides a source of impact air for operation of the airspeed indicator. The pitot mast is located on the leading edge of the left wing.

PITOT HEAT (Optional)

The pitot mast is provided with an electric heating element which is turned on and off with a switch on the instrument panel. The switch should be ON when flying in visible moisture. It is not advisable to operate the pitot heating element on the ground except for testing or for short intervals of time to remove ice or snow.

STATIC AIR SYSTEM

The static system provides a source of static air to the flight instruments through a flush static fitting on each side of the airplane fuselage. Drain moisture accumulations from the system by opening the access door on the side panel in the rear baggage compartment and removing the section of rubber hose. The rubber hose section should be removed and the moisture drained from the line every 100 hours and after exposure to visible moisture, either in the air or on the ground.

VACUUM SYSTEM

Vacuum for air driven gyroscopic flight instruments and other air driven equipment is supplied by an engine driven vacuum pump. An adjustable relief valve controls suction by bleeding outside air into the vacuum pump. The relief valve and an oil separator, which removes oil from the air, are located on the forward side of the firewall.

A suction gage indicates system vacuum in inches Hg. This instrument is located on the instrument panel; exact location may vary according to panel configuration. The vacuum should be maintained within the green arc for proper operation of the air driven instruments.

STALL WARNING

A stall warning indicator flashes a red light on the instrument panel (A33) or sounds a warning (B33) as the airplane approaches a stall condition. The stall warning indicator is triggered by a sensing vane on the leading edge of the left wing. Irregular and intermittent at first, the warning signal will become steady as the airplane approaches a complete stall.

ENGINE BREAK-IN INFORMATION

Use a straight mineral oil as recommended by the engine manufacturer throughout the break-in period. Drain the initial oil at 20 to 30 hours, replace with new mineral oil which is to be used until oil consumption stabilizes, usually a total of about 50 hours.

Drain and replace the engine oil as recommended in HANDLING, SERVICING AND MAINTENANCE. If operating conditions are unusually dusty or dirty, more frequent oil changes may be necessary. Oil changes are more critical during the break-in period than at any other time.

Use full throttle at recommended rpm for every take-off and maintain until at least 400 feet AGL, then reduce as necessary for cruise climb or cruise. Maintain the highest power recommended for cruise operations during the break-in period, avoiding altitudes above 8000 feet. Interrupt cruise power every 30 minutes or so by smoothly advancing to take-off power settings for about 30 seconds, then returning to cruise power settings.

Avoid long power-off descents especially during the break-in period. Maintain sufficient power during descent to permit cylinder head temperatures to remain in the green arc.

Minimize ground operation time, especially during warm weather. During the break-in period, avoid engine idling in excess of 15 minutes, especially in high ambient temperatures.

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SECTION VIII

HANDLING, SERVICING AND MAINTENANCE

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INTRODUCTION

The purpose of this section is to outline the requirements for maintaining the airplane in a condition equal to that of its original manufacture. This information sets the time frequency intervals at which the airplane should be taken to a BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer for periodic servicing or preventive maintenance.

The Federal Aviation Regulations place the responsibility for the maintenance of this airplane on the owner and operator of the airplane who must ensure that all maintenance is done by qualified mechanics in conformity with all airworthiness requirements established for this airplane.

All limits, procedures, safety practices, time limits, servicing and maintenance requirements contained in this handbook are considered mandatory.

Authorized BEECHCRAFT Aero or Aviation Centers and International Distributors or Dealers will have recommended modification, service, and operating procedures issued by both FAA and Beech Aircraft Corporation, designed to get maximum utility and safety from the airplane.

If there is a question concerning the care of the airplane, it is important to include the airplane serial number in any correspondence. The serial number appears on the model designation placard attached to the underside of the fuselage just forward of the tiedown.

PUBLICATIONS

The following publications are available through BEECHCRAFT Aero or Aviation Centers and International Distributors or Dealers:

1. Shop Manual
2. Parts Catalog
3. Service Instructions
4. Various Inspection Forms

NOTE

Neither Service Publications, Reissues, nor Revisions are automatically provided to the holder of this handbook. For information on how to obtain "Revision Service" applicable to this handbook, consult any BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer or refer to the latest revision of BEECHCRAFT Service Instructions No. 0250-010.

AIRPLANE INSPECTION PERIODS

1. FAA Required Annual Inspections.
2. BEECHCRAFT Recommended Inspection Guide.
3. Continuing Care Inspection Guide.
4. See "Recommended Servicing Schedule" and Overhaul or Replacement Schedule" for further inspection schedules.

NOTE

In event of emergency gear or flap extension at speeds above the respective normal extension speeds and before the next flight, inspect gear retract rods, gear doors and flaps for damage or distortion.

PREVENTATIVE MAINTENANCE THAT MAY BE ACCOMPLISHED BY A CERTIFICATED PILOT

1. A certificated pilot may perform limited maintenance. Refer to FAR Part 43 for the items which may be accomplished.

   To ensure proper procedures are followed, obtain a BEECHCRAFT Shop Manual for performing preventative maintenance.

2. All other maintenance must be performed by licensed personnel.

NOTE

Pilots operating airplanes of other than U.S. registry should refer to the regulations of the registering authority for information concerning preventative maintenance that may be performed by pilots.

ALTERATIONS OR REPAIRS TO AIRPLANE

The FAA should be contacted prior to any alterations on the airplane to ensure the airworthiness of the airplane is not violated.

NOTE

Alterations and repairs to the airplane must be made by properly licensed personnel.

GROUND HANDLING

The three-view drawing in Section 1 shows the minimum hangar clearances for a standard airplane. Allowances must be made for any special radio antennas.

CAUTION

> To ensure adequate propeller clearance, always observe recommended shock strut servicing procedures and tire inflation pressures.

TOWING

One man can move the airplane on a smooth and level surface using a hand tow bar. Attach the tow bar to the tow lugs on the nose gear lower torque knee.

Where movement is restricted, two men can pivot the airplane on the main wheels. One man should push on the wing leading edge or hold the wing tip, while the other operates the tow bar.

CAUTION

> Do not exert force on the propeller or control surfaces. Do not place weight on the stabilizers to raise the nose wheel. When towing with a tug, limit turns to prevent damage to the nose gear. Do not attempt to tow airplane backward by the tail tie down ring.

Care should be used when removing the tow bar to prevent damage to the lubrication fittings on the landing gear.

PARKING

The parking brake push-pull control is located to the right of the control console. To set the parking brakes, pull control out and depress both toe pedals until firm. Push the control in to release the brakes.

CAUTION

> The parking brake should be left off and wheel chocks installed if the airplane is to be left unattended. Changes in ambient temperature can cause the brakes to release or to exert excessive pressures.

TIE-DOWN

It is advisable to nose the airplane into the wind. Three tie-down lugs are provided:one on the lower side of each wing and a third at the rear of the fuselage.

1. Install the control column lock pin.
2. Chock the main wheels, fore and aft.
3. Using nylon line or chain of sufficient strength, secure the airplane at the three points provided. DO NOT OVER TIGHTEN; if the line at the rear of the fuselage is excessively tight, the nose may rise and produce lift due to the angle of attack of the wings.
4. Release the parking brake.

If high winds are anticipated, a vertical tail post should be installed at the rear tie-down lug, and a tie-down line attached to the nose gear.

MAIN WHEEL JACKING

1. Check the shock strut for proper inflation to prevent damage to the landing gear door by the jack adapter and to facilitate installation of the adapter.

CAUTION

Persons should not be in or on the airplane while it is on a main wheel jack.

2. Insert the main wheel jack adapter into the main wheel axle.
3. A scissors-type jack is recommended for raising and lowering the wheel.

PROLONGED OUT OF SERVICE CARE

Storage procedures are intended to protect the airplane from deterioration while it is not in use. The primary objectives of these measures are to prevent corrosion and damage from exposure to the elements.

Flyable Storage (7-30 days) has been considered here. For more extended storage periods, consult the Beech Airplane Shop Manual and Continental Service Bulletin M 74-9 or later issue.

FLYABLE STORAGE - 7 TO 30 DAYS

MOORING

If airplane cannot be placed in a hangar, tie down securely at the three points provided. Do not use hemp or manila rope. It is recommended a tail support be used to compress the nose strut and reduce the angle of attack of the wings. Attach a line to the nose gear.

ENGINE PREPARATION FOR STORAGE

Engines in airplanes that are flown only occasionally tend to exhibit cylinder wall corrosion much more than engines that are flown frequently.

Run engine at least five minutes at 1200 to 1500 rpm with oil and cylinder head temperatures in the normal operating range.

Check for correct oil level and add oil if necessary to bring level to full mark.

FUEL CELLS

Fill to capacity to minimize fuel vapor and protect cell inner liners.

FLIGHT CONTROL SURFACES

Lock with internal and external locks.

GROUNDING

Static ground airplane securely and effectively.

PITOT TUBE

Install cover.

WINDSHIELD AND WINDOWS

Close all windows and window vents. It is recommended that covers be installed over windshield and windows.

DURING FLYABLE STORAGE

Each seven days during flyable storage, the propeller shall be rotated by hand. After rotating the engine six revolutions, stop the propeller 60° or 120° from the position it was in.

WARNING

Before rotation of propeller blades, ascertain ignition switch is OFF, throttle in CLOSED position, and mixture control is in the IDLE CUT-OFF position. Always stand in the clear while turning propeller.

If at the end of 30 days airplane will not be removed from storage, the engine shall be started and run. The preferred method will be to fly the airplane for 30 minutes, and up to, but not exceeding normal oil and cylinder temperatures.

PREPARATION FOR SERVICE

Remove all covers and tape, clean the airplane and give it a thorough inspection, particularly wheel wells, flaps, and control openings.

If the engine has a total time of more than 25 hours drain the break-in oil after a ground warm-up and install straight mineral oil, which is to be used until oil consumption stabilizes. After break-in, install Teledyne Continental Motors recommended oil.

Preflight the airplane.

EXTERNAL POWER

When using external power, it is very important that the following precautions be observed:

1. The airplane has a negative ground system. Exercise care to avoid reversed polarity. Be sure to connect the positive lead of the external power unit to the positive terminal of the airplane's external power receptacle and the negative lead to the negative terminal of the external power receptacle. A positive voltage must also be applied to the small guide pin.

2. To prevent arcing, make certain no power is being supplied when the connection is made.

3. Make certain that the battery switch is ON, all avionics and electrical switches OFF, and a battery is in the system before connecting an external power unit. This protects the electronic voltage regulators and associated electrical equipment from voltage transients (power fluctuations).

CHECKING ELECTRICAL EQUIPMENT

Connect an auxiliary power unit as outlined above. Ensure that the current is stabilized prior to making any electrical equipment or avionics check.

CAUTION

If the auxiliary power unit has poor voltage regulation or produces voltage transients the equipment connected to the unit may be damaged.

SERVICING

FUEL SYSTEM

FUEL CELLS

See Consumable Materials for recommended fuel grades.

CAUTION

> Never leave bladder cells completely empty for more than a few days, as the cell inner liners may dry out and crack, permitting fuel to diffuse through the walls of the cell after refueling. If the cells are to be left empty for a week or more, a thin coating of light engine oil should be sprayed or flushed onto the inner liner of the cells.

(A33)

The standard fuel cell installation consists of a 25-gallon capacity fuel cell (22-gallon usable) and filler cap in each wing leading edge. In the optional installation an auxiliary tank in each wing adds 20 gallons (19-gallons usable) to the standard system. A filler neck for each auxiliary tank is outboard and aft of the main cell filler neck.

(B33)

The standard fuel cell installation consists of a 25-gallon capacity fuel cell (22-gallon usable) and filler cap in each wing leading edge. In the optional installation a 40-gallon capacity fuel cell (37-gallon usable) replaces the smaller capacity cell. On CD-514 and after, the filler neck in this installation contains a visual measuring tab to permit partial filling of the tank. Filling the tank until the fuel touches the bottom of the tab indicates 27 gallons of usable fuel, and filling to the slot in the tab indicates 32 gallons of usable fuel. The airplane must be level for the tabs to indicate accurately.

FUEL DRAINS

On the fuel system main cells open the three snap-type fuel drains daily to purge any water from the system. Each fuel cell drain is located on the bottom of the wing just outboard of the fuselage. The system low spot drain is at the bottom of the fuel selector valve. The drain is accessible through a door in the fuselage adjacent to the wing. When the optional auxiliary fuel system is installed (A33), also open the snap-type fuel drains on the auxiliary tanks, and a drain on the auxiliary cell interconnect line at the selector valve.

FUEL STRAINERS

At each 50 hour inspection the strainer plug should be removed from the fuel injection control valve and the fuel injection control valve screen washed in fresh cleaning solvent. After the strainer plug has been reinstalled and safetied, the installation should be checked for leakage. The strainer at the bottom of the fuel selector valve should also be removed and cleaned with solvent every 100 hours. To reduce the possibility of contaminated fuel, always cap any disconnected fuel lines or fittings.

Ordinarily the finger strainers in the fuel cell outlets should not require cleaning unless there is a definite indication of solid foreign material in the cells or the airplane has been stored for an extended period.

OIL SYSTEM

CAUTION

> Oil consumption tends to be higher during break-in periods on new engines, therefore, maximum range flights should be avoided and oil level brought to full after each flight during this period.

The engine oil filler cap and the dipstick are accessible by opening the access door on the left upper engine cowl. The sump capacity is 10 quarts. Normal operating level should be 8 to 10 quarts.

The oil should be changed and the oil screen should be cleaned every 50 hours under normal operating conditions. To assure complete drainage, the engine should be at operating temperature.

OIL CHANGE PROCEDURE

1. Remove the access plate from the engine cowl on the lower right side.
2. Locate the oil sump drain plug at the low point of the engine sump.
3. Remove the plug button below the sump drain and insert the oil drain duct.
4. Remove the oil sump drain plug.
5. Remove the oil screen and flush thoroughly. Replace the screen.

6. Replace the oil sump drain plug and fill the engine with oil.

See Consumable Materials and Approved Engine Oils for specified oils.

The engine manufacturer recommends ashless dispersant oils. In order to promote faster ring seating and oil control, a straight mineral oil should be used for the first oil change period or until oil consumption stabilizes. Oils must meet Continental Motors Corporation Specification MHS-24B. Refer to APPROVED ENGINE OILS.

BATTERY

The A33 battery is accessible by opening the right door of the engine cowling then through the access door on the firewall. The B33 battery is on the right forward side of the firewall. Check the electrolyte level after each 25 hours of operation and add distilled water as necessary. Do not overfill the battery.

Excessive water consumption may be an indication that the voltage regulator requires resetting. The specific gravity of the electrolyte should be checked periodically and maintained within the limits placarded on the battery.

The battery box is vented overboard to dispose of electrolyte and hydrogen gas fumes discharged during the normal charging operation. To ensure disposal of these fumes the vent tube should be checked frequently for obstructions and should be kept open.

TIRES

An inflation pressure of 30 psi should be maintained on the 6.00 x 6 main wheel tires. The 5.00 x 5 nose wheel tire should be inflated to 40 psi. Maintaining proper tire inflation will minimize tread wear and aid in preventing tire failure caused from running over sharp stones. When inflating tires, visually inspect them for cracks and breaks.

NOTE

Beech Aircraft Corporation cannot recommend the use of recapped tires. Recapped tires have a tendency to swell as a result of the increased temperature generated during takeoff. Increased tire size can jeopardize proper function of the landing gear retract system, with the possibility of damage to the landing gear doors and retract mechanism.

SHOCK STRUTS

The following procedures may be used for servicing both the main and the nose gear shock struts.

TO INFLATE STRUTS:

1. Check to see that the airplane is empty except for full fuel and oil.

2. While rocking the airplane gently to prevent possible binding of the piston in the barrel, inflate the shock strut until the main gear piston is extended 3 inches (3-1/2 inches on the nose gear).

CAUTION

If a compressed air bottle containing air under extremely high pressure is used, exercise care to avoid over-inflating the shock strut.

WARNING

NEVER FILL SHOCK STRUTS WITH OXYGEN.

3. Remove all foreign material from the exposed piston with a soft cloth moistened with hydraulic fluid.

TO REPLENISH STRUT HYDRAULIC FLUID:

1. Support the airplane on jacks at the wing jack points.

2. Remove the air valve cap, depress the valve core, and allow the strut to fully deflate.

3. Raise and block the strut 1/4 inch from the compressed position.

WARNING

Do not remove the valve body assembly until all air pressure has been released or it may blow off, causing injury to personnel or damage to equipment.

4. Carefully remove the valve body assembly.

5. Fill the strut to the level of the valve body assembly with hydraulic fluid (see Consumable Materials).

6. Slowly extend the strut from the blocked position and replace the valve body assembly.

7. Depress the valve core and completely compress the strut to release excess air and oil.

8. Inflate the strut as described in the preceding inflation procedure.

SHOCK STRUT SHIMMY DAMPER

The shimmy damper has a reservoir of fluid carried in the piston rod. Two coil springs installed in the piston rod keep fluid in the shimmy damper under pressure. As fluid is lost through leakage it is automatically replenished from the reservoir until the reservoir supply is exhausted.

To check the fluid level in the shimmy damper, insert a wire, approximately 1/32 inch in diameter, through the hole in the disc at the aft end of the piston rod until it touches the bottom of the hole in the floating piston. Mark the wire, remove it, and measure the depth of the insertion. When the shimmy damper is full, insertion depth is 2-3/16 inches, when empty, 3-1/16 inches.

NOTE

> The measuring wire should be inserted in the hole in the floating piston rather than against the piston face to give a more accurate reading. To determine if the wire is inserted in the hole in the floating piston, insert the wire several times, noting insertion depth each time. When the wire is inserted in the hole, the depth will be about 1/4 inch greater than when it rests against the piston face.

When the shimmy damper is found empty or nearly empty, it should be refilled. See Shop Manual.

BRAKES

The brake hydraulic fluid reservoir is located on the firewall in the engine compartment. A dipstick is attached to the reservoir cap. Refer to Consumable Materials for hydraulic fluid specification.

The brakes require no adjustments since the pistons move to compensate for lining wear.

VACUUM SYSTEM

The vacuum system incorporates two screens; a relief valve screen and an oil separator screen. These screens should be cleaned every 100 hours. If the airplane is operated in dusty conditions, the screens should be cleaned more frequently.

Clean the suction relief valve screen by removing and washing in cleaning solvent. Remove and clean the oil separator screen by backflushing or submerging the unit in cleaning fluid. Blow dry with air pressure.

The filter assemblies on the air driven instruments should be replaced every 100 hours under normal operating conditions, and more often if operated under dusty conditions.

INDUCTION AIR FILTER

This filter should be inspected for foreign matter at least once during each 50-hour operating period. In adverse climatic conditions, or if the airplane is stored, preflight inspection is recommended.

TO REMOVE AND CLEAN THE FILTER:

1. Remove the fuselage nose section grill.

2. Remove the wing nuts securing the filter and remove the filter.

3. Clean as described in the manufacturer's instructions on the filter.

PROPELLER BLADES

The daily preflight inspection should include a careful examination of the propeller blades for nicks and scratches.

Each blade leading edge should receive particular attention. It is very important that all nicks and scratches be smoothed out and polished. The BEECHCRAFT Aero or Aviation Center and International Distributors or Dealers will be glad to answer any questions concerning propeller blade repair.

WARNING

> When servicing a propeller, always make certain the ignition switch is off and that the engine has cooled completely. WHEN MOVING A PROPELLER, STAND IN THE CLEAR; there is always some danger of a cylinder firing when a propeller is moved.

MINOR MAINTENANCE

RUBBER SEALS

To prevent sticking of the rubber seals around the windows, doors, and engine cowling, the seals should be coated with Oakite 6 compound. The compound is noninjurious to paint and can be removed by employing normal cleaning methods.

GENERATOR

Since the generator and voltage regulator are designed for use on only one polarity system, the following precautionary measures must be observed when working on the charging circuit, or serious damage to the electrical equipment will result:

1. When installing a battery, make certain that the ground polarity of the battery and the ground polarity of the generator are the same.

2. When connecting a booster battery, be sure to connect the negative battery terminals together and the positive battery terminals together.

3. When using a battery charger, connect the positive lead of the charger to the positive battery terminal and the negative lead of the charger to the negative battery terminal.

MAGNETOS

Ordinarily, the magnetos will require only occasional adjustment, lubrication, and breaker point replacement. This work should be done by a BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer.

WARNING

To be safe, treat the magnetos as hot whenever a switch lead is disconnected at any point; they do not have an internal automatic grounding device. The magnetos can be grounded by replacing the switch lead at the noise filter capacitor with a wire which is grounded to the engine case. Otherwise, all spark plug leads should be disconnected or the cable outlet plate on the rear of the magneto should be removed.

CLEANING

EXTERIOR PAINTED SURFACES

CAUTION

Do not apply wax or polish for a paint cure period of 90 days after delivery. Waxes and polishes seal the paint from the air and prevent curing. Wash uncured painted surfaces with cold or lukewarm water and a MILD NON-DETERGENT SOAP. Any rubbing of the surface should be done gently and held to a minimum to avoid cracking the paint film.

When washing the airplane with mild soap and water, use special care to avoid washing away grease from any lubricated area. After washing with solvent in the wheel well areas, lubricate all lubrication points. Premature wear of lubricated surfaces may result if the above precautions are not taken.

Prior to cleaning, cover the wheels, making certain the brake discs are covered. Attach the pitot cover securely, and plug or mask off all other openings. Be particularly careful to mask off both static air buttons before washing or waxing.

Flush loose dirt away with clean water, then wash with a mild soap and water. Avoid harsh, abrasive, or alkaline soaps or detergents which could cause corrosion or scratches. To remove stubborn oil and grease, use a cloth dampened with aliphatic naphtha (see Consumable Materials). After being cleaned with naphtha, the surface should be re-waxed and polished. To prevent scratches, use soft cleaning cloths or a chamois when cleaning and polishing. Any good grade of automotive wax or polish can be used on painted surfaces.

WINDSHIELD AND WINDOWS

The windshield and plastic windows should be kept clean and waxed at all times. To prevent scratches, wash the windows carefully with plenty of soap and water, using the palm of the hand to feel and dislodge dirt and mud. A soft cloth, chamois or sponge may be used, but only to carry water to the surface. Rinse thoroughly, then dry with a clean, moist chamois. Rubbing the surface of the plastic with a dry cloth builds up an electrostatic charge which attracts dust particles in the air.

Remove oil and grease with a cloth moistened with isopropyl alcohol. Never use gasoline, benzine, alcohol, acetone, carbon tetrachloride, fire extinguisher fluid, anti-ice fluid, lacquer thinner or glass cleaner. These materials will soften the plastic and may cause it to craze.

After thoroughly cleaning, the surface should be waxed with a good grade of commercial wax. The wax will fill in minor scratches and help prevent further scratching. Apply a thin, even coat of wax and bring it to a high polish by rubbing lightly with a clean, dry, soft flannel cloth. Do not use a power buffer; the heat generated by the buffing pad may soften the plastic.

INTERIOR

To remove dust and loose dirt from the upholstery, headliner, and carpet, clean the interior regularly with a vacuum cleaner.

Blot up any spilled liquid promptly with cleansing tissue or rags. Do not pat the spot; press the blotting material firmly and hold it for several seconds. Continue blotting until no more liquid is taken up. Scrape off sticky materials with a dull knife, then spot-clean the area.

Oily spots may be cleaned with household spot removers, used sparingly. Before using any solvent, read the instructions on the container and test it on an obscure place on the fabric to be cleaned. Never saturate the fabric with a volatile solvent; it may damage the padding and backing materials.

Soiled upholstery and carpet may be cleaned with foam-type detergent used according to the manufacturer's instructions. To minimize wetting the fabric, keep the foam as dry as possible and remove it with a vacuum cleaner.

The plastic trim, instrument panel, and control knobs need only be wiped with a damp cloth. Oil and grease on the control wheel and control knobs can be removed with a cloth moistened with isopropyl alcohol. Volatile solvents, such as mentioned in the article on care of plastic windows should never be used since they soften and craze the plastic.

ENGINE

Clean the engine with neutral solvent. Spray or brush the fluid over the engine, then wash off with water and allow to dry. Solutions which may attack rubber or plastic should not be used.

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	LUBRICANT (Number refers to item on Consumable Materials)
Pre-flight	Check engine oil level	Upper left side of engine	5
	Drain fuel cell drains	Bottom of wing near wing root	-
	Drain fuel system low spot drain	Bottom of fuselage, left side	-
	Drain auxiliary fuel cells drain (A33)	Bottom of fuselage, left side	-
	Service fuel cells, main	Top of wings, leading edge	6
	Service auxiliary fuel cells (A33)	Aft and outboard of main cells	6
25 Hrs.	Check battery electrolyte	Under right cowling door (B33) and thru access door in firewall (A33)	See Shop Manual

50 Hrs.	Change engine oil	Lower side of engine	5
	Clean fuel injection control valve screen	Lower engine compartment	7
	Clean induction air filter	Behind nose section grill	-
	Drain static air lines	Behind aft cabin side panel access door	-
	Lubricate landing gear retract mechanism and uplock rollers	Wheel wells (K)	4
100 Hrs.	Clean fuel selector valve strainer	Left side belly	7
	Clean vacuum pump regulator screen	Engine compartment	7
	Lubricate aileron control linkage	Each wing (J)	4
	Lubricate cabin door mechanism	Aft edge of cabin door (E)	4
	Lubricate control column linkage	Forward of instrument panel (C)	4

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	LUBRICANT (Number refers to item on Consumable Materials)
100 Hrs. (Cont.)	Lubricate elevator and rudder control mechanism	Forward of tail bulk-head (H)	4
	Lubricate elevator tab chain	In each horizontal stabilizer (I)	4
	Lubricate landing gear door hinges	Edge of wheel well (L) (N)	4
	Lubricate landing gear retract mechanism and uplock rollers	Wheel wells (A) (K)	3, 4
	Lubricate nose wheel steering mechanism	Nose wheel well (B)	3
	Lubricate rudder pedals	Cockpit (M)	4
	Lubricate trim tab control	Control pedestal (D)	4
	Lubricate wheel bearings	Nose and main wheels (A, K)	1

300 Hrs.	Flap motor (brushes)	Under front seats in cabin (G)	
	Service landing gear actuator gear box	Under front seats in cabin (F)	8
600 Hrs.	Service landing gear motor-reduction gears	Under front seats in cabin (F)	3
	Service flap motor gear box	Under front seats in cabin (G)	10
900 Hrs.	Lubricate flap actuators	Inside wing aft of wheel well (G)	9, 10
	Lubricate flap flex driveshafts		
	Lubricate elevator tab actuators	Inside each horizontal stabilizer (I)	10
As Req.	Clean spark plugs	Engine compartment	-
	Service main and nose shock struts	Landing gear	2
	Service shimmy damper	Nose gear	2
	Drain static air lines	Behind aft cabin side panel access door	-

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	LUBRICANT (Number refers to item on Consumable Materials)
As Req. (Cont.)	Remove one end of the hose which forms the static line drain and permit the system to drain. NOTE The static air line should be drained frequently during periods of high humidity. Also drain the line each time the airplane is flown through heavy rain or is washed down.		
Note 3	Replace emergency locator transmitter battery	At emergency locator	-

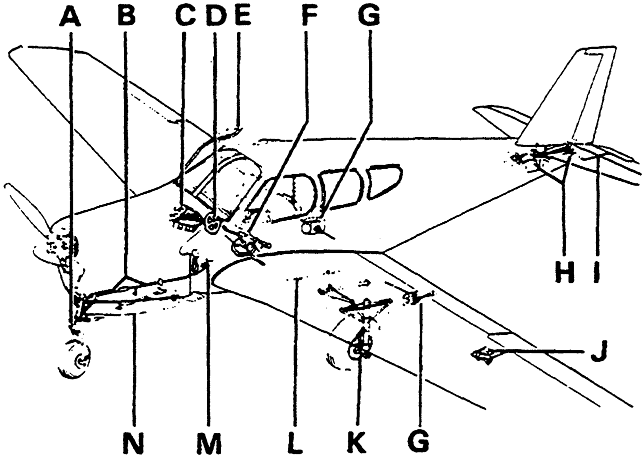
NOTES:

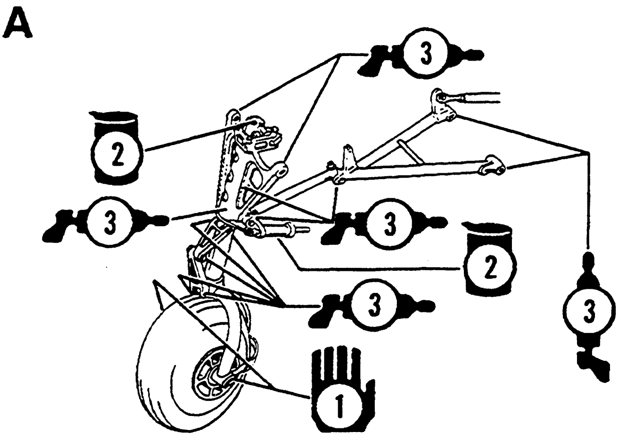
1. Anytime the control surfaces are altered, repaired, or repainted, they must be rebalanced per the Shop Manual.

2. Check the wing bolts for proper torque at the first 100-hour inspection and at the first 100-hour inspection after each reinstallation of the wing attach bolts.

3. Non-rechargeable Batteries: Replace after one cumulative hour or as noted on the battery.

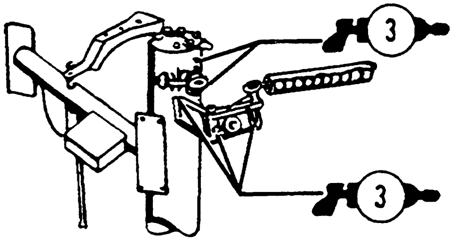
LUBRICATION POINTS





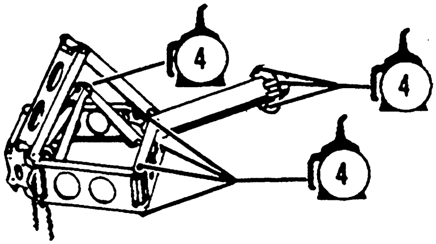
NOSE GEAR RETRACT

B



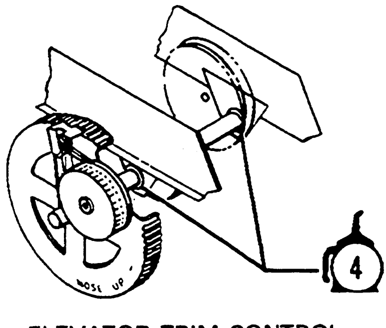
NOSE WHEEL STEERING

C



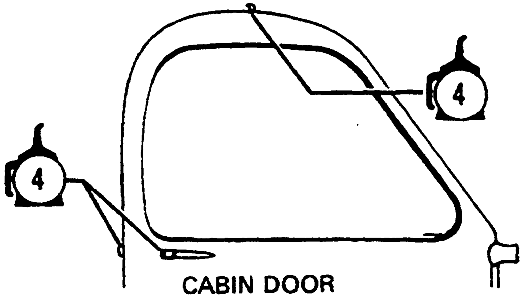
CONTROL COLUMN LINKAGE

D



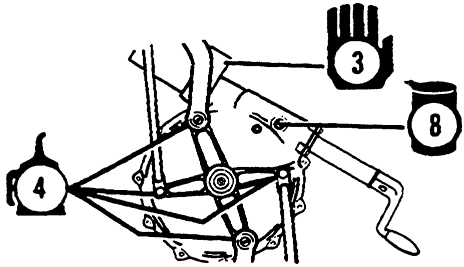
ELEVATOR TRIM CONTROL

E



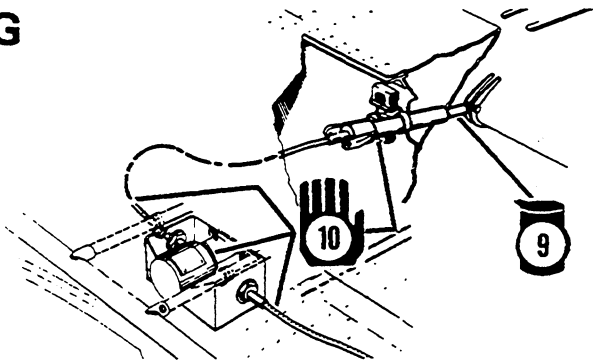
CABIN DOOR

F



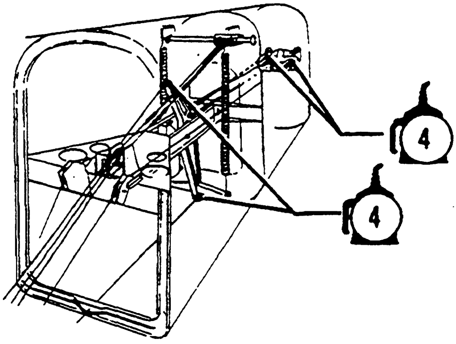
LANDING GEAR ACTUATOR GEAR BOX

G



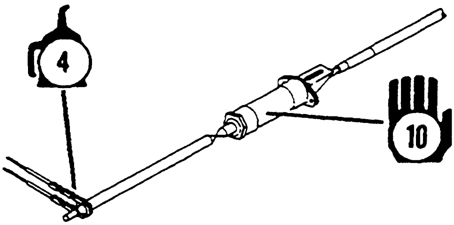
FLAP MOTOR AND ACTUATOR

H



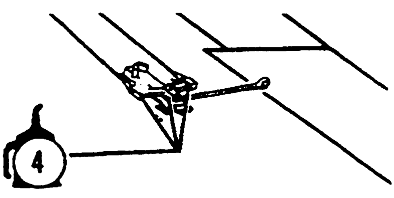
ELEVATORS AND RUDDER
CONTROL MECHANISM

I



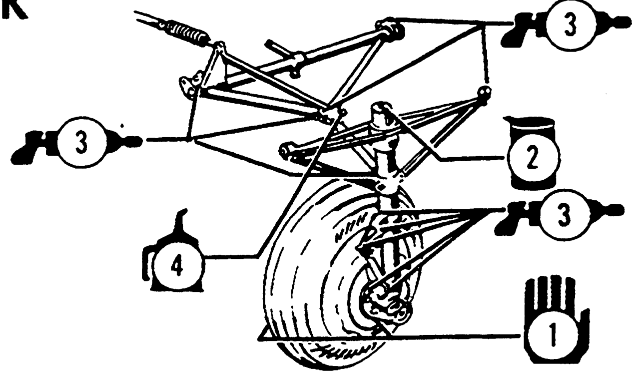
ELEVATOR TAB MECHANISM

J



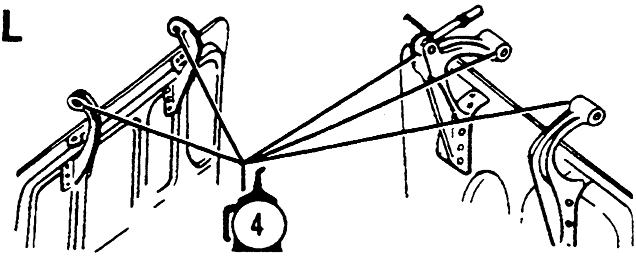
AILERON BELL CRANKS

K



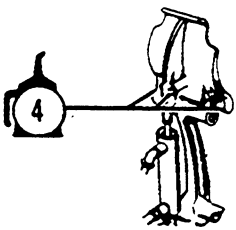
MAIN GEAR RETRACT

L



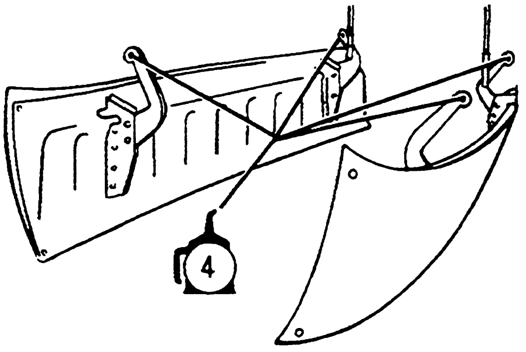
MAIN GEAR DOOR HINGES

M



RUDDER PEDALS

N



NOSE GEAR DOOR HINGES

 HAND OR PACK

 ZERK FITTING

 FLUID CONTAINER

 SQUIRT CAN

NOTE: Letters are keyed to the Service Schedule; Numbers refer to items in the Consumable Materials Chart.

CONSUMABLE MATERIALS

ITEM	MATERIAL	SPECIFICATION
1.	Lubricating Grease High Temperature	Aeroshell No. 5 or MIL-G-81322

CAUTION

Do not mix Aeroshell No. 5 with MIL-G-81322. Thoroughly clean grease from bearings and bearing area before changing grease.

ITEM	MATERIAL	SPECIFICATION
2.	Hydraulic Fluid	MIL-H-5606
*3.	Lubricating Grease, General Purpose	MIL-G-81322
4.	Lubricating Oil	SAE No. 20 or SAE10W-30
**5.	Engine Oil	SAE No. 30 (Below 40°F) SAE No. 50 (Above 40°F)
***6.	Engine Fuel	Grade 80/87 (Red)
7.	Solvent	Federal Specification, PD680
8.	Lubricant	Mobil Compound GG
9.	Lubricating Oil, Gear	MIL-L-10324 or MIL-L-2105C, Grade 75W
10.	Grease, Aircraft and Instrument	MIL-G-23827

ITEM	MATERIAL	SPECIFICATION
†11.	Lubricant, Rubber Seal	Oakite 6 Compound
12.	Naptha, Aliphatic	Federal Specification, TT-N-95

* In extremely cold climates use MIL-G-23827 grease in place of MIL-G-81322. (These greases harmful to paint.)

** Ashless dispersant oil (Teledyne Continental Motors Corp. Spec. MHS-24B) recommended; straight mineral oils recommended during break-in period. See servicing data.

*** If 80/87 (RED) grade fuel not available, use 100LL (BLUE) or 100 (GREEN) grade fuel.

† Product of Oakite Products, Inc., 50 Valley Road, Berkley Heights, NJ 07922.

APPROVED ENGINE OILS

COMPANY	BRAND AND WEIGHT
BP Oil Corporation	BP Aero Oil D65/80
Castrol Limited (Australia)	Grade 40, Castrolaero AD, Type III Grade 50, Castrolaero AD, Type II
Continental Oil Co.	Conoco Aero S
Delta Petroleum Co.	Delta Avoil - Grades 30, 40, 50
Gulf Oil Corporation	Gulfpride Aviation AD
Humble Oil & Refining Company	Esso Aviation Oil Enco Aviation Oil
Pennzoil Company	Pennzoil Aircraft Engine Oil, Heavy Duty Dispersant, Grades 30, 40, 50
Phillips Petroleum Co.	Phillips 66 Aviation Oil Type A (Replaced HD Aviation Oil)
Quaker State Oil Refining Corp.	Quaker State AD Aviation Engine Oil Grades 20W/30, 40 - 50
Sinclair Refining Co.	Sinclair Avoil 20W-40
Socony-Mobil	Mobil (Aero Oil 65) Mobil (Aero Oil 80) Mobil (Aero Oil 100) Mobil (Aero Oil 120) (Ashless Dispersant Aviation Engine Oil)

COMPANY	BRAND AND WEIGHT
Shell Oil Company	Aeroshell Oil W Aeroshell Oil W (in 4 grades) Grade 120 (Nominal SAE 60) - Military Grade 1120 Grade 100 (Nominal SAE 50) - Military Grade 1100 Grade 80 (Nominal SAE 40) - Military Grade 1080 Grade 65 (Nominal SAE 20 or 30) - Military Grade 1065
Texaco, Inc.	Texaco Aircraft Engine Oil - Premium AD, Grades 65, 80, 100
Union Oil Co. of California	Union Aircraft Engine Oil HD Grades 80 - 100

NOTE

This chart lists all oils which were certified as meeting the requirements of Teledyne Continental Motors Specification MHS-24B at the time this handbook was published. Any other oil which conforms to this specification may be used.

BULB REPLACEMENT GUIDE

LOCATION	NUMBER
Compass light	330
Dome light, cabin	89
Elevator tab position indicator light	53
Fuel selector placard light (B33)	53
Aux. fuel pump placard light (A33)	1813
Instrument light, overhead	89
Instrument light, post (B33)	330
Landing gear position light (A33)	1813
Landing gear position light (B33)	330
Landing gear visual position light	53
Landing light	4522
Navigation light, tail cone	93
Navigation light, wing	1512
Rotating beacon (Grimes)	A-7079-12
Rotating beacon (Whelen) (B33)	WRM-44
Stall warning light (A33)	1813

OVERHAUL OR REPLACEMENT SCHEDULE

The first overhaul or replacement should be performed not later than the required period. The condition of the item at the end of the first period can be used as a criterion for determining subsequent periods applicable to the individual airplane or fleet operation, providing the operator has an approved monitoring system.

The time periods for inspection noted in this handbook are based on average usage and average environmental conditions.

SPECIAL CONDITIONS CAUTIONARY NOTICE

Airplanes operated for Air Taxi or other than normal operation and airplanes operated in humid tropics or cold and damp climates, etc., may need more frequent inspections for wear, corrosion and/or lack of lubrication. In these areas periodic inspections should be performed until the operator can set his own inspection periods based on experience.

NOTE

The required periods do not constitute a guarantee that the item will reach the period without malfunction, as the aforementioned factors cannot be controlled by the manufacturer.

COMPONENT	OVERHAUL OR REPLACE
LANDING GEAR	
Main gear	Every 2000 hours
Nose gear	Every 2000 hours
Actuator assembly	
All except -13	Every 2000 hours
P/N 35-810075-13	Every 4000 hours
Retract motor	Every 1000 hours
Retract motor brushes	Every 500 hours or on condition
Shimmy damper	Every 1000 hours
Wheels and tires	On condition
Brake assembly	On condition
Brake lining	On condition
Master cylinder	On condition
Shuttle valve assembly	On condition
Parking brake valve	On condition
All hose	On condition

POWER PLANT

NOTE

When an engine has been overhauled, or a new engine installed, it is recommended that low power settings not be used until oil consumption has stabilized. The average time for piston ring seating is approximately 50 hours.

Engine	*Every 1500 hours
Engine controls	On condition
Engine vibration isolator mounts	Engine change or on condition
Exhaust system	On condition
Starter	Inspect at engine overhaul, overhaul or replace on condition

COMPONENT	OVERHAUL OR REPLACE
Generator/Alternator	On condition
Oil cooler	On condition
Propeller (Hartzell)	1500 hours or 4 years. Reduce to 1000 hours or 3 years if airplane is stored out in the weather.
Propeller (McCauley)	At engine overhaul not to exceed 1500 hours if accumulated within 3 calendar years, otherwise 1200 hours
Propeller (Flottorp)	At engine overhaul but not to exceed 1000 hours.
Propeller controls	On condition
Propeller governor	At engine overhaul but not to exceed 1500 hours or 3 years
Fuel pressure pump	Every 1500 hours
Cabin heat muff	Inspect every 100 hours

FUEL SYSTEM

Fuel cells	On condition
Wing fuel quantity transmitters	On condition
Fuel cell drain valve	On condition
Fuel system check valves	On condition
Fuel selector valve	Inspect every 600 hours Overhaul every 1200 hours
Auxiliary fuel pump	Every 1200 hours
All hose	Hose carrying flammable liquids at engine overhaul or every 5 years. All other hose on condition.

COMPONENT	OVERHAUL OR REPLACE
INSTRUMENTS	
Turn coordinator	On condition
Altimeter	Every 24 months per FAA Directive (Inspect and calibrate)
Directional gyro	On condition
Gyro horizon	On condition
Gyro pressure	On condition
Engine indicator units	On condition
Airspeed indicator	On condition
Rate-of-climb	On condition
Fuel quantity indicator	On condition
Fuel pressure (flow) indicator	On condition
Manifold pressure indicator	On condition
Tachometer	On condition
Free air temperature indicator	On condition
All hose	On condition
Vacuum system filter	Every 100 hours
Vacuum regulator valve	On condition
ELECTRICAL SYSTEM	
Battery master relay	On condition
All other relays	On condition
Voltage regulator	On condition
Starter relay	On condition

COMPONENT	**OVERHAUL OR REPLACE**
FLAPS AND FLIGHT CONTROLS	
Flight controls	On condition
Elevator tab actuator	On condition
Flap motor and drives	Every 2000 hours
Flap motor brushes	On condition
Flap gear box	Every 2000 hours
Flap actuators	Every 2000 hours
Flap flexible shaft	Every 2000 hours
MISCELLANEOUS	
Seat belts	Inspect every 12 months, replace on condition
Hand fire extinguisher	Inspect every 12 months, recharge as necessary
Cabin heating and ventilating ducts	On condition, inspect every 12 months

*Reference Teledyne Continental Motors Corporation Service Bulletin M74-20, Rev. 1, dated November 7, 1974 or later issue.

With particular attention to throttle response, smooth power and oil consumption, a qualified certificated mechanic must determine that the engine is operating normally at the time of each periodic inspection.

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SECTION IX

SUPPLEMENTS

NOTE

The supplemental data contained in this section is for equipment that was delivered on the airplane including standard optional equipment that was available, whether it was installed or not. Supplements for equipment for which the vendor obtained a Supplemental Type Certificate · were included as loose equipment with the airplane at the time of delivery. These and other Supplements for other equipment that was installed after the airplane was delivered new from the factory should be placed in this SUPPLEMENTS Section of this Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

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PILOT'S OPERATING HANDBOOK
and
FAA APPROVED AIRPLANE FLIGHT MANUAL
P/N 33-590000-17B
LOG OF SUPPLEMENTS

FAA Supplements must be in the airplane for flight operation when subject equipment is installed

Part Number	Subject	Rev No.	Date
33-590013-1	Tactair T-2 Autopilot	1	6/77
33-590013-3	Tactair T-3 Autopilot	3	9/77
35-590101-9	McCauley Propeller	1	6/77
33-500013-65	Power Flite Control		10/78
36-590002-39	Fuel Selector Valve Stop Installation		3/83
58-590000-49	Inside Cabin Door Handle With Open/Closed Placard		12/90

Supplements applicable to equipment other than that installed may, at the discretion of the owner/operator, be removed from the manual.

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BEECHCRAFT LANDPLANES

35-33, 35-A33 and 35-B33

PILOT'S OPERATING HANDBOOK AND
FAA APPROVED AIRPLANE FLIGHT MANUAL
SUPPLEMENT

for the

TACTAIR T-2 AUTOPILOT

GENERAL

This document is to be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the airplane is equipped with a Tactair T-2 Autopilot, which has been installed in accordance with BEECHCRAFT FAA approved data.

The information in this document supersedes the Pilot's Operating Handbook only where covered in the items contained herein.

LIMITATIONS

1. Autopilot operation not certificated above 20,000 feet.
2. Do not use autopilot during take-off or landing.

EMERGENCY PROCEDURES

1. If a drop in suction below 3.5 is noted on the Instrument Suction Gage, push Master Pilot "OFF" to return instruments to normal flight operation. Check for leaks in Autopilot system at earliest convenience.
2. The Autopilot can be disengaged by pushing the Master "ON-OFF" to the "OFF" position, in the event of malfunction. It can also be overpowered manually by exerting enough force on the controls to override the Autopilot.

NORMAL PROCEDURES

1. To Engage Autopilot:

   Trim airplane for cruising flight. Cage the directional gyro. Have Course Selector Card coincide with Directional Gyro heading.

   Center the Roll Trim Knob.

   Pull Master "ON-OFF" to "ON" position to engage Autopilot.

   Adjust Roll Trim Knob for level flight.

   Uncage directional gyro.

2. Operation of Autopilot:

   Heading can be selected by setting the upper card of the Directional Gyro with the "Course" Selector Knob. Autopilot will bring airplane to desired heading if within 80° of either side of desired heading. Past 80°, the Heading Lock will turn the airplane to the reciprocal of the heading requested. All corrections using the Course Selector Knob have a turn rate of approximately 1° per second. The Roll Trim Knob can be moved left or right to shift the roll zero point in the corresponding direction.

PERFORMANCE - No change

Approved:

Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

FAA Approved
Revised: June 1977

P/N 33-590013-1

BEECHCRAFT LANDPLANES
35-33, 35-A33, 35-B33 and 35-C33

PILOT'S OPERATING HANDBOOK AND
FAA APPROVED AIRPLANE FLIGHT MANUAL
SUPPLEMENT

for the

TACTAIR T-3 AUTOPILOT

GENERAL

This document is to be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the airplane is equipped with a Tactair T-3 Autopilot, which has been installed in accordance with BEECHCRAFT FAA approved data.

The information in this document supersedes the Pilot's Operating Handbook only where covered in the items contained herein.

LIMITATIONS

1. Autopilot operation not certificated above 20,000 feet.
2. Do not use autopilot during take-off or landing.

EMERGENCY PROCEDURES

1. Maximum altitude lost during malfunctioning tests in cruise configuration, 100 feet.
2. Maximum altitude lost during malfunctioning test in approach configuration, 100 feet.
3. If a drop in suction below 3.5 is noted on the Instrument Suction Gage, push Master Pilot "OFF" to return instruments to normal flight operation. Check for leaks in Autopilot system at earliest convenience.

4. The Autopilot can be disengaged by pushing the Master "ON-OFF" to the "OFF" position, in the event of malfunction. It can also be overpowered manually by exerting enough force on the controls to override the Autopilot.

5. Altitude Hold (if installed). If altitude deviates excessively from set altitude, disengage Altitude Hold by pushing knob in. Then reengage Altitude Hold as indicated above. If it still deviates, a malfunction exists, and the Altitude Hold should be disengaged. Check for leakage at the earliest convenience.

NOTE

The Altitude Hold may be overpowered manually, however, upon release of the controls, the airplane will attempt to return to the set altitude, unless Altitude Hold is disengaged before changing altitude.

NORMAL PROCEDURES

1. To Engage Autopilot:

   Trim airplane for cruising flight. Have Course Selector Card coincide with Directional Gyro heading.

   Set Pitch Control Knob for level flight (raised pointer near center of Knob range).

   Center the Turn Knob.

   Pull Master "ON-OFF" to "ON" position to engage Autopilot.

   If necessary, readjust Pitch Knob.

2. Operation of Autopilot:

Pitch angle (climb or dive) can be controlled within limits by rotation of Pitch Control Knob. (Command limits are approximately 10° down, 15° up).

Controlled turns left or right, up to 26° bank angles, can be made by rotating Turn Control Knob off center. Operation of the Turn Knob off center disconnects the "Heading Lock".

When the Turn Knob is set at center for level flight, the "Heading Lock" button can be pushed in to provide heading reference to the Directional Gyro. Heading can be selected by setting the upper card of the Directional Gyro with the "Course" Selector Knob. Autopilot will bring airplane to desired heading if within 80° of either side of desired heading. Past 80°, the Heading Lock will turn the airplane to the reciprocal of the heading requested. All corrections using the Course Selector Knob have a turn rate of approximately 1° per second. The tab beneath the Turn Knob can be moved left or right to shift the roll zero point up to two degrees in the corresponding direction. When desired altitude is attained, engage Altitude Hold (if installed) by pulling out Altitude Hold Knob on right side of Command Control Unit.

Disengage Altitude Hold by pushing in Altitude Hold Knob whenever a change to another altitude is desired.

PERFORMANCE - No change

Approved:

Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT LANDPLANES

35-33, 35-A33, 35-B33, N35 AND P35

PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL
SUPPLEMENT

for the

McCAULEY 2A36C23/84 B-O PROPELLER

GENERAL

This document is to be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the McCauley 2A36C23/84 B-O Propeller is installed.

LIMITATIONS

Propeller

Hub 2A36C23
Blade 84B-O
Spinner D-3290
Pitch Setting .... Refer to Aircraft Specification 3A15

EMERGENCY PROCEDURES - No change

NORMAL PROCEDURES - No change

PERFORMANCE - No change

Approved:

Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT LANDPLANES
35-B33 AND P35

PILOT'S OPERATING HANDBOOK AND
FAA APPROVED AIRPLANE FLIGHT MANUAL
SUPPLEMENT

for the

BEECHCRAFT POWER FLITE CONTROL

GENERAL

This document is to be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the airplane is equipped with a BEECHCRAFT Power Flite Control, which has been installed in accordance with BEECHCRAFT FAA approved data.

The information in this document supersedes the Pilot's Operating Handbook only where covered in the items contained herein.

LIMITATIONS

1. Autopilot operation not certificated above 20,000 feet.

2. Do not use autopilot during take-off or landing.

3. Speed limitations for Autopilot same as airplane speed limitations.

EMERGENCY PROCEDURES

1. If a drop in suction below 3.5 in. Hg is noted on the Instrument Suction Gage, push the MAIN Knob "OFF" to return instruments to normal flight operation. Check for leaks in Autopilot system at earliest convenience.

2. The Autopilot can be disengaged by pushing the MAIN Knob to the "OFF" position, in the event of malfunction. It can also be overpowered manually by exerting enough force on the controls to override the Autopilot.

NORMAL PROCEDURES

1. To Engage Autopilot:

   a. Trim airplane for cruising flight.

   b. Turn the Command Knob to the center detent position and pull "out."

   c. Center the TRIM Knob.

   d. On Power Flite Control with "course selector" directional gyro installed: Align the course selector card with the directional gyro compass card heading.

   e. Pull MAIN Knob to "ON" position to engage Autopilot.

   f. If necessary, readjust TRIM Knob to maintain a wings level flight condition.

2. Operation of Autopilot:

a. Controlled turns left or right, up to a rate of 3 degrees per second, can be made by pulling the Command Knob to the "out" detent position and turning off center. To return the airplane to level flight, rotate the Command Knob to the extreme opposite position, until the airplane returns to level flight, then center the Command Knob to the detent position. A new heading may be obtained by manually overriding the Autopilot.

b. On Power Flite Control with "course selector" directional gyro installed:

(1) When the Command Knob is set at center for level flight, the Knob can be pushed in to provide heading reference to the directional gyro. Heading can be selected by setting the upper card of the directional gyro with the "Course" Selector Knob. Autopilot will bring airplane to desired heading if within 80° of either side of desired heading. Past 80°, the Heading Lock will turn the airplane to the reciprocal of the heading requested. All corrections using the Course Selector Knob have a turn rate of approximately 1° per second.

(2) When the "course selector" heading signal is engaged, the TRIM Knob is used to align the heading on the directional gyro compass card with the selected heading on the course selector card.

(3) The heading feature may be disengaged by pulling the Command Knob to the "out" detent position. Pulling the Command Knob to the "out" detent position disengages the heading signal completely, and turns can be made by rotating the Command Knob. Turns cannot be made when the Command Knob is in the "in" detent position, engaging the heading signal.

PERFORMANCE - No change.

Approved:

Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT Debonair/Bonanza
35-B33, 35-C33, E33, F33, and G33
(Serials CD-388 thru CD-1304);
35-C33A, E33A, and F33A
(Serials CE-1 thru CE-1013);
Bonanza E33C and F33C
(Serials CJ-1 thru CJ-155);
P35, S35, V35, V35TC, V35A, V35A-TC, V35B, and V35B-TC
(Serials D-6874 thru D-10403);
36 and A36
(Serials E-1 thru E-2061);
and A36TC
(Serials EA-1 thru EA-272 except EA-242)
LANDPLANES

PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT for the FUEL SELECTOR VALVE STOP INSTALLATION (BEECHCRAFT SERVICE INSTRUCTIONS NO. 1248)

GENERAL

This document is to be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the airplane is equipped with the Fuel Selector Valve Stop Installation which has been installed in accordance with BEECHCRAFT Service Instructions No. 1248.

This document supersedes or adds to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual only where covered in the items contained herein.

NOTE

This installation is not applicable to airplanes equipped with the Brittain wing tip fuel system.

LIMITATIONS

PLACARDS

On Fuel Selector Panel:

LEFT, RIGHT AND
OFF-NOT IN SAME
POSITIONS ON ALL
BONANZAS

and;

DEPRESS STOP
TURN HANDLE
TO OFF

EMERGENCY PROCEDURES

No Change

NORMAL PROCEDURES

No Change

PERFORMANCE

No Change

WEIGHT AND BALANCE

No Change

SYSTEMS DESCRIPTION

FUEL SYSTEM

FUEL TANK SELECTION

The fuel selector valve handle is located forward and to the left of the pilot's seat. Takeoffs and landings should be made using the tank that is more nearly full.

On airplanes equipped with the fuel selector valve stop installation (BEECHCRAFT Service Instructions No. 1248), the pilot is cautioned to observe that the short, pointed end of the handle aligns with the fuel tank position being selected. The tank positions are located on the aft side of the valve. The OFF position is forward and to the left. An OFF position lock-out feature has been added to prevent inadvertant selection of the OFF position. To select OFF, depress the lock-out stop and rotate the handle to the full clockwise position. Depression of the lock-out stop is not required when moving the handle counterclockwise from OFF to LEFT MAIN or RIGHT MAIN. When selecting the LEFT MAIN or RIGHT MAIN fuel tanks, position handle by sight and by feeling for detent.

If the engine stops because of insufficient fuel, refer to the EMERGENCY PROCEDURES Section for the Air Start procedures.

Approved: Donald St. Peter

for W. H. Schultz
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT SERIES 33,35,36,55,58

PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR

INSIDE CABIN DOOR HANDLE WITH OPEN/ CLOSED PLACARD

THIS SUPPLEMENT IS APPLICABLE TO PILOT'S OPERATING HANDBOOKS AND FAA APPROVED AIRPLANE FLIGHT MANUALS:

(SEE NEXT PAGE FOR APPLICABILITY)

Airplane Serial Number:__________________________

Airplane Registration Number:______________________

FAA Approved:

W. H. Schultz
Beech Aircraft Corporation
DOA CE-2

This supplement applies to the following Pilot's Operating Handbooks and FAA Approved Airplane Flight Manuals:

MODEL	PART NUMBER	A/C SERIALS
35-B33	33-590000-17B	All
35-C33, E33, F33	33-590002-9B	All
35-C33A, E33A, E33C	33-590003-7B	All
F33A, F33C	33-590009-13	CE-674 & after, CJ-129 & after
F33A, F33C	33-590009-15	CE-290 thru CE-673, CJ-26 thru CJ-128
G33	33-590027-3	All
F35	35-590071-13	All
G35	35-590072-9	All
H35	35-590073-15	All
N35, P35	35-590094-7	All
S35-TC	35-590110-3	All
S35	35-590110-11B	All
V35-TC	35-590113-3	All
V35A-TC	35-590116-3	All
V35B-TC	35-590118-23	D-9069 thru D-9947
V35B	35-590118-29	D-9948 & after
V35, V35A, V35B	35-590118-31B	D-7977 thru D-9947
A36	36-590002-17	E-927 thru E-2110 except E-1946 & E-2104
36, A36	36-590002-19C	E-1 thru E-926
A36	36-590002-37	E-1946, E-2104, E-2111 & after
A36-TC	36-590003-3	EA-1 thru EA-272 except EA-242

MODEL	PART NUMBER	A/C SERIALS
B36-TC	36-590006-3	EA-242, EA-273 thru EA-388 except EA-326
B36-TC	36-590006-19	EA-326, EA-389 & after
95-B55B	55-590000-49	All
95-55, 95-A55	55-590000-65B	TC-1 thru TC-501 except TC-350 & TC-371
58, 58A	58-590000-21	TH-773 thru TH-1395 except TH-1389
58, 58A	58-590000-31B	TH-1 thru TH-772
58, 58A	58-590000-35	TH-1389, TH-1396 thru TH-1471, TH-1476, TH-1487,TH-1489, TH-1498
58, 58A	58-590000-39	TH-1472 & after, except TH-1476, TH-1487, TH-1489, TH-1498
E55, E55A	96-590010-17	TE-1084 & after
95-C55, 95-C55A, D55, D55A, E55, E55A	96-590010-29B	TC-350, TE-1 thru TE-942, except TE-938
E55, E55A	96-590010-31	TE-938, TE-943 thru TE-1083
E55, E55A	96-590010-37	TE-1197 only
95-B55, 95-B55A	96-590011-17	TC-2003 & after
95-B55, 95-B55A	96-590011-23	TC-1608 thru TC-2002
95-B55, 95-B55A	96-590011-25	TC-371, TC-502 thru TC-1607
58TC	106-590000-5	TK-1 thru TK-84
58TC, 58TCA	106-590000-19	TK-85 thru TK-150, except TK-147

MODEL	PART NUMBER	A/C SERIALS
58TC, 58TCA	106-590000-21	TK-147, TK-151 & after

CONTENTS

GENERAL

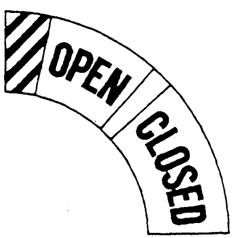
The information in this supplement is FAA-approved material and must be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the airplane has been modified by installation of the Inside Cabin Door Handle With Open/Closed Placard in accordance with Beech Kit 35-5050.

The information in this supplement supersedes or adds to the basic Pilot's Operating Handbook and FAA Approved Airplane Flight Manual only as set forth below. Users of the manual are advised to always refer to the supplement for possibly superseding information and placarding applicable to operation of the airplane.

LIMITATIONS

PLACARDS

On inside of Cabin Door Adjacent to Door Handle:



EMERGENCY PROCEDURES

No change.

NORMAL PROCEDURES

BEFORE TAKEOFF

All procedures specified in the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual for the particular airplane shall be completed. In addition, accomplish the following:

— Doors and Windows - SECURE (Check cabin door lock indicator - CLOSED)

PERFORMANCE

No change.

WEIGHT AND BALANCE

No change.

SYSTEMS DESCRIPTION

DOORS, WINDOWS AND EXITS

CABIN DOOR

The airplane has a conventional cabin door on the forward right side of the fuselage and when closed, the outside cabin door handle is spring loaded to fit into a recess in the door to create a flat aerodynamically clean surface. The door may be locked with a key. To open the door from the outside, lift the handle from its recess and pull until the door opens.

To close the cabin door from the inside, observe that the door handle is in the open position. In this position, the latch handle is free to move approximately one inch in either direction before engagement of the locking mechanism. Then grasp the door and firmly pull the door closed. Rotate the door handle fully counterclockwise into the locked position. Observe that the door handle indicator is in the CLOSED position. When the door is properly locked, the door latch handle is free to move approximately one inch in either direction.

NOTE

When checking the door latch handle, do not move it far enough to engage the door latch release mechanism.

Press firmly outward at the top rear corner of the door. If any movement of the door is detected, completely open the door and close again following the above instructions.

To open the door from the inside, depress the lock button and rotate the handle clockwise.

HANDLING, SERVICING, AND MAINTENANCE

No change.

SECTION X
SAFETY INFORMATION
TABLE OF CONTENTS

SUBJECT *PAGE*

SECTION X
SAFETY INFORMATION
TABLE OF CONTENTS (Continued)

SUBJECT *PAGE*

INTRODUCTION

Beech Aircraft Corporation has developed this special summary publication of safety information to refresh pilots' and owners' knowledge of safety related subjects. Topics in this publication are dealt with in more detail in FAA Advisory Circulars and other publications pertaining to the subject of safe flying.

The skilled pilot recognizes that safety consciousness is an integral - and never-ending - part of his or her job. Be thoroughly familiar with your airplane. Know its limitations and your own. Maintain your currency, or fly with a qualified instructor until you are current and proficient. Practice emergency procedures at safe altitudes and airspeeds, preferably with a qualified instructor pilot, until the required action can be accomplished without reference to the manual. Periodically review this safety information as part of your recurrency training regimen.

BEECHCRAFT airplanes are designed and built to provide you with many years of safe and efficient transportation. By maintaining your BEECHCRAFT properly and flying it prudently you will realize its full potential.

. . . . Beech Aircraft Corporation

WARNING

Because your airplane is a high performance, high speed transportation vehicle, designed for operation in a three-dimensional environment, special safety precautions must be observed to reduce the risk of fatal or serious injuries to the pilot(s) and occupant(s).

It is mandatory that you fully understand the contents of this publication and the other operating and maintenance manuals which accompany the airplane; that FAA requirements for ratings, certifications and review be scrupulously complied with; and that you allow only persons who are properly licensed and rated, and thoroughly familiar with the contents of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual to operate the airplane.

IMPROPER OPERATION OR MAINTENANCE OF AN AIRPLANE, NO MATTER HOW WELL BUILT INITIALLY, CAN RESULT IN CONSIDERABLE DAMAGE OR TOTAL DESTRUCTION OF THE AIRPLANE, ALONG WITH SERIOUS OR FATAL INJURIES TO ALL OCCUPANTS.

GENERAL

As a pilot, you are responsible to yourself and to those who fly with you, to other pilots and their passengers and to people on the ground, to fly wisely and safely.

The following material in this Safety Information publication covers several subjects in limited detail. Here are some condensed Do's and Don'ts.

DO'S

Be thoroughly familiar with your airplane, know its limitations and your own.

Be current in your airplane, or fly with a qualified instructor until you are current. Practice until you are proficient.

Preplan all aspects of your flight - including a proper weather briefing and adequate fuel reserves.

Use services available - weather briefing, inflight weather and Flight Service Station.

Carefully preflight your airplane.

Use the approved checklist.

Have more than enough fuel for takeoff, plus the trip, and an adequate reserve.

Be sure your weight and C.G. are within limits.

Use seatbelts and shoulder harnesses at all times.

Be sure all loose articles and baggage are secured.

Check freedom and proper direction of operation of all controls during preflight inspection.

Maintain the prescribed airspeeds in takeoff, climb, descent, and landing.

Avoid wake turbulence (Vortices).

Preplan fuel and fuel tank management before the actual flight. Utilize auxiliary tanks only in level cruise flight. Take off and land on the fullest main tank, NEVER use auxiliary tanks for takeoff or landing.

Practice emergency procedures at safe altitudes and air-speeds, preferably with a qualified instructor pilot, until the required action can be accomplished without reference to the manual.

Keep your airplane in good mechanical condition.

Stay informed and alert; fly in a sensible manner.

DON'TS

Don't take off with frost, ice or snow on the airplane.

Don't take off with less than minimum recommended fuel, plus adequate reserves, and don't run the tank dry before switching.

Don't fly in a reckless, show-off, or careless manner.

Don't fly into thunderstorms or severe weather.

Don't fly in possible icing conditions.

Don't fly close to mountainous terrain.

Don't apply controls abruptly or with high forces that could exceed design loads of the airplane.

Don't fly into weather conditions that are beyond your ratings or current proficiency.

Don't fly when physically or mentally exhausted or below par.

Don't trust to luck.

SOURCES OF INFORMATION

There is a wealth of information available to the pilot created for the sole purpose of making your flying safer, easier and more efficient. Take advantage of this knowledge and be prepared for an emergency in the event that one should occur.

PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL

You must be thoroughly familiar with the contents of your operating manuals, placards, and check lists to ensure safe utilization of your airplane. When the airplane was manufactured, it was equipped with one or more of the following: placards, Owner's Manual, FAA Approved Airplane Flight Manual, FAA Approved Airplane Flight Manual Supplements, Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. Beech has revised and reissued many of the early manuals for certain models of airplanes in GAMA Standard Format as Pilot's Operating Handbooks and FAA Approved Airplane Flight Manuals. For simplicity and convenience, all official manuals in various models are referred to as the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. If the airplane has changed ownership, the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual may have been misplaced or may not be current. Replacement handbooks may be obtained from any BEECHCRAFT Authorized Outlet.

BEECHCRAFT SERVICE PUBLICATIONS

Beech Aircraft Corporation publishes a wide variety of manuals, service letters, service instructions, service bulletins, safety communiques and other publications for the various models of BEECHCRAFT airplanes. Information on how to obtain publications relating to your airplane is contained in BEECHCRAFT Service Bulletin number 2001, entitled "General - BEECHCRAFT Service Publications - What is Available and How to Obtain It."

Beech Aircraft Corporation automatically mails original issues and revisions of BEECHCRAFT Service Bulletins (Mandatory, Recommended and Optional), FAA Approved Airplane Flight Manual Supplements, reissues and revisions of FAA Approved Airplane Flight Manuals, Flight Handbooks, Owners Manuals, Pilot's Operating Manuals and Pilot's Operating Handbooks, and original issues and revisions of BEECHCRAFT Safety Communiques to BEECHCRAFT Owner addresses as listed by the FAA Aircraft Registration Branch List and the BEECHCRAFT International Owner Notification Service List. While this information is distributed by Beech Aircraft Corporation, Beech can not make changes in the name or address furnished by the FAA. The owner must contact the FAA regarding any changes to name or address. Their address is: FAA Aircraft Registration Branch (AAC250) P.O. Box 25082, Oklahoma City, OK 73125, Phone (405) 680-2131.

It is the responsibility of the FAA owner of record to ensure that any mailings from Beech are forwarded to the proper persons. Often the FAA registered owner is a bank or financing company or an individual not in possession of the airplane. Also, when an airplane is sold, there is a lag in processing the change in registration with the FAA. If you are a new owner, contact your BEECHCRAFT Authorized Outlet and ensure your manuals are up to date.

Beech Aircraft Corporation provides a subscription service which provides for direct factory mailing of BEECHCRAFT publications applicable to a specific serial number airplane. Details concerning the fees and ordering information for this owner subscription service are contained in Service Bulletin number 2001.

For owners who choose not to apply for a Publications Revision Subscription Service, Beech provides a free Owner Notification Service by which owners are notified by post card of BEECHCRAFT manual reissues, revisions and supplements which are being issued applicable to the airplane owned. On receipt of such notification, the owner may obtain the publication through a BEECHCRAFT Authorized Outlet. This notification service is available when requested by the owner. This request may be made by using the owner notification request card furnished with the loose equipment of each airplane at the time of delivery, or by a letter requesting this service, referencing the specific airplane serial number owned. Write to:

Supervisor, Special Services
Dept. 52
Beech Aircraft Corporation
P.O. Box 85
Wichita, Kansas 67201-0085

From time to time Beech Aircraft Corporation issues BEECHCRAFT Safety Communiques dealing with the safe operation of a specific series of airplanes, or airplanes in general. It is recommended that each owner/operator maintain a current file of these publications. Back issues of BEECHCRAFT Safety Communiques may be obtained without charge by sending a request, including airplane model and serial number, to the Supervisor, Special Services, at the address listed above.

Airworthiness Directives (AD's) are not issued by the manufacturer. They are issued and available from the FAA.

FEDERAL AVIATION REGULATIONS

FAR Part 91, General Operating and Flight Rules, is a document of law governing operation of airplanes and the owner's and pilot's responsibilities. Some of the subjects covered are:

Responsibilities and authority of the pilot-in-command
Certificates required
Liquor and drugs
Flight plans
Preflight action
Fuel requirements
Flight rules
Maintenance, preventive maintenance, alterations, inspection and maintenance records

You, as a pilot, have responsibilities under government regulations. The regulations are designed for your protection and the protection of your passengers and the public. Compliance is mandatory.

AIRWORTHINESS DIRECTIVES

FAR Part 39 specifies that no person may operate a product to which an Airworthiness Directive issued by the FAA applies, except in accordance with the requirements of that Airworthiness Directive.

AIRMAN'S INFORMATION MANUAL

The Airman's Information Manual (AIM) is designed to provide airmen with basic flight information and ATC procedures for use in the national airspace system of the United States. It also contains items of interest to pilots concerning health and medical facts, factors affecting flight safety, a pilot/controller glossary of terms in the Air Traffic Control system, information on safety, and accident/hazard reporting. It is revised at six-month intervals and can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

This document contains a wealth of pilot information. Among the subjects are:

Controlled Airspace
Emergency Procedures
Services Available to Pilots
Weather and Icing
Radio Phraseology and Technique
Mountain Flying
Airport Operations
Wake Turbulence - Vortices
Clearances and Separations
Medical Facts for Pilots
Preflight
Bird Hazards
Departures - IFR
Good Operating Practices
En route - IFR
Airport Location Directory
Arrival - IFR

All pilots must be thoroughly familiar with and use the information in the AIM.

ADVISORY INFORMATION

NOTAMS (Notices to Airmen) are documents that have information of a time-critical nature that would affect a pilot's decision to make a flight; for example, an airport closed, terminal radar out of service, or enroute navigational aids out of service.

FAA ADVISORY CIRCULARS

The FAA issues Advisory Circulars to inform the aviation public in a systematic way of nonregulatory material of interest. Advisory Circulars contain a wealth of information with which the prudent pilot should be familiar. A complete list of current FAA Advisory Circulars is published in AC 00-2, which lists Advisory Circulars that are for sale, as well as those distributed free of charge by the FAA, and provides ordering information. Many Advisory Circulars which are for sale can be purchased locally in aviation bookstores or at FBO's. These documents are subject to periodic revision. Be certain the Advisory Circular you are using is the latest revision available. Some of the Advisory Circulars of interest to pilots are:

***00-6**	Aviation Weather
00-24	Thunderstorms
00-30	Rules of Thumb for Avoiding or Minimizing Encounters with Clear Air Turbulence
***00-45**	Aviation Weather Services
00-46	Aviation Safety Reporting Program
20-5	Plane Sense
20-32	Carbon Monoxide (CO) Contamination in Aircraft - Detection and Prevention
20-35	Tie-Down Sense
20-43	Aircraft Fuel Control
20-105	Engine Power-Loss Accident Prevention
20-113	Pilot Precautions and Procedures to be Taken in Preventing Aircraft Reciprocating Engine Induction System & Fuel System Icing Problems
20-125	Water in Aviation Fuel

21-4	Special Flight Permits for Operation of Overweight Aircraft
43-9	Maintenance Records: General Aviation Aircraft
43-12	Preventive Maintenance
60-4	Pilot's Spatial Disorientation
60-6	Airplane Flight Manuals (AFM), Approved Manual Materials, Markings and Placards - Airplanes
60-12	Availability of Industry-Developed Guidelines for the Conduct of the Biennial Flight Review
60-13	The Accident Prevention Counselor Program
*61-9	Pilot Transition Courses for Complex Single-Engine and Light Twin-Engine Airplanes
*61-21	Flight Training Handbook
*61-23	Pilot's Handbook of Aeronautical Knowledge
*61-27	Instrument Flying Handbook
61-67	Hazards Associated with Spins in Airplanes Prohibited from Intentional Spinning.
61-84	Role of Preflight Preparation
*67-2	Medical Handbook for Pilots
90-23	Aircraft Wake Turbulence
90-42	Traffic Advisory Practices at Nontower Airports

90-48	Pilot's Role in Collision Avoidance
90-66	Recommended Standard Traffic Patterns for Airplane Operations at Uncontrolled Airports
90-85	Severe Weather Avoidance Plan (SWAP)
91-6	Water, Slush and Snow on the Runway
91-13	Cold Weather Operation of Aircraft
*91-23	Pilot's Weight and Balance Handbook
91-26	Maintenance and Handling of Air Driven Gyroscopic Instruments
91-33	Use of Alternate Grades of Aviation Gasoline for Grade 80/87 and Use of Automotive Gasoline
91-35	Noise, Hearing Damage, and Fatigue in General Aviation Pilots
91-43	Unreliable Airspeed Indications
91-44	Operational and Maintenance Practices for Emergency Locator Transmitters and Receivers
91-46	Gyroscopic Instruments - Good Operating Practices
91-50	Importance of Transponder Operations and Altitude Reporting
91-51	Airplane Deice and Anti-ice Systems
91-59	Inspection and Care of General Aviation Aircraft Exhaust Systems
91-65	Use of Shoulder Harness in Passenger Seats

103-4	Hazards Associated with Sublimation of Solid Carbon Dioxide (Dry Ice) Aboard Aircraft
210-5A	Military Flying Activities

*** For Sale**

FAA GENERAL AVIATION NEWS

FAA General Aviation News is published by the FAA in the interest of flight safety. The magazine is designed to promote safety in the air by calling the attention of general aviation airmen to current technical, regulatory and procedural matters affecting the safe operation of airplanes. FAA General Aviation News is sold on subscription by the Superintendent of Documents, Government Printing Office, Washington D.C., 20402.

FAA ACCIDENT PREVENTION PROGRAM

The FAA assigns accident prevention specialists to each Flight Standards and General Aviation District Office to organize accident prevention program activities. In addition, there are over 3,000 volunteer airmen serving as accident prevention counselors, sharing their technical expertise and professional knowledge with the general aviation community. The FAA conducts seminars and workshops, and distributes invaluable safety information under this program.

Usually the airport manager, the FAA Flight Service Station (FSS), or Fixed Base Operator (FBO), will have a list of accident prevention counselors and their phone numbers available. All Flight Standards and General Aviation District Offices have a list of the counselors serving the District.

Before flying over unfamiliar territory, such as mountainous terrain or desert areas, it is advisable for transient pilots to consult with local counselors. They will be familiar with the more desirable routes, the wind and weather conditions, and the service and emergency landing areas that are available along the way. They can also offer advice on the type of emergency equipment you should be carrying.

ADDITIONAL INFORMATION

The National Transportation Safety Board and the Federal Aviation Administration periodically issue, in greater detail, general aviation pamphlets concerning aviation safety. FAA Regional Offices also publish material under the FAA General Aviation Accident Prevention Program. These can be obtained at FAA Offices, Weather Stations, Flight Service Stations or Airport Facilities. Some of these are titled:

12 Golden Rules for Pilots
Weather or Not
Disorientation
Plane Sense
Weather Info Guide for Pilots
Wake Turbulence
Don't Trust to Luck, Trust to Safety
Rain, Fog, Snow
Thunderstorm - TRW
Icing
Pilot's Weather Briefing Guide
Thunderstorms Don't Flirt ... Skirt 'em
IFR-VFR - Either Way Disorientation Can Be Fatal
IFR Pilot Exam-O-Grams
VFR Pilot Exam-O-Grams
Tips on Engine Operation in Small General Aviation Aircraft
Estimating Inflight Visibility
Is the Aircraft Ready for Flight
Tips on Mountain Flying
Tips on Desert Flying
Always Leave Yourself An Out

Safety Guide for Private Aircraft Owners
Tips on How to Use the Flight Planner
Tips on the Use of Ailerons and Rudder
Some Hard Facts About Soft Landings
Propeller Operation and Care
Torque "What it Means to the Pilot"
Weight and Balance. An Important Safety Consideration for Pilots

GENERAL INFORMATION ON SPECIFIC TOPICS

MAINTENANCE

Safety of flight begins with a well maintained airplane. Make it a habit to keep your airplane and all its equipment in airworthy condition. Keep a "squawk list" on board, and see that all discrepancies, however minor, are noted and promptly corrected.

Schedule your maintenance regularly, and have your airplane serviced by a reputable organization. Be suspicious of bargain prices for maintenance, repair and inspections.

It is the responsibility of the owner and the operator to assure that the airplane is maintained in an airworthy condition and that proper maintenance records are kept.

Use only genuine BEECHCRAFT or BEECHCRAFT approved parts obtained from BEECHCRAFT approved sources, in connection with the maintenance and repair of Beech airplanes.

Genuine BEECHCRAFT parts are produced and inspected under rigorous procedures to insure airworthiness and suitability for use in Beech airplane applications. Parts purchased from sources other than BEECHCRAFT, even though outwardly identical in appearance, may not have had the required tests and inspections performed, may be different in fabrication techniques and materials, and may be dangerous when installed in an airplane.

Salvaged airplane parts, reworked parts obtained from non-BEECHCRAFT approved sources or parts, components, or structural assemblies, the service history of which is unknown or cannot be authenticated, may have been subjected to unacceptable stresses or temperatures or have other hidden damage not discernible through routine visual or usual nondestructive testing techniques. This may render the part, component, or structural assembly, even though originally manufactured by BEECHCRAFT, unsuitable and unsafe for airplane use.

BEECHCRAFT expressly disclaims any responsibility for malfunctions, failures, damage or injury caused by use of non-BEECHCRAFT parts.

Airplanes operated for Air Taxi or other than normal operation, and airplanes operated in humid tropics, or cold and damp climates, etc., may need more frequent inspections for wear, corrosion and/or lack of lubrication. In these areas, periodic inspections should be performed until the operator can set his own inspection periods based on experience.

NOTE

The required periods do not constitute a guarantee that the item will reach the period without malfunction, as the aforementioned factors cannot be controlled by the manufacturer.

Corrosion and its effects must be treated at the earliest possible opportunity. A clean, dry surface is virtually immune to corrosion. Make sure that all drain holes remain unobstructed. Protective films and sealants help to keep corrosive agents from contacting metallic surfaces. Corrosion inspections should be made most frequently under high-corrosion-risk operating conditions, such as in areas of excessive airborne salt concentrations (e.g., near the sea) and in high-humidity areas (e.g., tropical regions).

If you have purchased a used airplane, have your mechanic inspect the airplane registration records, logbooks and maintenance records carefully. An unexplained period of time for which the airplane has been out of service, or unexplained significant repairs may well indicate the airplane has been seriously damaged in a prior accident. Have your mechanics inspect a used airplane carefully. Take the time to ensure that you really know what you are buying when you buy a used airplane.

HAZARDS OF UNAPPROVED MODIFICATIONS

Many airplane modifications are approved under Supplemental Type Certificates (STC's). Before installing an STC on your airplane, check to make sure that the STC does not conflict with other STC's that have already been installed. Because approval of an STC is obtained by the individual STC holder based upon modification of the original type design, it is possible for STC's to interfere with each other when both are installed. Never install an unapproved modification of any type, however innocent the apparent modification may seem. Always obtain proper FAA approval.

Airplane owners and maintenance personnel are particularly cautioned not to make attachments to, or otherwise modify, seats from original certification without approval from the FAA Engineering and Manufacturing District Office having original certification responsibility for that make and model.

Any unapproved attachment or modification to seat structure may increase load factors and metal stress which could cause failure of seat structure at a lesser "G" force than exhibited for original certification.

Examples of unauthorized attachments found are drilling holes in seat tubing to attach fire extinguishers and drilling holes to attach approach plate book bins to seats.

FLIGHT PLANNING

FAR Part 91 requires that each pilot in command, before beginning a flight, familiarize himself with all available information concerning that flight.

Obtain a current and complete preflight briefing. This should consist of local, enroute and destination weather and enroute navaid information. Enroute terrain and obstructions, alternate airports, airport runways active, length of runways, and takeoff and landing distances for the airplane for conditions expected should be known.

The prudent pilot will review his planned enroute track and stations and make a list for quick reference. It is strongly recommended a flight plan be filed with Flight Service Stations, even though the flight may be VFR. Also, advise Flight Service Stations of changes or delays of one hour or more and remember to close the flight plan at destination.

The pilot must be completely familiar with the performance of the airplane and performance data in the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. The resultant effect of temperature and pressure altitude must be taken into account in performance if not accounted for on the charts. An applicable FAA Approved Airplane Flight Manual must be aboard the airplane at all times and include the weight and balance forms and equipment list.

PASSENGER INFORMATION CARDS

Beech has available, for most current production airplanes, passenger information cards which contain important information on the proper use of restraint systems, oxygen masks, emergency exits and emergency bracing procedures. Passenger information cards may be obtained at any BEECHCRAFT Authorized Outlet. A pilot should not only be familiar with the information contained in the cards, but should always, prior to flight, inform the passengers of the information contained in the information cards. The pilot should orally brief the passengers on the proper use of restraint systems, doors and emergency exits, and other emergency procedures, as required by Part 91 of the FAR's.

STOWAGE OF ARTICLES

The space between the seat pan and the floor is utilized to provide space for seat displacement. If hard, solid objects are stored beneath seats, the energy absorbing feature is lost and severe spinal injuries can occur to occupants.

Prior to flight, pilots should insure that articles are not stowed beneath seats that would restrict seat pan energy absorption or penetrate the seat in event of a high vertical velocity accident.

FLIGHT OPERATIONS

GENERAL

The pilot MUST be thoroughly familiar with ALL INFORMATION published by the manufacturer concerning the airplane, and is required by law to operate the airplane in accordance with the FAA Approved Airplane Flight Manual and placards installed.

PREFLIGHT INSPECTION

In addition to maintenance inspections and preflight information required by FAR Part 91, a complete, careful preflight inspection is imperative.

Each airplane has a checklist for the preflight inspection which must be followed. USE THE CHECKLIST.

WEIGHT AND BALANCE

Maintaining center of gravity within the approved envelope throughout the planned flight is an important safety consideration.

The airplane must be loaded so as not to exceed the weight and center of gravity (C.G.) limitations. Airplanes that are loaded above the maximum takeoff or landing weight limitations will have an overall lower level of performance compared to that shown in the Performance section of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. If loaded above maximum takeoff weight, takeoff distance and the landing distance will be longer than that shown in the Performance section; the stalling speed will be higher, rate of climb, the cruising speed, and the range of the airplane at any level of fuel will all be lower than shown in the Performance section.

If an airplane is loaded so that the C.G. is forward of the forward limit, it will require additional control movements for maneuvering the airplane with correspondingly higher control forces. The pilot may have difficulty during takeoff and landing because of the elevator control limits.

If an airplane is loaded aft of the aft C.G. limitation, the pilot will experience a lower level of stability. Airplane characteristics that indicate a lower stability level are; lower control forces, difficulty in trimming the airplane, lower control forces for maneuvering with attendant danger of structural overload, decayed stall characteristics, and a lower level of lateral-directional damping.

Ensure that all cargo and baggage is properly secured before takeoff. A sudden shift in balance at rotation can cause controllability problems.

AUTOPILOTS AND ELECTRIC TRIM SYSTEMS

Because there are several different models of autopilots and electric trim systems installed in Beech airplanes and different installations and switch positions are possible from airplane to airplane, it is essential that every owner/operator review his Airplane Flight Manual (AFM) Supplements and ensure that the supplements properly describe the autopilot and trim installations on his specific airplane. Each pilot, prior to flight, must be fully aware of the proper procedures for operation, and particularly disengagement, for the system as installed.

In addition to ensuring compliance with the autopilot manufacturer's maintenance requirements, all owners/operators should thoroughly familiarize themselves with the operation, function and procedures described in the Airplane Flight Manual Supplements. Ensure a full understanding of the methods of engagement and disengagement of the autopilot and trim systems.

Compare the descriptions and procedures contained in the Supplements to the actual installation in the airplane to ensure that the supplement accurately describes your installation. Test that all buttons, switches and circuit breakers function as described in the Supplements. If they do not function as described, have the system repaired by a qualified service agency. If field service advice or assistance is necessary, contact Beech Aircraft Corporation, Customer Support Department.

As stated in all AFM Supplements for autopilot systems and trim systems installed on Beech airplanes, the preflight check must be conducted before every flight. The preflight check assures not only that the systems and all of their features are operating properly, but also that the pilot, before flight, is familiar with the proper means of engagement and disengagement of the autopilot and trim system.

Autopilot Airplane Flight Manual Supplements caution against trying to override the autopilot system during flight without disengaging the autopilot because the autopilot will continue to trim the airplane and oppose the pilot's actions. This could result in a severely out of trim condition. This is a basic feature of all autopilots with electric trim follow-up.

Do not try to manually override the autopilot during flight.

IN CASE OF EMERGENCY, YOU CAN OVERPOWER THE AUTOPILOT TO CORRECT THE ATTITUDE, BUT THE AUTOPILOT AND ELECTRIC TRIM MUST THEN IMMEDIATELY BE DISENGAGED.

It is often difficult to distinguish an autopilot malfunction from an electric trim system malfunction. The safest course is to deactivate both. Do not re-engage either system until after you have safely landed. Then have the systems checked by a qualified service facility prior to further flight.

Depending upon the installation on your airplane, the following additional methods may be available to disengage the autopilot or electric trim in the event that the autopilot or electric trim does not disengage utilizing the disengage methods specified in the Supplements.

CAUTION

Transient control forces may occur when the autopilot is disengaged.

1. Turn off the autopilot master switch, if installed.
2. Pull the autopilot and trim circuit breaker(s) or turn off the autopilot switch breaker, if installed.
3. Turn off the RADIO MASTER SWITCH, if installed, and if the autopilot system and the trim system are wired through this switch.

CAUTION

Radios, including VHF COMM are also disconnected when the radio master switch is off.

4. Turn off the ELECTRIC MASTER SWITCH.

WARNING

Almost all electrically powered systems will be inoperative. Consult the AFM for further information.

5. Push the GA switch on throttle grip, if installed (depending upon the autopilot system).
6. Push TEST EACH FLT switch on the autopilot controller, if installed.

NOTE

After the autopilot is positively disengaged, it may be necessary to restore other electrical functions. Be sure when the master switches are turned on that the autopilot does not re-engage.

The above ways may or may not be available on your autopilot. It is essential that you read your airplane's AFM SUPPLEMENT for your autopilot system and check each function and operation on your system.

The engagement of the autopilot must be done in accordance with the instructions and procedures contained in the AFM SUPPLEMENT.

Particular attention must be paid to the autopilot settings prior to engagement. If you attempt to engage the autopilot when the airplane is out of trim, a large attitude change may occur.

IT IS ESSENTIAL THAT THE PROCEDURES SET FORTH IN THE APPROVED AFM SUPPLEMENTS FOR YOUR SPECIFIC INSTALLATION BE FOLLOWED BEFORE ENGAGING THE AUTOPILOT.

FLUTTER

Flutter is a phenomenon that can occur when an aerodynamic surface begins vibrating. The energy to sustain the vibration is derived from airflow over the surface. The amplitude of the vibration can (1) decrease, if airspeed is reduced; (2) remain constant, if airspeed is held constant and no failures occur; or (3) increase to the point of self-destruction, especially if airspeed is high and/or is allowed to increase. Flutter can lead to an in-flight break up of the airplane. Airplanes are designed so that flutter will not occur in the normal operating envelope of the airplane as long as the airplane is properly maintained. In the case of any airplane, decreasing the damping and stiffness of the structure or increasing the trailing edge weight of control surfaces will tend to cause flutter. If a combination of those factors is sufficient, flutter can occur within the normal operating envelope.

Owners and operators of airplanes have the primary responsibility for maintaining their airplanes. To fulfill that responsibility, it is imperative that all airplanes receive a thorough preflight inspection. Improper tension on the control cables or any other loose condition in the flight control system can also cause or contribute to flutter. Pilot's should pay particular attention to control surface attachment hardware including tab pushrod attachment during preflight inspection. Looseness of fixed surfaces or movement of control surfaces other than in the normal direction of travel should be rectified before flight. Further, owners should take their airplanes to mechanics who have access to current technical publications and prior experience in properly maintaining that make and model of airplane. The owner should make certain that control cable tension inspections are performed as outlined in the applicable Beech Inspection Guide. Worn control surface attachment hardware must be replaced. Any repainting or repair of a moveable control surface will require a verification of the control surface balance before the airplane is returned to service. Control surface drain holes must be open to prevent freezing of accumulated moisture, which could create an increased trailing-edge-heavy control surface and flutter.

If an excessive vibration, particularly in the control column and rudder pedals, is encountered in flight, this may be the onset of flutter and the procedure to follow is:

1. IMMEDIATELLY REDUCE AIRSPEED (lower the landing gear if necessary).
2. RESTRAIN THE CONTROLS OF THE AIRPLANE UNTIL THE VIBRATION CEASES.
3. FLY AT THE REDUCED AIRSPEED AND LAND AT THE NEAREST SUITABLE AIRPORT.
4. HAVE THE AIRPLANE INSPECTED FOR AIRFRAME DAMAGE, CONTROL SURFACE ATTACHING HARDWARE CONDITION/SECURITY, TRIM TAB FREE PLAY, PROPER CONTROL CABLE TENSION, AND CONTROL SURFACE BALANCE BY ANOTHER MECHANIC WHO IS FULLY QUALIFIED.

TURBULENT WEATHER

A complete and current weather briefing is a requirement for a safe trip.

Updating of weather information enroute is also essential. The wise pilot knows that weather conditions can change quickly, and treats weather forecasting as professional advice, rather than an absolute fact. He obtains all the advice he can, but stays alert to any sign or report of changing conditions.

Plan the flight to avoid areas of reported severe turbulence. It is not always possible to detect individual storm areas or find the in-between clear areas.

The National Weather Service classifies turbulence as follows:

Class of Turbulence	Effect
Extreme	Airplane is violently tossed about and is practically impossible to control. May cause structural damage.
Severe	Airplane may be momentarily out of control. Occupants are thrown violently against the belts and back into the seat. Unsecured objects are tossed about.
Moderate	Occupants require seat belts and occasionally are thrown against the belt. Unsecured objects move about.
Light	Occupants may be required to use seat belts, but objects in the airplane remain at rest.

Thunderstorms, squall lines and violent turbulence should be regarded as extremely dangerous and must be avoided. Hail and tornadic wind velocities can be encountered in thunderstorms that can destroy any airplane, just as tornadoes destroy nearly everything in their path on the ground.

Thunderstorms also pose the possibility of a lightning strike on an airplane. Any structure or equipment which shows evidence of a lightning strike, or of being subjected to a high current flow due to a strike, or is a suspected part of a lightning strike path through the airplane should be thoroughly inspected and any damage repaired prior to additional flight.

A roll cloud ahead of a squall line or thunderstorm is visible evidence of extreme turbulence; however, the absence of a roll cloud should not be interpreted as denoting that severe turbulence is not present.

Even though flight in severe turbulence must be avoided, flight in turbulent air may be encountered unexpectedly under certain conditions.

The following recommendations should be observed for airplane operation in turbulent air:

Flying through turbulent air presents two basic problems, the answer to both of which is proper airspeed. On one hand, if you maintain an excessive airspeed, you run the risk of structural damage or failure; on the other hand, if your airspeed is too low, you may stall.

If turbulence is encountered, reduce speed to the turbulent air penetration speed, if given, or to the maneuvering speed, which is listed in the Limitations section of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. These speeds give the best assurance of avoiding excessive stress loads, and at the same time provide the proper margin against inadvertent stalls due to gusts.

Beware of overcontrolling in an attempt to correct for changes in attitude; applying control pressure abruptly will build up G-forces rapidly and could cause structural damage or even failure. You should watch particularly your angle of bank, making turns as wide and shallow as possible. Be equally cautious in applying forward or back pressure to keep the airplane level. Maintain straight and level attitude in either up or down drafts. Use trim sparingly to avoid being grossly out of trim as the vertical air columns change velocity and direction. If necessary to avoid excessive airspeeds, lower the landing gear.

WIND SHEAR

Wind shears are rapid, localized changes in wind direction, which can occur vertically as well as horizontally. Wind shear can be very dangerous to all airplanes, large and small, particularly on approach to landing when airspeeds are slow.

A horizontal wind shear is a sudden change in wind direction or speed that can, for example, transform a headwind into a tailwind, producing a sudden decrease in indicated airspeed because of the inertia of the airplane. A vertical wind shear, is a sudden updraft or downdraft. Microbursts are intense, highly localized severe downdrafts.

The prediction of wind shears is far from an exact science. Monitor your airspeed carefully when flying near storms, particularly on approach. Be mentally prepared to add power and go around at the first indication that a wind shear is being encountered.

WEATHER RADAR

Airborne weather avoidance radar is, as its name implies, for avoiding severe weather--not for penetrating it. Whether to fly into an area of radar echoes depends on echo intensity, spacing between the echoes, and the capabilities of you and your airplane. Remember that weather radar detects only precipitation drops; it does not detect turbulence. Therefore, the radar scope provides no assurance of avoiding turbulence. The radar scope also does not provide assurance of avoiding instrument weather due to clouds and fog. Your scope may be clear between intense echoes; this clear area does not necessarily mean you can fly between the storms and maintain visual sighting of them.

Thunderstorms build and dissipate rapidly. Therefore, do not attempt to plan a course between echoes using ground based radar. The best use of ground radar information is to isolate general areas and coverage of echoes. You must avoid individual storms from in-flight observations either by visual sighting or by airborne radar. It is better to avoid the whole thunderstorm area than to detour around individual storms unless they are scattered.

Remember that while hail always gives a radar echo, it may fall several miles from the nearest visible cloud and hazardous turbulence may extend to as much as 20 miles from the echo edge. Avoid intense or extreme level echoes by at least 20 miles; that is, such echoes should be separated by at least 40 miles before you fly between them. With weaker echoes you can reduce the distance by which you avoid them.

Above all, remember this: never regard any thunderstorm lightly. Even when radar observers report the echoes are of light intensity, avoiding thunderstorms is the best policy. The following are some do's and don'ts of thunderstorm avoidance:

1. Don't land or take off in the face of an approaching thunderstorm. A sudden gust front of low level turbulence could cause loss of control.
2. Don't attempt to fly under a thunderstorm even if you can see through to the other side. Turbulence and wind shear under the storm could be disastrous.
3. Don't fly without airborne radar into a cloud mass containing scattered embedded thunderstorms. Embedded thunderstorms usually can not be visually circumnavigated.
4. Don't trust visual appearance to be a reliable indicator of the turbulence inside a thunderstorm.

5. Do avoid by at least 20 miles any thunderstorm identified as severe or giving an intense radar echo. This is especially true under the anvil of a large cumulonimbus.
6. Do circumnavigate the entire area if the area has 6/10 or greater thunderstorm coverage.
7. Do remember that vivid and frequent lightning indicates the probability of a severe thunderstorm.
8. Do regard as extremely hazardous any thunderstorm with tops 35,000 feet or higher, whether the top is visually sighted or determined by radar.

If you cannot avoid penetrating a thunderstorm, the following are some do's BEFORE entering the storm:

9. Tighten your safety belt, put on your shoulder harness, and secure all loose objects.
10. Plan and hold your course to take you through the storm in minimum time.
11. To avoid the most critical icing, establish a penetration altitude below the freezing level or above the level of -15°C.
12. Verify that pitot heat is on and turn on carburetor heat or engine anti-ice. Icing can be rapid at any altitude and cause almost instantaneous power failure and/or loss of airspeed indication.

MOUNTAIN FLYING

Pilots flying in mountainous areas should inform themselves of all aspects of mountain flying, including the effects of topographic features on weather conditions. Many good articles have been published, and a synopsis of mountain flying operations is included in the FAA Airman's Information Manual, Part 1.

Avoid flight at low altitudes over mountainous terrain, particularly near the lee slopes. If the wind velocity near the level of the ridge is in excess of 25 knots and approximately perpendicular to the ridge, mountain wave conditions are likely over and near the lee slopes. If the wind velocity at the level of the ridge exceeds 50 knots, a strong mountain wave is probable with extreme up and down drafts and severe turbulence. The worst turbulence will be encountered in and below the rotor zone, which is usually 8 to 10 miles downwind from the ridge. This zone is sometimes characterized by the presence of "roll clouds" if sufficient moisture is present; altocumulus standing lenticular clouds are also visible signs that a mountain wave exists, but their presence is likewise dependent on moisture. Mountain wave turbulence can, of course, occur in dry air and the absence of such clouds should not be taken as assurance that mountain wave turbulence will not be encountered. A mountain wave downdraft may exceed the climb capability of your airplane. Avoid mountain wave downdrafts.

VFR - LOW CEILINGS

If you are not instrument rated, do not attempt "VFR on Top" or "Special VFR" flight or clearances. Being caught above a solid cloud layer when an emergency descent is required (or at destination) is an extremely hazardous position for the VFR pilot. Accepting a clearance out of airport control zones with no minimum ceiling and one-mile visibility as permitted with "Special VFR" is a foolish practice for the VFR pilot.

Avoid areas of low ceilings and restricted visibility unless you are instrument rated and proficient and have an instrument equipped airplane. Then proceed with caution and with planned alternates.

VFR AT NIGHT

When flying VFR at night, in addition to the altitude appropriate for the direction of flight, pilots should maintain a safe minimum altitude as dictated by terrain, obstacles such as

TV towers, or communities in the area flown. This is especially true in mountainous terrain, where there is usually very little ground reference. Minimum clearance is 2,000 feet above the highest obstacle enroute. Do not depend on your ability to see obstacles in time to miss them. Flight on dark nights over sparsely populated country can be the same as IFR, and must be avoided by inexperienced or non-IFR rated pilots.

VERTIGO - DISORIENTATION

Disorientation can occur in a variety of ways. During flight, inner ear balancing mechanisms are subjected to varied forces not normally experienced on the ground. This, combined with loss of outside visual reference, can cause vertigo. False interpretations (illusions) result, and may confuse the pilot's conception of the attitude and position of his airplane.

Under VFR conditions, the visual sense, using the horizon as a reference, can override the illusions. Under low visibility conditions (night, fog, clouds, haze, etc.) the illusions predominate. Only through awareness of these illusions, and proficiency in instrument flight procedures, can an airplane be operated safely in a low visibility environment.

Flying in fog, dense haze or dust, cloud banks, or very low visibility, with strobe lights or rotating beacons turned on can contribute to vertigo. They should be turned off in these conditions, particularly at night.

All pilots should check the weather and use good judgment in planning flights. The VFR pilot should use extra caution in avoiding low visibility conditions.

Motion sickness often precedes or accompanies disorientation and may further jeopardize the flight.

Disorientation in low visibility conditions is not limited to VFR pilots. Although IFR pilots are trained to look at their instruments to gain an artificial visual reference as a replacement for the loss of a visual horizon, they do not always do so. This can happen when the pilot's physical condition will not permit him to concentrate on his instruments; when the pilot is not proficient in flying instrument conditions in the airplane he is flying; or, when the pilot's work load of flying by reference to his instruments is augmented by such factors as turbulence. Even an instrument rated pilot encountering instrument conditions, intentional or unintentional, should ask himself whether or not he is sufficiently alert and proficient in the airplane he is flying, to fly under low visibility conditions and in the turbulence anticipated or encountered.

If any doubt exists, the flight should not be made or it should be discontinued as soon as possible.

The result of vertigo is loss of control of the airplane. If the loss of control is sustained, it will result in an excessive speed accident. Excessive speed accidents occur in one of two manners, either as an inflight airframe separation or as a high speed ground impact; and they are fatal accidents in either case. All airplanes are subject to this form of accident.

For years, Beech Pilot's Operating Handbooks and FAA Approved Airplane Flight Manuals have contained instructions that the landing gear should be extended in any circumstance in which the pilot encounters IFR conditions which approach the limits of his capability or his ratings. Lowering the gear in IFR conditions or flight into heavy or severe turbulence, tends to stabilize the airplane, assists in maintaining proper airspeed, and will substantially reduce the possibility of reaching excessive airspeeds with catastrophic consequences, even where loss of control is experienced.

Excessive speed accidents occur at airspeeds greatly in excess of two operating limitations which are specified in the manuals: Maximum maneuvering speed and the "red line" or "never exceed" speed. Such speed limits are set to protect the structure of an airplane. For example, flight controls are designed to be used to their fullest extent only below the airplane's maximum maneuvering speed. As a result, the control surfaces should never be suddenly or fully deflected above maximum maneuvering speed. Turbulence penetration should not be performed above that speed. The accidents we are discussing here occur at airspeeds greatly in excess of these limitations. No airplane should ever be flown beyond its FAA approved operating limitations.

STALLS, SLOW FLIGHT AND TRAINING

The stall warning system must be kept operational at all times and must not be deactivated by interruption of circuits, circuit breakers, or fuses. Compliance with this requirement is especially important in all high performance single engine airplanes during simulated engine-out practice or stall demonstrations, because the stall speed is critical in all low-speed operation of airplanes.

Training should be accomplished under the supervision of a qualified instructor-pilot, with careful reference to the applicable sections of the FAA Practical Test Standards and FAA Pilot Transition Courses for Complex Single Engine and Light Twin Engine Airplanes (AC 61-9). In particular, observe carefully the warnings in the Practical Test Standards.

SPINS

A major cause of fatal accidents in general aviation airplanes is a spin. Stall demonstrations and practice are a means for a pilot to acquire the skills to recognize when a stall is about to occur and to recover as soon as the first signs of a stall are evident.
If a stall does not occur - A spin cannot occur.

It is important to remember, however, that a stall can occur in any flight attitude, at any airspeed, if controls are misused.

Unless your airplane has been specifically certificated in the aerobatic category and specifically tested for spin recovery characteristics, it is placarded against intentional spins.

The pilot of an airplane placarded against intentional spins should assume that the airplane may become uncontrollable in a spin, since its performance characteristics beyond certain limits specified in the FAA regulations may not have been tested and are unknown. This is why airplanes are placarded against intentional spins, and this is why stall avoidance is your protection against an inadvertent spin.

Pilots are taught that intentional spins are entered by deliberately inducing a yawing moment with the controls as the airplane is stalled. Inadvertent spins result from the same combination - stall plus yaw. That is why it is important to use coordinated controls and to recover at the first indication of a stall when practicing stalls.

Always remember that extra alertness and pilot techniques are required for slow flight maneuvers, including the practice or demonstration of stalls. In addition to the foregoing mandatory procedure, always:

- Be certain that the center of gravity of the airplane is as far forward as possible. Forward C.G. aids stall recovery, spin avoidance and spin recovery. An aft C.G. can create a tendency for a spin to stabilize, which delays recovery.
- Whenever a student pilot will be required to practice slow flight, be certain that the qualified instructor pilot has a full set of operable controls available. FAA regulations prohibit flight instruction without full dual controls.

- Conduct any maneuvers which could possibly result in a spin at altitudes in excess of five thousand (5,000) feet above ground level in clear air only.
- Remember that an airplane, at or near traffic pattern and approach altitudes, cannot recover from a spin, or perhaps even a stall, before impact with the ground. On final approach maintain at least the airspeed shown in the flight manual.
- Remember that if an airplane flown under instrument conditions is permitted to stall or enter a spin, the pilot, without reference to the horizon, is certain to become disoriented. He may be unable to recognize a stall, spin entry, or the spin condition and he may be unable to determine even the direction of the rotation.
- Finally, never forget that stall avoidance is your best protection against an inadvertent spin. MAINTAIN YOUR AIRSPEED.

In airplanes not certificated for aerobatics, spins are prohibited. If a spin is entered inadvertently:

Immediately move the control column full forward and simultaneously apply full rudder opposite to the direction of the spin; continue to hold this position until rotation stops and then neutralize all controls and execute a smooth pullout. Ailerons should be neutral and the throttle in idle position at all times during recovery.

DESCENT

In single engine piston-powered airplanes, supercharged or normally aspirated, it is necessary to avoid prolonged descents with low power, as this produces two problems: (1) excessively cool cylinder head temperatures which cause premature engine wear, and (2) excessively rich mixtures due to idle enrichment (and altitude) which causes soot and lead deposits on the spark plugs (fouling). The second of these is the more serious consideration; the engine may not respond to the throttle when it is desired to discontinue the descent. Both problems are amenable to one solution: maintain adequate power to keep cylinder head temperature in the "green" range during descent, and lean to best power mixture (that is, progressively enrich the mixture from cruise only slightly as altitude decreases). This procedure will lengthen the descent, of course, and requires some advance planning. If it is necessary to make a prolonged descent at or near idle, as in practicing forced landings, at least avoid the problem of fouled spark plugs by frequently advancing the throttle until the engine runs smoothly, and maintain an appropriate mixture setting with altitude. (Refer to pre-landing check list.)

VORTICES - WAKE TURBULENCE

Every airplane generates wakes of turbulence while in flight. Part of this is from the propeller or jet engine, and part from the wing tip vortices. The larger and heavier the airplane, the more pronounced and turbulent the wakes will be. Wing tip vortices from large, heavy airplanes are very severe at close range, degenerating with time, wind and distance. These are rolling in nature, from each wing tip. In tests, vortex velocities of 133 knots have been recorded. Encountering the rolling effect of wing tip vortices within two minutes after passage of large airplanes is most hazardous to light airplanes. This roll effect can exceed the maximum counterroll obtainable in a light airplane. The turbulent areas may remain for as long as three minutes or more, depending on wind conditions, and may extend several miles behind the airplane. Plan to fly slightly above and to the windward side of other airplanes. Because of the wide variety of conditions that can be encountered, there is no set rule to follow to avoid wake turbulence in all situations. However, the Airman's Information Manual, and to a greater extent Advisory Circular 90-23, Aircraft Wake Turbulence, provide a thorough discussion of the factors you should be aware of when wake turbulence may be encountered.

TAKEOFF AND LANDING CONDITIONS

When taking off on runways covered with water or freezing slush, the landing gear should remain extended for approximately ten seconds longer than normal, allowing the wheels to spin and dissipate the freezing moisture. The landing gear should then be cycled up, then down, wait approximately five seconds and then retracted again. Caution must be exercised to insure that the entire operation is performed below Maximum Landing Gear Operating Airspeed.

Use caution when landing on runways that are covered by water or slush which cause hydroplaning (aquaplaning), a phenomenon that renders braking and steering ineffective because of the lack of sufficient surface friction. Snow and ice covered runways are also hazardous. The pilot should also be alert to the possibility of the brakes freezing.

Use caution when taking off or landing during gusty wind conditions. Also be aware of the special wind conditions caused by buildings or other obstructions located near the runway.

MEDICAL FACTS FOR PILOTS

GENERAL

When the pilot enters the airplane, he becomes an integral part of the man-machine system. He is just as essential to a successful flight as the control surfaces. To ignore the pilot in preflight planning would be as senseless as failing to inspect the integrity of the control surfaces or any other vital part of the machine. The pilot has the responsibility for determining his reliability prior to entering the airplane for flight. When piloting an airplane, an individual should be free of conditions which are harmful to alertness, ability to make correct decisions, and rapid reaction time.

FATIGUE

Fatigue generally slows reaction time and causes errors due to inattention. In addition to the most common cause of fatigue; insufficient rest and loss of sleep, the pressures of business, financial worries, and family problems can be important contributing factors. If you are tired, don't fly.

HYPOXIA

Hypoxia, in simple terms, is a lack of sufficient oxygen to keep the brain and other body tissues functioning properly. There is a wide individual variation in susceptibility to hypoxia. In addition to progressively insufficient oxygen at higher altitudes, anything interfering with the blood's ability to carry oxygen can contribute to hypoxia (anemias, carbon monoxide, and certain drugs). Also, alcohol and various drugs decrease the brain's tolerance to hypoxia.

Your body has no built-in alarm system to let you know when you are not getting enough oxygen. It is impossible to predict when or where hypoxia will occur during a given flight, or how it will manifest itself. Some of the common symptoms of hypoxia are increased breathing rate, a light-headed or dizzy sensation, tingling or warm sensation, sweating, reduced visual field, sleepiness, blue coloring of skin, fingernails, and lips, and behavior changes. A particularly dangerous feature of hypoxia is an increased sense of well-being, called euphoria. It obscures a person's ability and desire to be critical of himself, slows reaction time, and impairs thinking ability. Consequently, a hypoxic individual commonly believes things are getting progressively better while he nears total collapse.

The symptoms are slow but progressive, insidious in onset, and are most marked at altitudes starting above ten thousand feet. Night vision, however, can be impaired starting at an altitude of 5,000 feet. Persons who have recently overindulged in alcohol, who are moderate to heavy smokers, or who take certain drugs, may be more susceptible to hypoxia. Susceptibility may also vary in the same individual from day to day or even morning to evening. Use oxygen on flights above 10,000 feet and at any time when symptoms appear.

Depending upon altitude, a hypoxic individual has a limited time to make decisions and perform useful acts, even though he may remain conscious for a longer period. The time of useful consciousness is approximately 3-5 minutes at 25,000 feet of altitude and diminishes markedly as altitude increases.

Should symptoms occur that cannot definitely be identified as either hypoxia or hyperventilation, try three or four deep breaths of oxygen. The symptoms should improve markedly if the condition was hypoxia (recovery from hypoxia is rapid).

Pilots who fly to altitudes that require or may require the use of supplemental oxygen should be thoroughly familiar with the operation of the airplane oxygen systems. A preflight inspection of the system should be performed, including proper fit of the mask. The passengers should be briefed on the proper use of their oxygen system before flight.

Pilots who wear beards should be careful to ensure that their beard is carefully trimmed so that it will not interfere with proper sealing of the oxygen masks. If you wear a beard or moustache, test the fit of your oxygen mask on the ground for proper sealing. Studies conducted by the military and oxygen equipment manufacturers conclude that oxygen masks do not seal over beards or heavy facial hair.

Federal Aviation Regulations related to the use of supplemental oxygen by flight crew and passengers must be adhered to if flight at higher altitudes is to be accomplished safely. Passengers with significant circulatory or lung disease may need to use supplemental oxygen at lower altitudes than specified by these regulations.

HYPERVENTILATION

Hyperventilation, or overbreathing, is a disturbance of respiration that may occur in individuals as a result of emotional tension or anxiety. Under conditions of emotional stress, fright, or pain, breathing rate may increase, causing increased lung ventilation, although the carbon dioxide output of the body cells does not increase. As a result, carbon dioxide is "washed out" of the blood. The most common symptoms of hyperventilation are: dizziness, nausea, sleepiness, and finally, unconsciousness. If the symptoms persist, discontinue use of oxygen and consciously slow your breathing rate until symptoms clear, and then resume normal breathing rate. Normal breathing can be aided by talking aloud.

ALCOHOL

Common sense and scientific evidence dictate that you must not fly as a crew member while under the influence of alcohol. Alcohol, even in small amounts, produces (among other things):

- A dulling of critical judgement.
- A decreased sense of responsibility.
- Diminished skill reactions and coordination.
- Decreased speed and strength of muscular reflexes (even after one ounce of alcohol).
- Decreases in efficiency of eye movements during reading (after one ounce of alcohol).
- Increased frequency of errors (after one ounce of alcohol).
- Constriction of visual fields.
- Decreased ability to see under dim illuminations.
- Loss of efficiency of sense of touch.
- Decrease of memory and reasoning ability.

- Increased susceptibility to fatigue and decreased attention span.
- Decreased relevance of response.
- Increased self confidence with decreased insight into immediate capabilities.

Tests have shown that pilots commit major errors of judgment and procedure at blood alcohol levels substantially less than the minimum legal levels of intoxication for most states. These tests further show a continuation of impairment from alcohol up to as many as 14 hours after consumption, with no appreciable diminution of impairment. The body metabolizes ingested alcohol at a rate of about one-third of an ounce per hour. Even after the body completely destroys a moderate amount of alcohol, a pilot can still be severely impaired for many hours by hangover. The effects of alcohol on the body are magnified at altitudes, as 2 oz. of alcohol at 18,000 feet produce the same adverse effects as 6 oz. at sea level.

Federal Aviation Regulations have been amended to reflect the FAA's growing concern with the effects of alcohol impairment. FAR 91 states:

"Alcohol or drugs.

(a) No person may act or attempt to act as a crewmember of a civil aircraft -

(1) Within 8 hours after the consumption of any alcoholic beverage;

(2) While under the influence of alcohol;

(3) While using any drug that affects the person's faculties in any way contrary to safety; or

(4) While having .04 percent by weight or more alcohol in the blood.

(b) Except in an emergency, no pilot of a civil aircraft may allow a person who appears to be intoxicated or who demonstrates by manner or physical indications that the individual is under the influence of drugs (except a medical patient under proper care) to be carried in that aircraft."

Because of the slow destruction of alcohol by the body, a pilot may still be under influence eight hours after drinking a moderate amount of alcohol. Therefore, an excellent rule is to allow at least 12 to 24 hours between "bottle and throttle," depending on the amount of alcoholic beverage consumed.

DRUGS

Self-medication or taking medicine in any form when you are flying can be extremely hazardous. Even simple home or over-the-counter remedies and drugs such as aspirin, antihistamines, cold tablets, cough mixtures, laxatives, tranquilizers, and appetite suppressors, may seriously impair the judgment and coordination needed while flying. The safest rule is to take no medicine before or while flying, except after consultation with your Aviation Medical Examiner.

SCUBA DIVING

Flying shortly after any prolonged scuba diving could be dangerous. Under the increased pressure of the water, excess nitrogen is absorbed into your system. If sufficient time has not elapsed prior to takeoff for your system to rid itself of this excess gas, you may experience the bends at altitudes even under 10,000 feet, where most light planes fly.

CARBON MONOXIDE AND NIGHT VISION

The presence of carbon monoxide results in hypoxia which will affect night vision in the same manner and extent as hypoxia from high altitudes. Even small levels of carbon monoxide have the same effect as an altitude increase of 8,000 to 10,000 feet. Smoking several cigarettes can result in a carbon monoxide saturation sufficient to affect visual sensitivity equal to an increase of 8,000 feet altitude.

DECOMPRESSION SICKNESS

Pilots flying unpressurized airplanes at altitudes in excess of 10,000 feet should be alert for the symptoms of 'decompression sickness'. This phenomenon, while rare, can impair the pilot's ability to perform and in extreme cases, can result in the victim being rendered unconscious. Decompression sickness, also known as dysbarism and aviators "bends", is caused by nitrogen bubble formation in body tissue as the ambient air pressure is reduced by climbing to higher altitudes. The symptoms are pain in the joints, abdominal cramps, burning sensations in the skin, visual impairment and numbness. Some of these symptoms are similar to hypoxia. The only known remedy for decompression sickness is recompression, which can only be accomplished in an unpressurized airplane by descending. The pilot should immediately descend if it is suspected that this condition exists, since the effects will only worsen with continued exposure to the reduced pressure environment at altitude and could result, if uncorrected, in complete incapacitation. The possibility of decompression sickness can be greatly reduced by pre-breathing oxygen prior to flight and by commencing oxygen breathing well below the altitudes where it is legally mandatory.

A FINAL WORD

Airplanes are truly remarkable machines. They enable us to shrink distance and time, and to expand our business and personal horizons in ways that, not too many years ago, were virtually inconceivable. For many businesses, the general aviation airplane has become the indispensable tool of efficiency.

Advances in the mechanical reliability of the airplanes we fly have been equally impressive, as attested by the steadily declining statistics of accidents attributed to mechanical causes, at a time when the airframe, systems and power plants have grown infinitely more complex. The explosion in capability of avionics systems is even more remarkable. Radar, RNAV, LORAN, sophisticated autopilots and other devices which, just a few years ago, were too large and prohibitively expensive for general aviation size airplanes, are becoming increasingly commonplace in even the smallest airplanes.

It is thus that this Safety Information is directed to the pilot, for it is in the area of the skill and proficiency of you, the pilot, that the greatest gains in safe flying are to be made over the years to come. Intimate knowledge of your airplane, its capabilities and its limitations, and disciplined adherence to the procedures for your airplane's operation, will enable you to transform potential tragedy into an interesting hangar story when - as it inevitably will - the abnormal situation is presented.

Know your airplane's limitations, and your own. Never exceed either.

Safe flying,

BEECH AIRCRAFT CORPORATION

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