Beechcraft®

Bonanza® J35

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, flight manuals, and check lists issued for this airplane with the exception of FAA Approved Airplane Flight Manual Supplements.

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NOTE

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GAMA General Aviation Manufacturers Association

Raytheon Aircraft

Bonanza J35
Log of Temporary Changes
to the
Pilot's Operating Handbook
and
FAA Approved Airplane Flight Manual
P/N 35-590079-5

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
35-590079-5TC1	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.

BONANZA J35
PILOT'S OPERATING HANDBOOK
AND
FAA APPROVED AIRPLANE FLIGHT MANUAL

A4 Revision . . . . . July, 1994

LOG OF REVISIONS

Page	Description
Title Page	Updated
Page A (A4)	New
10-1 thru 10-48	Revised Section X, Safety Information (May, 1994)

A4

BONANZA J35
PILOT'S OPERATING HANDBOOK
AND
FAA APPROVED AIRPLANE FLIGHT MANUAL

A3 Revision . . . . . October, 1990

LOG OF REVISIONS

Page	Description
Title Page	Updated
Page A (A3)	New
10-1 thru 10-48	Revised Section X, Safety Information (October, 1990)

A3

Bonanza J35
Pilot's Operating Handbook
and
FAA Approved Airplane Flight Manual

A2 .....MARCH 1987

LOG OF REVISIONS

Page	Description
Title Page	Update
Page A (A2)	New
2-7	Revise "Maximum Baggage Compartment Load" and "CG Limits"
2-21	Add "WARNING" Placard
6-1	Revise "Table of Contents"
6-4 & 6-5	Add "WARNING"
6-6	Shift Material
6-8A, 6-8B, 6-8C & 6-8D	Add "SAMPLE LOADINGS"

A2

Bonanza J35
Pilot's Operating Handbook
and
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A1 . . . . . March 1983

LOG OF REVISIONS

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Logo Page	Add
Page A (A1)	New
Page A (Orig)	Revise from "a" page
a & b	Revise from "b" and "c" pages. Revise "Introduction" and Add "Warning"
1-1	Update Table of Contents
1-3 & 1-4	Revise "Important Notice" and "Use of the Handbook"
1-4A & 1-4B	Revise "NOTE"
1-5	Revise "Revising The Handbook"
1-6 & 1-6B	Add "Airplane Flight Manual Supplements Revision Record", "Vendor-Issued STC Supplements", "Wing Area" and Shift Material
2-7	Revise "Approved Maneuvers"
2-19	Add "CAS" to Placard Listing
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3-1	Update Table of Contents
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3-8	Revise "Emergency Exits" and Shift Material
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4-6A, 4-6B, 4-7 & 4-8	Revise "Starting", Add "After Starting, and Taxi", Revise "Before Takeoff" and Shift Material
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A1

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8-5	Revise "Introduction"
8-6 & 8-6A	Revise "Publications" and "Airplane Inspection Periods"
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8-36, 8-36A, 8-36B & 8-37	Revise "Consumable Materials"

A1

Original . . . . . April 1976

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	Section 9	See Log of Supplements
March 1981	10-1 thru 10-67	Revision

Original A

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. 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.

WARNING

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 ensure 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 approved parts.

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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 Bonanza 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 Bonanza. The handbook presents suggestions and recommendations to help obtain safe and maximum performance without sacrificing economy. The BEECHCRAFT Bonanza 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 Federal Aviation Regulations applicable to the operation and maintenance of the airplane and FAR Part 91 General Operating and Flight Rules. Further, the 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, which are 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 Bonanza. 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 I	General
Section II	Limitations
Section III	Emergency Procedures
Section IV	Normal Procedures
Section V	Performance
Section VI	Weight and Balance/Equipment List
Section VII	Systems Description
Section VIII	Handling, Servicing and Maintenance
Section IX	Supplements
Section X	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.

The following information may be provided to the holder of this manual automatically:

1. Original issues and revisions of Class I and Class II Service Instructions

2. Original issues and revisions of FAA Approved Airplane Flight Manual Supplements

3. Reissues and revisions of FAA Approved Airplane Flight Manuals, Flight Handbooks, Owner's Manuals, Pilot's Operating Manuals, and Pilot's Operating Handbooks

This service is free and will be provided only to holders of this handbook who are listed on the FAA Aircraft Registration Branch List or the BEECHCRAFT International Owners Notification Service List, and then only if listed by airplane serial number for the model for which this handbook is applicable. For detailed information on how to obtain "Revision Service"

applicable to this handbook or other BEECHCRAFT Service Publications, consult a BEECHCRAFT Aero or Aviation Center, 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.

The owner/operator should always refer to all supplements, whether STC Supplements or Beech Supplements, for possible placards, limitations, normal, emergency and other operational procedures for proper operation of the airplane with optional equipment installed.

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 purposes, it is the pilot's responsibility to maintain it in current status.

AIRPLANE FLIGHT MANUAL SUPPLEMENTS REVISION RECORD

Section IX contains the FAA Approved Airplane Flight Manual Supplements headed by a Log of Supplements page. On the "Log" page is a listing of the FAA Approved Supplemental Equipment available for installation on the airplane. When new supplements are received or existing supplements are revised, a new "Log" page will replace the previous one, since it contains a listing of all previous approvals, plus the new approval. The supplemental material will be added to the grouping in accordance with the descriptive listing.

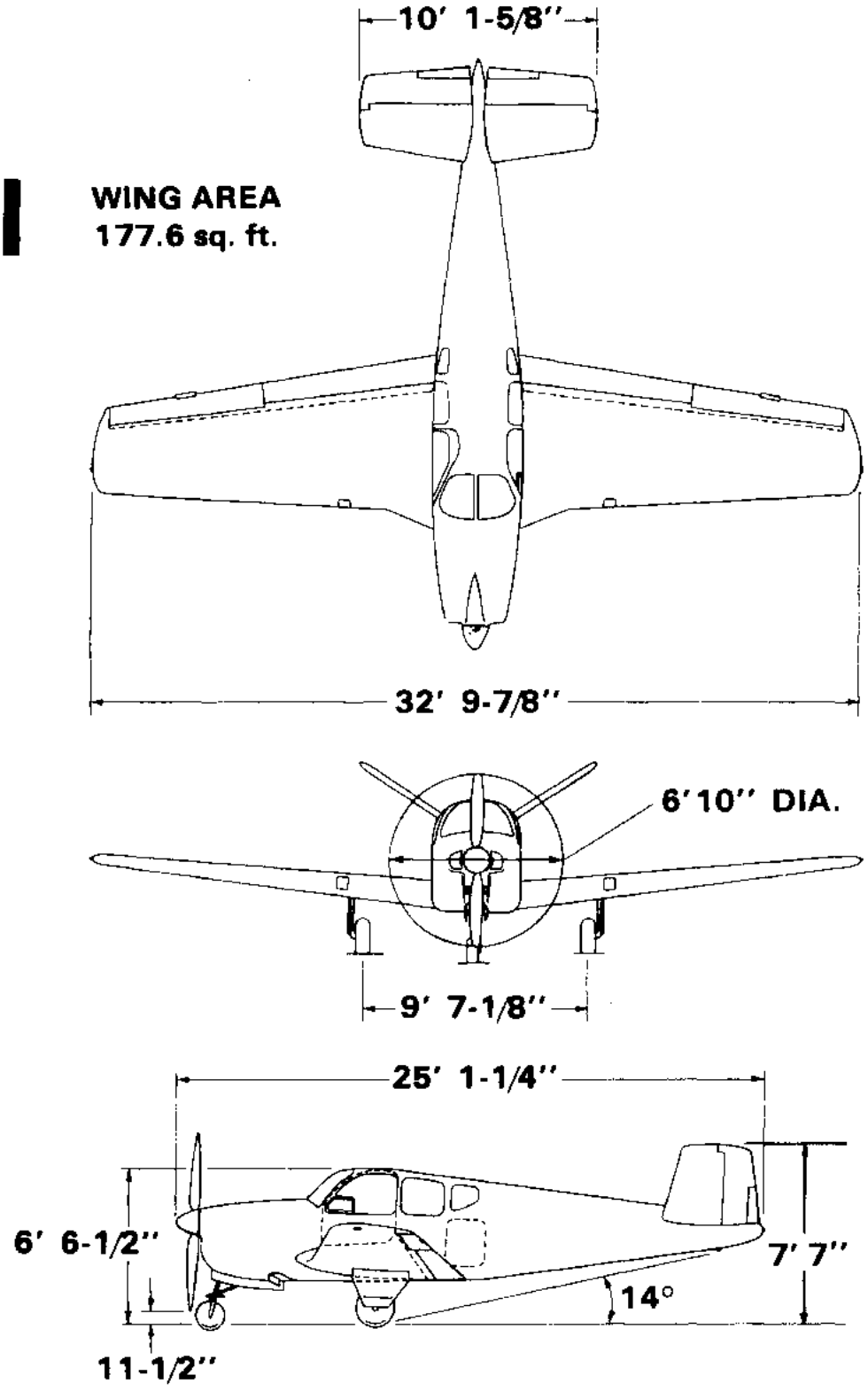
NOTE

Upon receipt of a new or revised supplement, compare the "Log" page just received with the existing "Log" page in the manual. Retain the "Log" page with the latest date on the bottom of the page and discard the other log.

VENDOR-ISSUED STC SUPPLEMENTS

When a new airplane is delivered from the factory, the handbook delivered with it contains either an STC (Supplemental Type Certificate) Supplement or a Beech Flight Manual Supplement for every installed item requiring a supplement. If a new handbook for operation of the airplane is obtained at a later date, it is the responsibility of the owner/operator to ensure that all required STC Supplements (as well as weight and balance and other pertinent data) are transferred into the new handbook.

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10' 1-5/8"
WING AREA
177.6 sq. ft.
32' 9-7/8"
6'10" DIA.
9' 7-1/8"
25' 1-1/4"
6' 6-1/2"
7' 7"
14°
11-1/2"

DESCRIPTIVE DATA

ENGINE

Continental IO-470-C fuel injected engine.

Take-off and maximum continuous operation rated at 250 hp at 2600 rpm.

PROPELLER

Beech constant speed two-blade propeller using Beech 278-100-7 hub with 278-214-82 or 278-213-82 blades.

NOTE

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

FUEL

Aviation Gasoline 91/96 (blue) minimum grade or low lead 100/130 (blue) or 100/130 (green).

Standard fuel system: Two 20-gallon tanks in wings. Total 34 gallons usable.

Optional fuel system: Two 20-gallon main tanks and two interconnected 10-gallon auxiliary tanks in wings. Total 53 gallons usable.

OIL CAPACITY

The oil capacity is 9 quarts.

WEIGHTS

Maximum Ramp Weight	2910 lbs
Maximum Take-Off Weight	2900 lbs
Maximum Landing Weight	2900 lbs

CABIN DIMENSIONS

Length	6 ft 11 in.
Height	4 ft 2 in.
Width	3 ft 6 in.
Entrance Door	36 in. x 37 in.

BAGGAGE

Volume	16.5 cu ft
Capacity	270 lbs
Baggage Door	22.5 in. x 18.5 in.

SPECIFIC LOADINGS

Wing Loading	16.3 lbs/sq ft
Power Loading	11.5 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 inches 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 inches of mercury (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 Chart.
Station Pressure	Actual atmospheric pressure at field elevation.
Wind	The wind velocities recorded as variables on the charts of this handbook are to be understood as the headwind 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 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 flow mixtures 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.

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.

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		IAS		REMARKS
	KNOTS	MPH	KNOTS	MPH	
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	187	Do not exceed this speed except in smooth air and then only with caution
Maneuvering V_A	123	142	125	144	Do not make full or abrupt control movements above this speed
Maximum Flap Extension/ Extended V_{FE}	104	120	105	121	Do not extend flaps or operate with flaps extended above this speed
Maximum Landing Gear Operating/ Extended V_{LO} and V_{LE}	122	140	123	142	Do not extend, retract or operate with landing gear extended above this speed

***AIRSPEED INDICATOR MARKINGS**

MARKING	CAS		IAS		SIGNIFICANCE
	KNOTS	MPH	KNOTS	MPH	
White Arc	50-104	57-120	50-105	57-121	Full Flap Operating Range
Green Arc	57-161	66-185	59-162	68-187	Normal Operating Range
Yellow Arc	161-195	185-225	162-197	187-227	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-C fuel injected engine.

Take-off and maximum continuous operation rated at 250 hp at 2600 rpm.

FUEL

Aviation Gasoline 91/96 (blue) minimum grade or low lead 100/130 (blue) or 100/130 (green).

OIL

Ashless dispersant oils must meet Continental Motors Corporation Specification MHS-24A. Refer to APPROVED ENGINE OILS, Section 8, Servicing.

PROPELLER

Beech constant speed two-blade propeller using Beech 278-100-7 hub with 278-214-82 or 278-213-82 blades.

Diameter is maximum 82 in., minimum 81.5 in. Pitch settings at 33 in. sta.: low 13.5°, high not under 30°.

NOTE

Other propellers are approved for this model Bonanza 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) ... 1750 to 2600 rpm
- Maximum RPM (Red Radial) ..... 2600 rpm

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

INSTRUMENT VACUUM
- 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

FUEL PRESSURE
- Minimum (Red Radial) ..... 1.5 psi
- Operating Range (Green Arc) ..... 4 to 17 psi
- Maximum (Red Radial) ..... 17.5 psi

WEIGHT AND CENTER OF GRAVITY

Maximum Take-off and Landing Weight ..... 2900 lbs
Maximum Ramp Weight ..... 2910 lbs
Zero Fuel Weight ..... No Structural Limitation
Maximum Baggage Compartment Load ..... Refer to Weight and Balance Section

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.

CG LIMITS (Gear Down)

Loading calculations shall be checked before each flight to ensure that the Weight and Center of Gravity remain within the approved limits during flight.

Forward: 77.0 inches aft of datum to 2475 lbs with straight line variation to 82.1 inches at 2900 lbs.

Aft: 85.7 inches aft of datum to 2525 lbs with straight line variation to 84.7 inches at 2900 lbs.

APPROVED MANEUVERS (2950 POUNDS)

MANEUVER	ENTRY SPEED (CAS)
Chandelle	123 kts/142 mph
Steep Turn	123 kts/142 mph
Lazy Eight	123 kts/142 mph
Stall (Except Whip)	Use slow deceleration

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

Spins are prohibited.

FLIGHT LOAD FACTORS (2900 POUNDS)

4.4G positive maneuvering load factor with flaps up.
2.0G positive maneuvering load factor with flaps down.

REQUIRED EQUIPMENT FOR VARIOUS CONDITIONS OF FLIGHT

Federal Aviation Regulations (23.785, 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 aircraft such as galley equipment, entertainment systems, passenger convenience items, etc. However, it is important to note that ALL ITEMS WHICH ARE RELATED TO THE AIRWORTHINESS OF THE AIRPLANE AND NOT INCLUDED ON THE LIST ARE AUTOMATICALLY REQUIRED TO BE OPERATIVE.

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.

NOTE

FLIGHT IN KNOWN ICING CONDITIONS PROHIBITED.

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					
VFH 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	
Fuel pressure indicator	1	1	1	1	
ATA 100 CHAPTER 30 ICE AND RAIN PROTECTION					
Pitot heater	-	-	1	1	

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	
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	

SYSTEM and/or COMPONENT	VFR Day	VFR Night	IFR Day	IFR Night	Remarks and/or Exceptions
ATA 100 CHAPTER 34 NAVIGATION INSTRUMENTS					
Altimeter	1	1	1	1	
Airspeed indicator	1	1	1	1	
Vertical speed	-	-	-	-	
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	
ATA 100 CHAPTER 77 ENGINE INDICATING INSTRUMENTS					
Engine tachometer ind.	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

Take-off on left main tank.

Standard fuel system: Two 20-gallon tanks in wings. Total 34 gallons usable.

Optional fuel system: Two 20-gallon main tanks and two interconnected 10-gallon auxiliary tanks in wings. Total 53 gallons usable.

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.

Do not take off when Fuel Quantity Gages indicate in Yellow Band or with less than 10 gallons in each main tank.

Maximum slip duration: 30 seconds

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

P/N 35-590079-5TC1

Publication Affected	J35 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual (P/N 35-590079-5, Issued April, 1976 or Subsequent)
Airplane Serial Numbers Affected	D-5062, D-5331 thru D-5725
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 J35 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual immediately following page 2-16 (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:

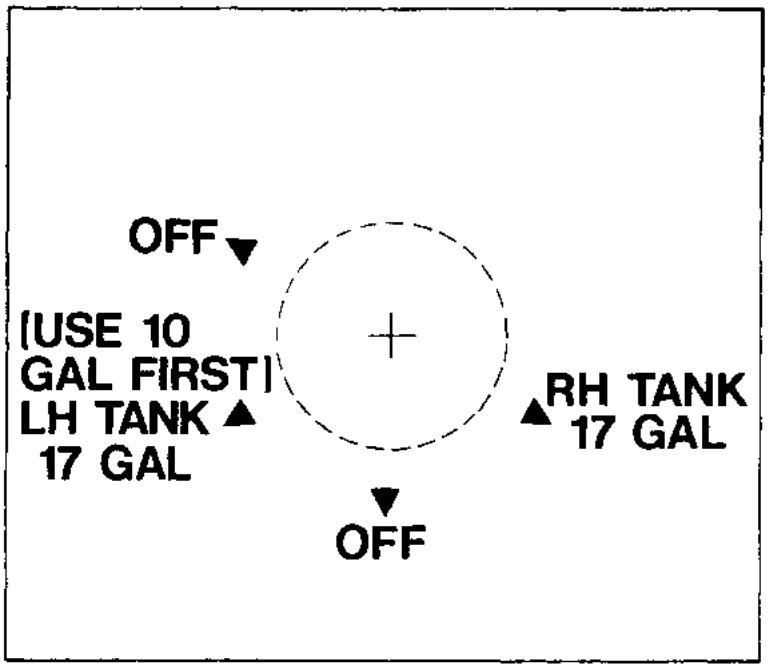
WARNING - POSITION SELECTOR IN DETENTS ONLY - NO FUEL FLOW TO ENGINE BETWEEN DETENTS

Approved:

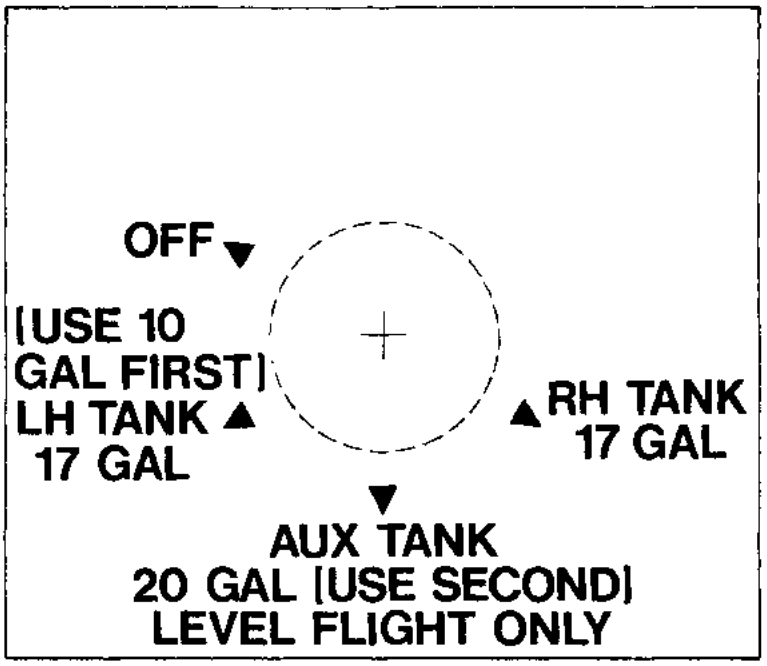
A.C. Jackson
Raytheon Aircraft Company
DOA CE-2

PLACARDS

On Fuel Selector Valve:

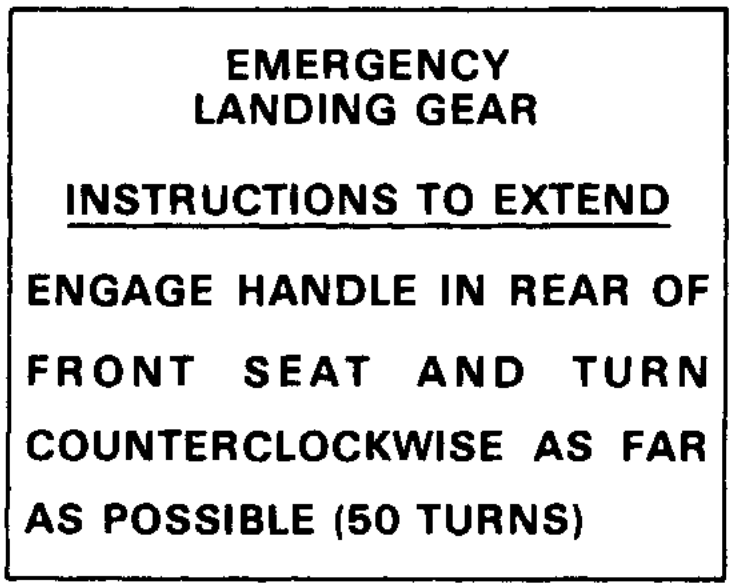


On Fuel Selector Valve On Airplanes Equipped With Auxiliary Fuel Tanks:

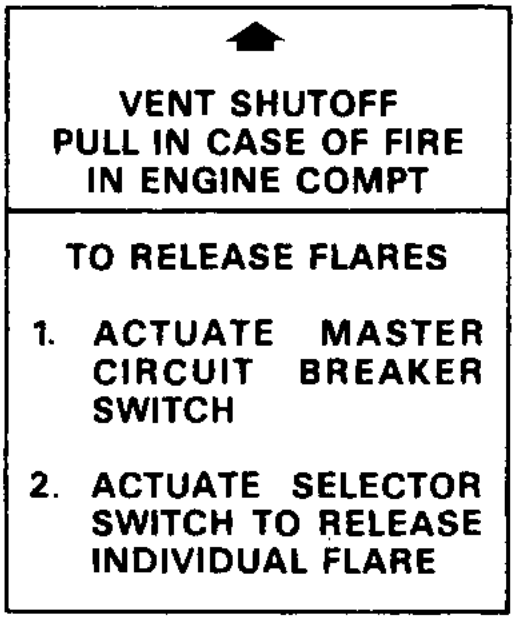


PLACARDS (Cont'd)

On Inner Side Of Glove Compartment Door:



On Inner Side Of Electrical Control Panel Door:



On Inner Side Of Baggage Compartment Door:

BAGGAGE COMPARTMENT

LOAD IN ACCORDANCE WITH AIRPLANE FLIGHT MANUAL

MAXIMUM STRUCTURAL CAPACITY - 270 POUNDS

On Storm Window: (CAS)

CAUTION

DO NOT OPEN ABOVE 145 MPH (126 KNOTS)

Above Inside Door Handle:

CAUTION

AFTER CLOSING DOOR ROTATE HANDLE TO FULL LOCKED POSITION

PLACARDS (Cont'd)

In Full View of Pilot:

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

Below Left and Right Openable Windows After Compliance with BEECHCRAFT Service Instructions 1241:

EMERGENCY EXIT
LIFT LATCH - PULL PIN
PUSH WINDOW OUT

On Openable Windows:

DO NOT OPEN
IN FLIGHT

LATCH
WINDOW
BEFORE
TAKE-OFF

Above Landing Gear Mechanical Position Indicator When Winter Baffles Are Installed:

NOTICE
REMOVE WINTER BAFFLES WHEN OAT EXCEEDS 70° F

In Full View on Inside of Cabin Door and on Inside of Baggage Compartment Door:

WARNING
THIS AIRPLANE IS EASILY LOADED BEYOND AFT CG LIMITS. WEIGHT AND CG MUST BE WITHIN LIMITS FOR EACH FLIGHT.
REFER TO PILOTS OPERATING HANDBOOK

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SECTION III

EMERGENCY PROCEDURES

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EMERGENCY AIRSPEEDS

Emergency Descent	123 Knots/142 MPH
Glide	105 Knots/121 MPH
Emergency Landing Approach	78 Knots/90 MPH

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 FIRE (GROUND)

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

ENGINE FAILURE ON TAKE-OFF

DURING GROUND ROLL

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

If airborne and insufficient runway remains for landing:

1. Fuel Selector Valve - SELECT OTHER MAIN TANK
2. Auxiliary Fuel Pump - ON
3. Mixture - FULL RICH
4. Magnetos - CHECK, ON BOTH

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 MALFUNCTION IN FLIGHT

ENGINE FAILURE

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

DISCREPANCY CHECKS

(Rough running engine, loss of engine power, loss of fuel flow, etc.)

1. Rough Running Engine
   a. Mixture - FULL RICH, then lean as required
   b. Ignition Switch - CHECK on BOTH position
2. Loss of Power
   a. Fuel Pressure Gage - CHECK (fuel pressure abnormally low)
      (1) Mixture - FULL RICH
      (2) Auxiliary Fuel Pump - ON
      (3) Auxiliary Fuel Pump - OFF if performance does not improve in a few moments
   b. Fuel Quantity Indicator - CHECK (fuel tank being used is empty)
      (1) Select other tank (check to feel detent)

3. Propeller Overspeed
   a. Retard throttle to reduce RPM to red line.
   b. Check oil pressure.
   c. Reduce speed to assist in maintaining altitude.
   d. Select nearest landing site, follow emergency landing procedures. (If loss of oil pressure was cause of overspeed, the engine will seize after a short period of operation.)

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 (FLIGHT)

The red VENT SHUTOFF control on the outboard side of the right lower subpanel 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. Vent Shutoff Control - PULL TO CLOSE
2. Mixture - IDLE CUT-OFF
3. Fuel Selector Valve - OFF
4. Battery, Generator, and Ignition Switches - OFF (Extending the landing gear can be accomplished manually if desired.)
5. Do not attempt to restart engine.

EMERGENCY DESCENT

1. Power - IDLE
2. Propeller - HIGH RPM
3. Landing Gear - DOWN
4. Airspeed - ESTABLISH 123 kts/142 mph

MAXIMUM GLIDE CONFIGURATION

1. Landing Gear - UP
2. Flaps - UP
3. Cowl Flaps - CLOSED
4. Propeller - PULL for LOW RPM
5. Airspeed - 105 KTS/121 MPH

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

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 (Right Subpanel) - OFF (PULL OUT)
2. Landing Gear Switch Handle - DOWN position
3. Remove Safety Boot or Cover from handcrank handle at rear of front seats.
4. Engage handcrank and turn counterclockwise as far as possible (approximately 50 turns).
5. If electrical system is operative, check landing gear warning horn (check LDG GEAR WARNING circuit breaker engaged).
6. Check mechanical landing gear indicator - DOWN
7. Handcrank - DISENGAGE.

Always keep the handcrank strapped or stowed in the disengaged position when not in use. Do not retract the landing gear manually.

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

EMERGENCY LANDING

When assured of reaching the landing site selected, and on final approach:

1. Airspeed - Establish 74 to 78 kts/85 to 90 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, Generator and Ignition Switches - OFF

GEAR-UP LANDING

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, Generator and Ignition 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.

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.

EMERGENCY EXITS

Emergency exits, provided by the openable window on each side of the cabin, may be used for egress in addition to the cabin door. An emergency exit placard is installed below the left and right openable windows.

To open each emergency exit:

1. Lift the latch.
2. Pull out the emergency release pin and push the window out.

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.

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.

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SECTION IV

NORMAL PROCEDURES

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

AIRSPEEDS FOR SAFE OPERATION (2900 LBS)

Maximum Demonstrated Crosswind Component	17 kts/20 mph
Takeoff:	
Lift-off	65 kts/75 mph
50-ft Speed	71 kts/82 mph
Best Angle-of-Climb (V_X)	71 kts/82 mph
Best Rate-of-Climb (V_Y)	90 kts/104 mph
Cruise Climb	104 kts/120 mph
Turbulent Air Penetration	125 kts/144 mph
Landing Approach	70 kts/80 mph
Balked Landing Climb	70 kts/80 mph

PREFLIGHT INSPECTION

1. CABIN:
   a. Parking Brake - SET
   b. Control Lock - REMOVE
   c. All Switches - OFF
   d. Emergency Locator Transmitter - ARMED

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. Landing Light - CHECK
   d. Fuel Tank(s) - CHECK QUANTITY; Filler Cap(s) - SECURE.
   e. Cabin Air Intake - CHECK
   f. 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; Cover - SECURE

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

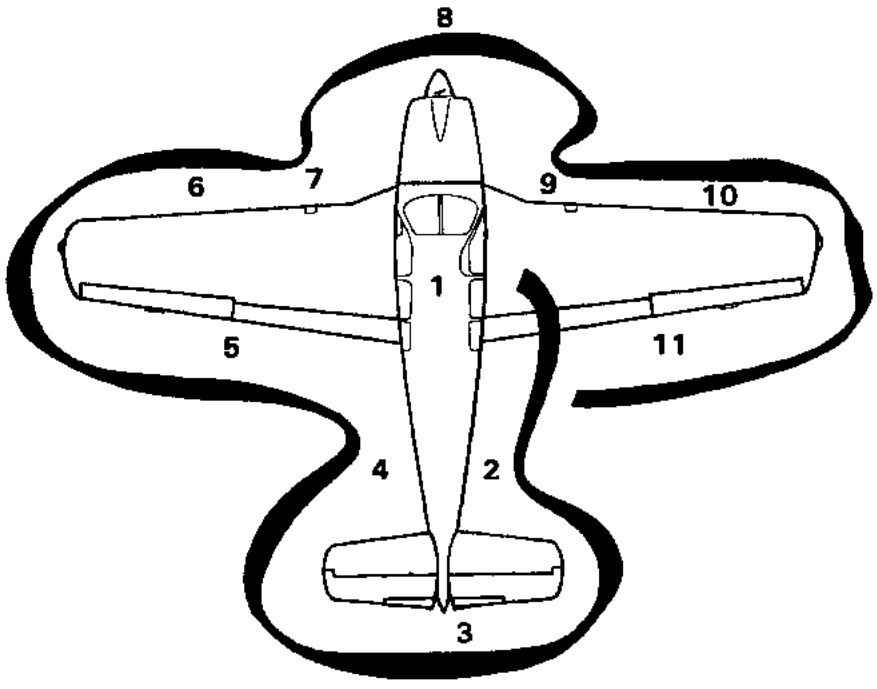
9. RIGHT LANDING GEAR:
   a. Fuel Vent - CHECK
   b. Fuel Sump(s) - DRAIN
   c. Wheel Well Door, Tire and Strut - CHECK

10. RIGHT WING LEADING EDGE:
   a. Cabin Air Intake - CHECK
   b. Tie Down and Chocks - REMOVE
   c. Fuel Tank(s) - CHECK QUANTITY; Filler Cap(s) - SECURE
   d. Landing Light - CHECK

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. Seat Belts and Shoulder Harnesses - FASTEN
2. Parking Brake - SET
3. All Avionics - OFF
4. Circuit Breakers - IN
5. Landing Gear Handle - DOWN
6. Flaps - UP
7. Cowl Flaps - OPEN
8. Light Switches - OFF
9. Battery and Generator Switches - ON (If external power is used, turn Generator Switch - OFF)
10. Ignition Switch - BATTERY
11. Fuel Quantity Indicators - CHECK QUANTITY

WARNING

Do not take off if gages indicate in yellow arc or with less than 10 gallons in each main tank.

12. Fuel Selector Valve - SELECT LEFT MAIN TANK.

STARTING

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 momentarily ON until fuel pressure stabilizes.
6. Starter Button - Press until engine starts.

CAUTION

Do not engage starter for more than 30 seconds in any 4-minute period.

NOTE

If starting fuel pressure is low, switch auxiliary fuel pump to ON, then back to MOMENTARY ON when pressure stabilizes.

7. Auxiliary Fuel Pump - OFF when engine runs smoothly.
8. 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), hold the auxiliary fuel pump to MOMENTARY ON to purge the system. Then turn it OFF.

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

CAUTION

The ammeter indication should be less than 25% of full charge at 1000 to 1200 rpm within two minutes, with no additional electrical equipment on. If not, turn off the battery and generator switches and do not take off.

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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. Parking Brake - SET
2. Seat Belts and Shoulder Harnesses - CHECK

NOTE

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

3. Avionics - CHECK
4. Engine Instruments - CHECK
5. Flight Instruments - CHECK AND SET

6. Ammeter - CHECK - for stabilized indication between 0 and 25% of full charge at 1000 to 1200 rpm.
7. Auxiliary Fuel Pump - CHECK OFF
8. Throttle - 1900 RPM
9. Propeller - EXERCISE to obtain 300 to 400 rpm drop; return to high rpm
10. Magnetos - CHECK at 1700 rpm (variance between individual magnetos should not exceed 50 rpm, maximum drop not to exceed 150 rpm.)
11. Trim - SET
    a. Aileron - NEUTRAL
    b. Elevator - 0° (3° nose up if only front seats are occupied)
12. Flaps - Check operation, then UP
13. Door and Windows - SECURE
14. Flight Controls - CHECK PROPER DIRECTION, FULL TRAVEL AND FREEDOM OF MOVEMENT
15. Mixture - FULL RICH (or as required by field elevation)
16. Brakes - RELEASED
17. Instruments - CHECK (Make final check of manifold pressure, fuel pressure, and rpm at the start of the take-off run.)

TAKE-OFF

Take-Off and Maximum
Continuous ..... full throttle, 2600 rpm

1. Power - SET TAKE-OFF POWER AND RELEASE BRAKES
2. Airspeed - ACCELERATE TO RECOMMENDED SPEED
3. Landing Gear - RETRACT (when positive rate of climb is established)
4. Airspeed - ESTABLISH DESIRED CLIMB SPEED (when clear of obstacles)

CLIMB

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

1. Engine Temperatures - MONITOR
2. Power - SET AS DESIRED.

CRUISE

See Cruise Power Setting Tables, SECTION V.

1. Cowl Flaps - CLOSED
2. Power - SET
3. Fuel Pressure - SET

DESCENT

1. Fuel Pressure - MONITOR
   (Increase as required during descent.)

BEFORE LANDING

1. Seat Belts and Shoulder Harnesses - SECURE

NOTE

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

2. Fuel Selector Valve - SELECT MAIN TANK MORE NEARLY FULL
3. Cowl Flaps - AS REQUIRED
4. Mixture - FULL RICH (or as required by field elevation)
5. Landing Gear - DOWN and CHECK. (Maximum extension speed 123 kts/142 mph)
6. Flaps - DOWN (Maximum extension speed 105 kts/121 mph)
7. Airspeed - ESTABLISH NORMAL LANDING APPROACH SPEED.
8. Propeller - HIGH RPM

SHUTDOWN

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

COLD WEATHER OPERATION

See Section 7, Systems

ICING CONDITIONS

Flight in Known Icing Conditions Prohibited.

SECTION V

PERFORMANCE

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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 CRUISE CLIMB at 15°C to 5650 ft and to 2900 lbs. Enter at -5°C to 11500 ft and to 2900 lbs. Read:

Time to Climb = 16 - 7 = 9 min
Fuel Used to Climb = 3.9 - 1.8 = 2.1 gal
Distance Traveled = 30 - 11 = 19 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 may 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		
ALTI-TUDE FEET	MAN. PRESS. IN. HG	FUEL FLOW PSI/ GPH	TAS KNOTS	MAN. PRESS. IN. HG	FUEL FLOW PSI/ GPH	TAS KNOTS
10000	20.3	6.8/11.8	165	20.3	6.5/11.4	166
12000	18.8	6.2/10.9	163	18.8	5.9/10.6	163

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 PSI/GPH	TAS KNOTS
DEN-PUB	19.2	6.3/11.1	164
PUB-TBE	19.2	6.2/11.0	164
TBE-DHT	19.2	6.1/10.8	164
DHT-AMA	19.2	6.1/10.8	164

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	*36	193	0:11	2.0
COS-PUB	40	191	0:13	2.4
PUB-TBE	74	149	0:30	5.5
TBE-DHT	87	152	0:34	6.1
DHT-AMA	65	155	0:25	4.5

*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	0:09	2.1	19
Cruise	1:53	20.5	302
Total	2:02	24.3	321

Total Flight Time: 2 hours, 2 minutes

Block Speed: 321 NM ÷ 2 hours, 2 minutes = 158 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 8.2 gallons per hour.
Reserve fuel = (45 min) (8.2 GPH) = 6.2 gallons

Total Fuel = 24.3 + 6.2 = 30.5 gallons

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

Assumed ramp weight = 2910 lbs

Estimated fuel from DEN to AMA = (24.3 gal) (6 lbs/gal) = 146 lbs

Estimated landing weight = 2910 - 146 = 2764 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

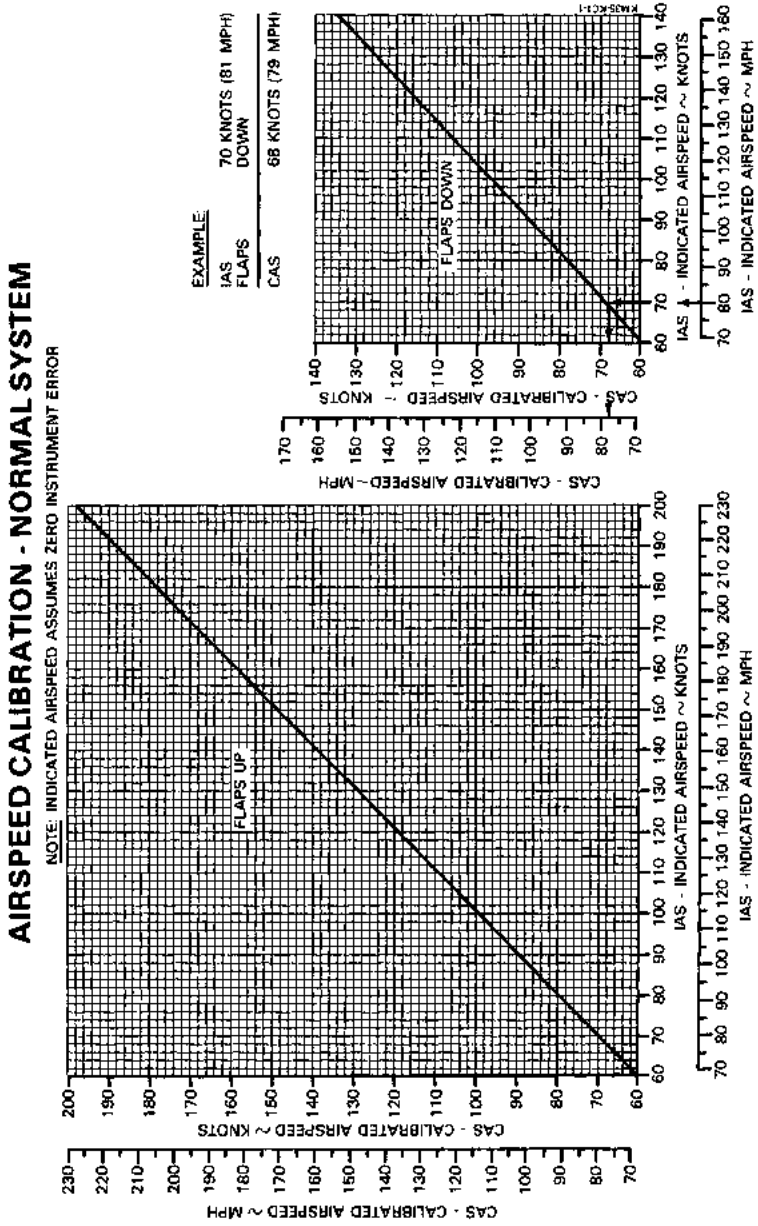
1. The example, in addition to presenting an answer for a particular set of conditions, also presents the order in which the graphs should normally be used, i.e., if the first item in the example is OAT, then enter the graph at the known OAT.

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.

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
FLAPS UP
CAS - CALIBRATED AIRSPEED ~ KNOTS
CAS - CALIBRATED AIRSPEED ~ MPH
IAS - INDICATED AIRSPEED ~ KNOTS
IAS - INDICATED AIRSPEED ~ MPH
EXAMPLE:
IAS 70 KNOTS (81 MPH)
FLAPS DOWN
CAS 68 KNOTS (79 MPH)
FLAPS DOWN
CAS - CALIBRATED AIRSPEED - KNOTS
CAS - CALIBRATED AIRSPEED - MPH
IAS - INDICATED AIRSPEED ~ KNOTS
IAS - INDICATED AIRSPEED ~ MPH

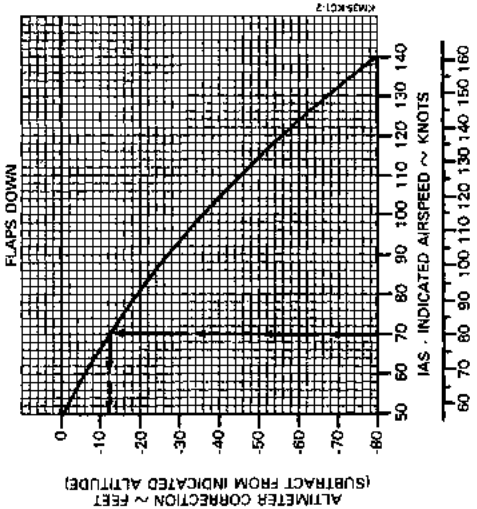
ALTIMETER CORRECTION - NORMAL SYSTEM

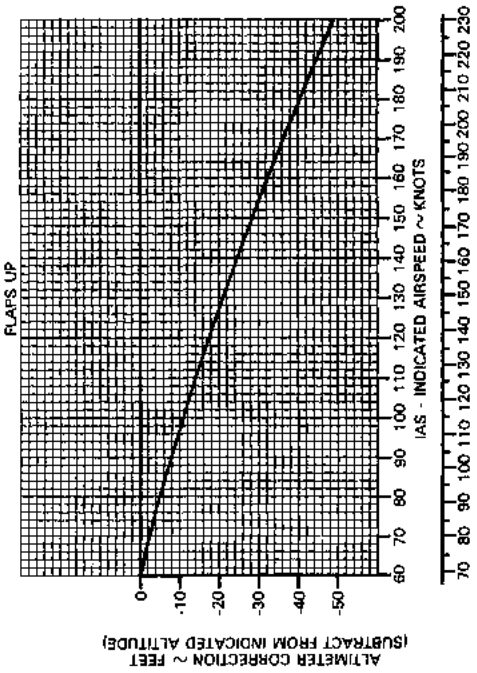
NOTE: INDICATED AIRSPEED AND INDICATED ALTITUDE ASSUME ZERO INSTRUMENT ERROR

EXAMPLE:

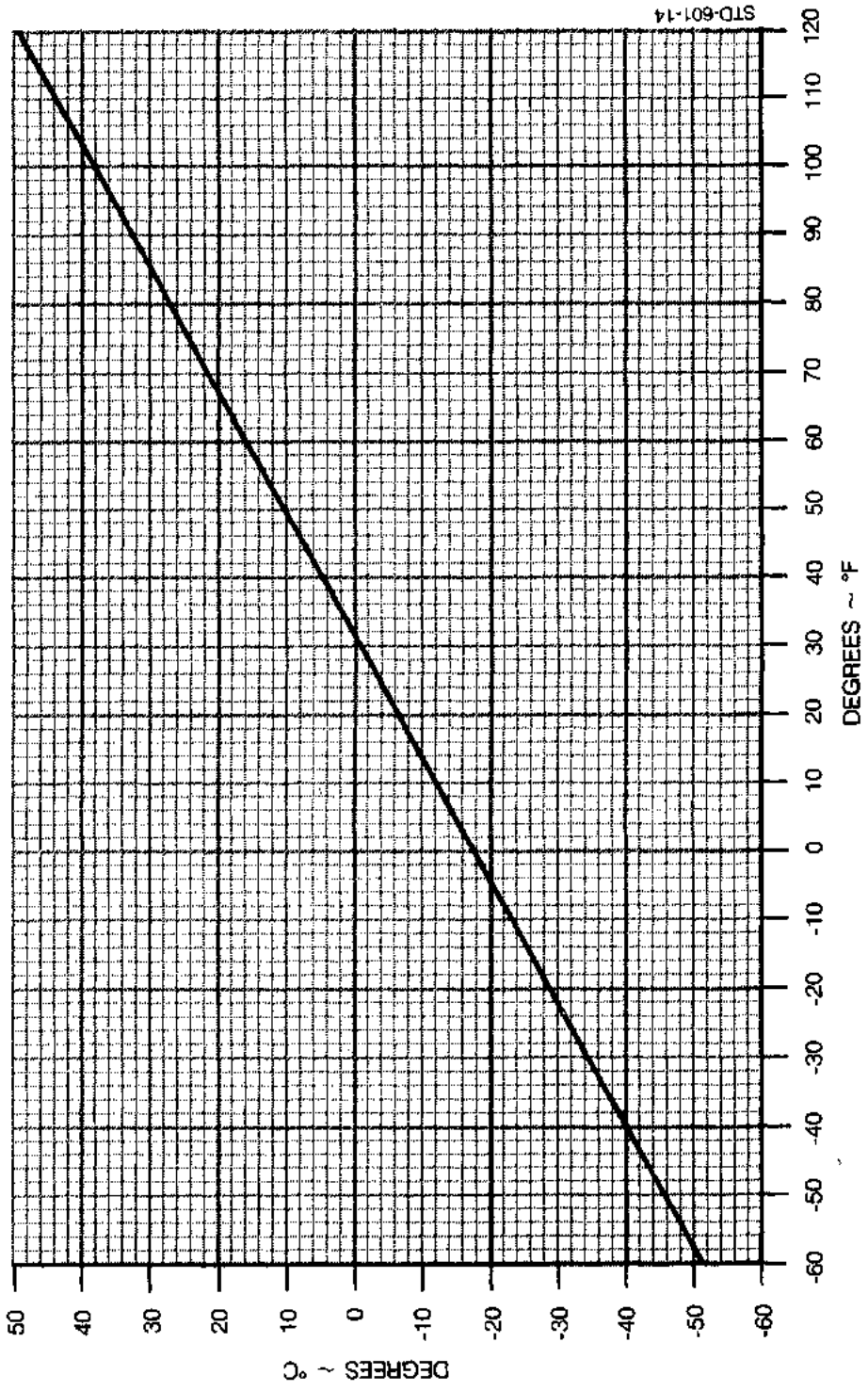
IAS	70 KNOTS (80 MPH)
FLAPS	DOWN
INDICATED PRESSURE ALTITUDE	4500 FT
ALTIMETER CORRECTION	-12 FT

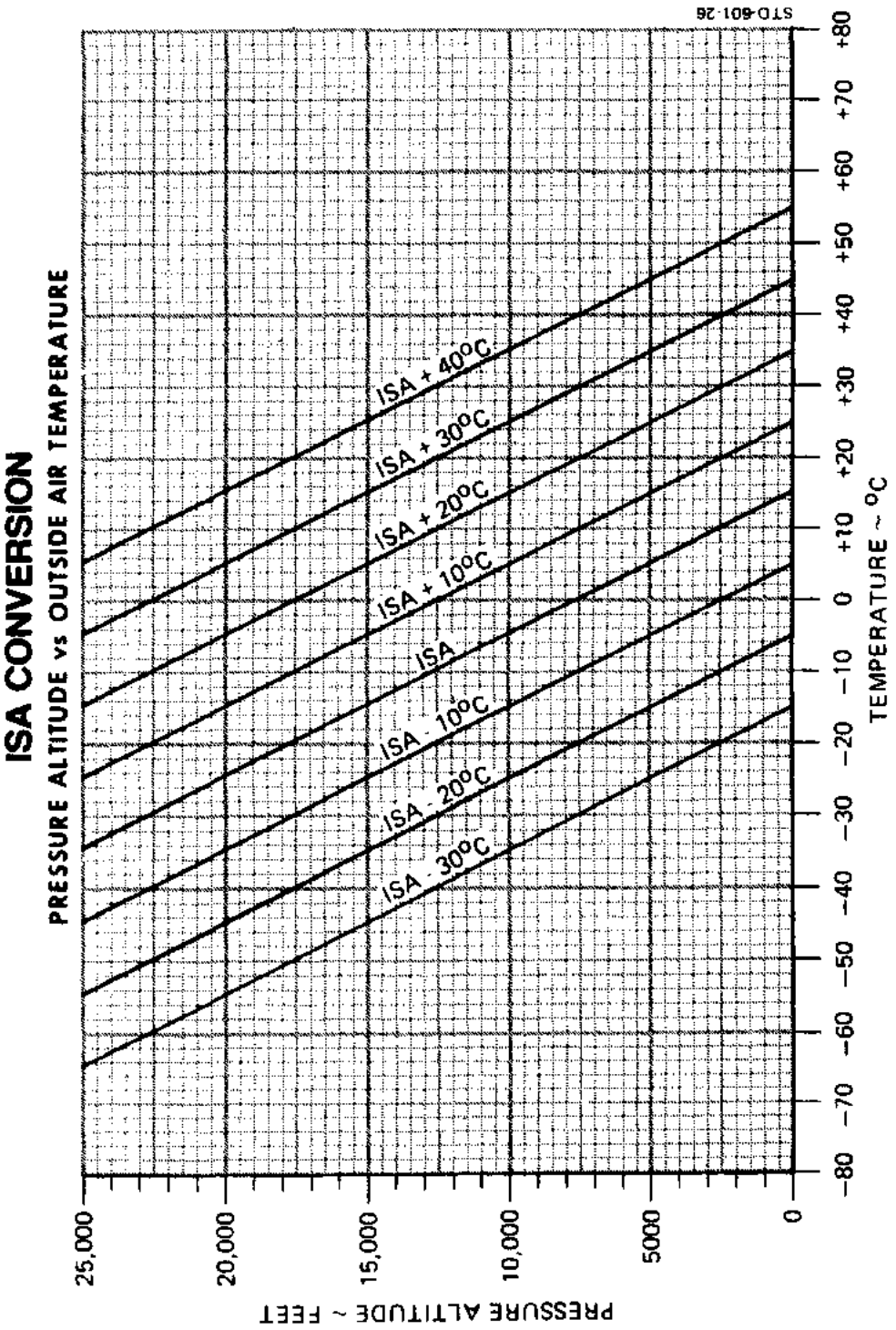
ACTUAL PRESSURE ALTITUDE:
= 4500-12 = 4488 FT





FAHRENHEIT TO CELSIUS TEMPERATURE CONVERSION



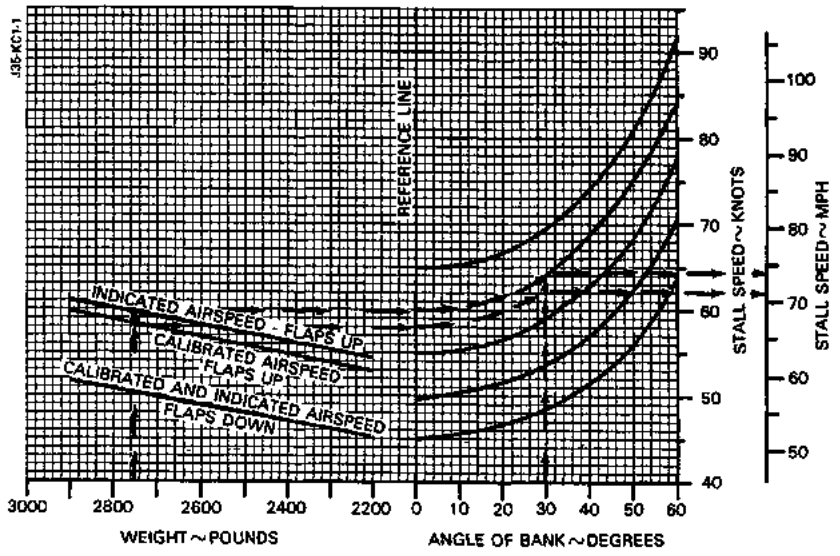

ISA CONVERSION
PRESSURE ALTITUDE vs OUTSIDE AIR TEMPERATURE
STO-601-26
ISA + 40°C
ISA + 30°C
ISA + 20°C
ISA + 10°C
ISA
ISA - 10°C
ISA - 20°C
ISA - 30°C
25,000
20,000
15,000
10,000
5000
0
PRESSURE ALTITUDE ~ FEET
-80 -70 -60 -50 -40 -30 -20 -10 0 +10 +20 +30 +40 +50 +60 +70 +80
TEMPERATURE ~ °C

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	2750 LBS
FLAPS	UP
ANGLE OF BANK	30°
STALL SPEED	CAS: 62 KTS (71 MPH) IAS: 65 KTS (75 MPH)

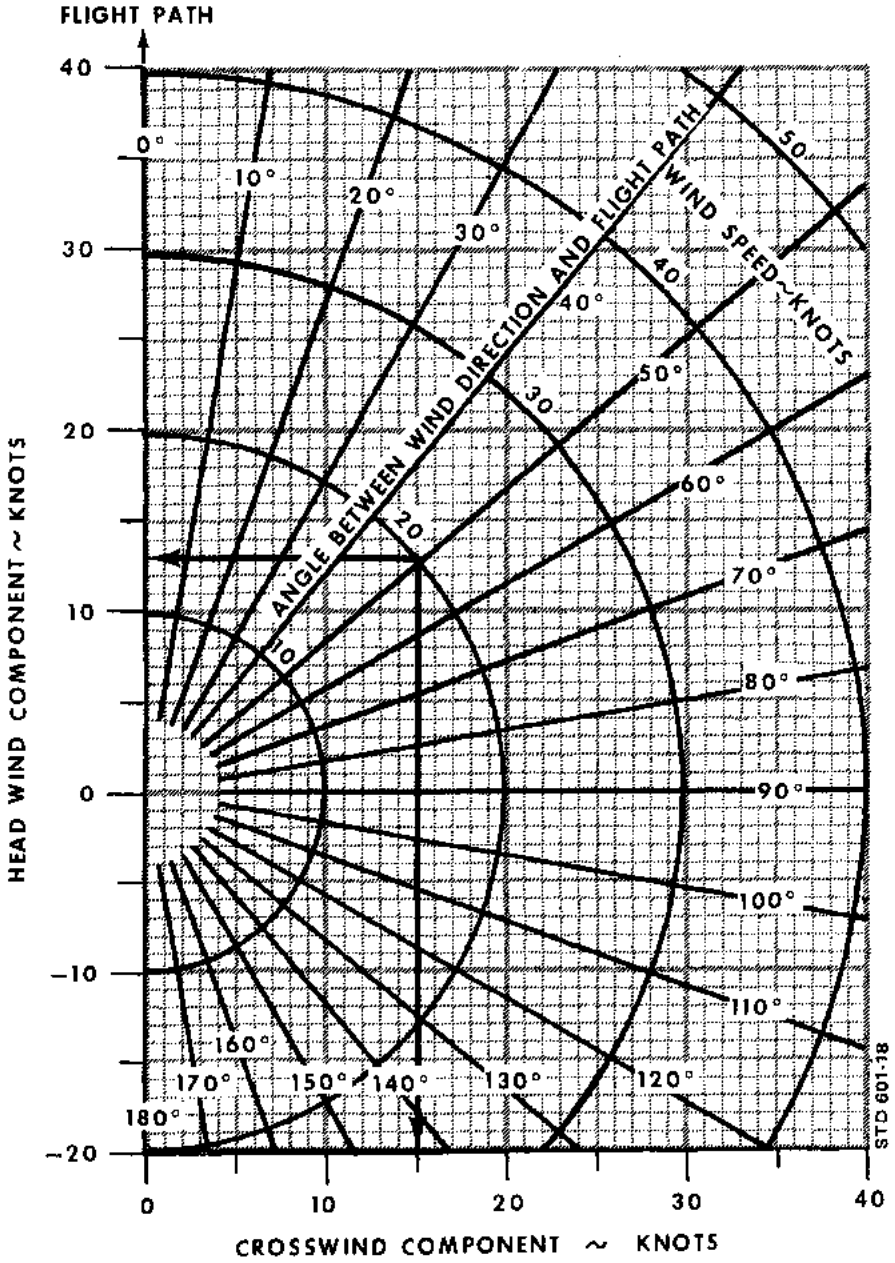


WIND COMPONENTS

Demonstrated Crosswind 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

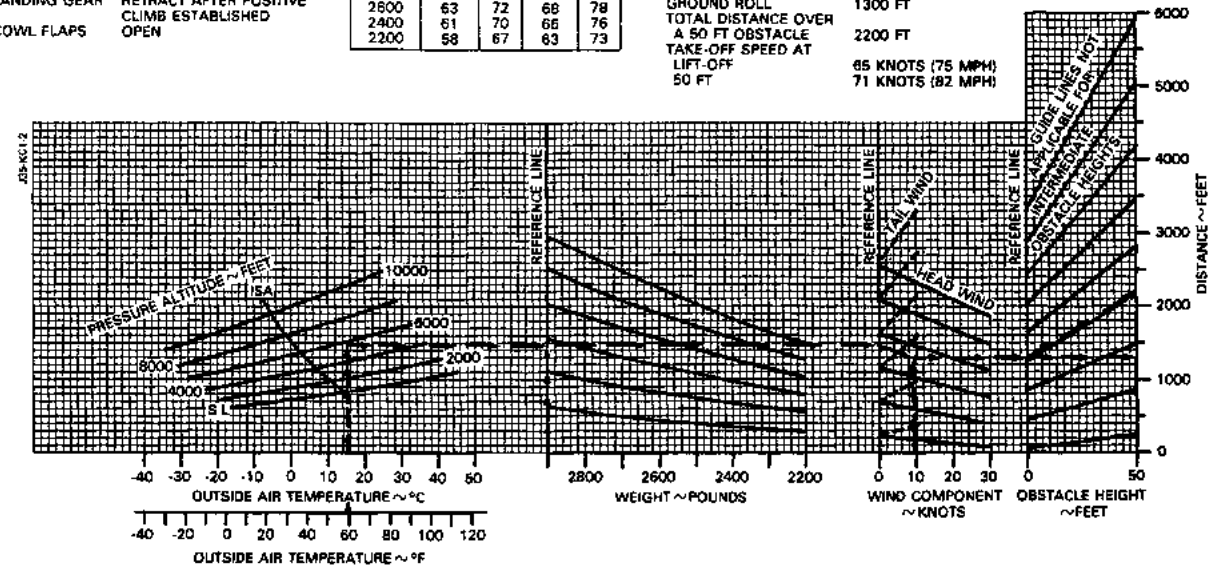
ASSOCIATED CONDITIONS:

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

WEIGHT ~ POUNDS	TAKE-OFF SPEED			
	LIFT-OFF		50 FT	
	KNOTS	MPH	KNOTS	MPH
2900	65	75	71	82
2800	64	74	70	81
2600	63	72	68	78
2400	61	70	66	76
2200	58	67	63	73

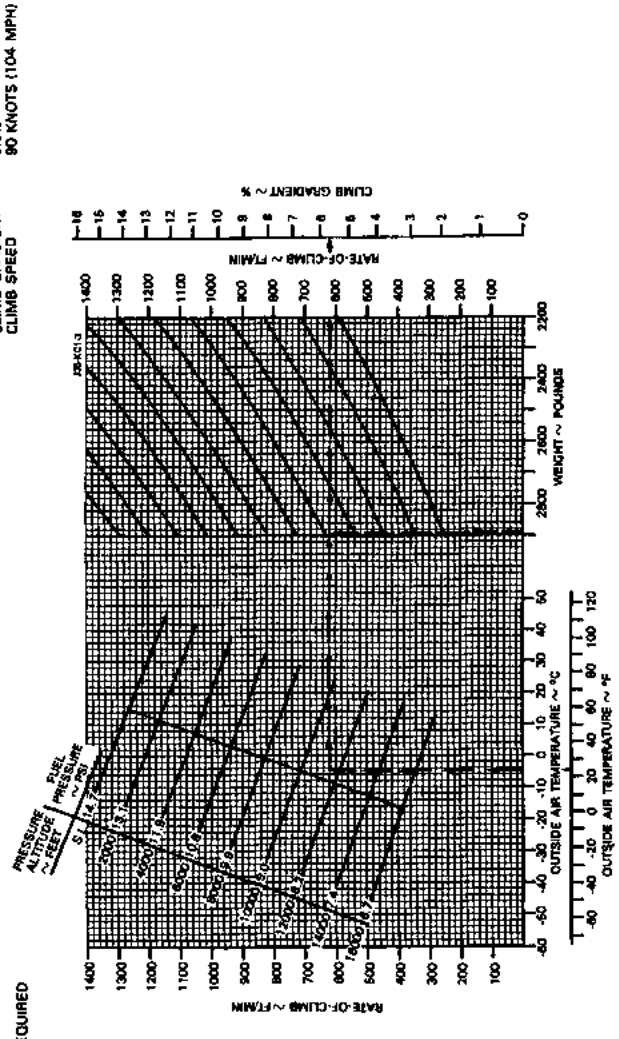
EXAMPLE:

OAT	15°C (59°F)
PRESSURE ALTITUDE	5650 FT
TAKE-OFF WEIGHT	2900 LBS
HEAD WIND COMP.	9.5 KNOTS
GROUND ROLL	1300 FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	2200 FT
TAKE-OFF SPEED AT	
LIFT-OFF	65 KNOTS (75 MPH)
50 FT	71 KNOTS (82 MPH)



CLIMB

CLIMB SPEED 90 KNOTS (ALL WEIGHTS)
104 MPH



ASSOCIATED CONDITIONS:

POWER	FULL THROTTLE AT 2800 RPM
MIXTURE	LEAN TO APPROPRIATE FUEL PRESSURE
FLAPS	UP
LANDING GEAR	UP
COWL FLAPS	AS REQUIRED

CRUISE CLIMB

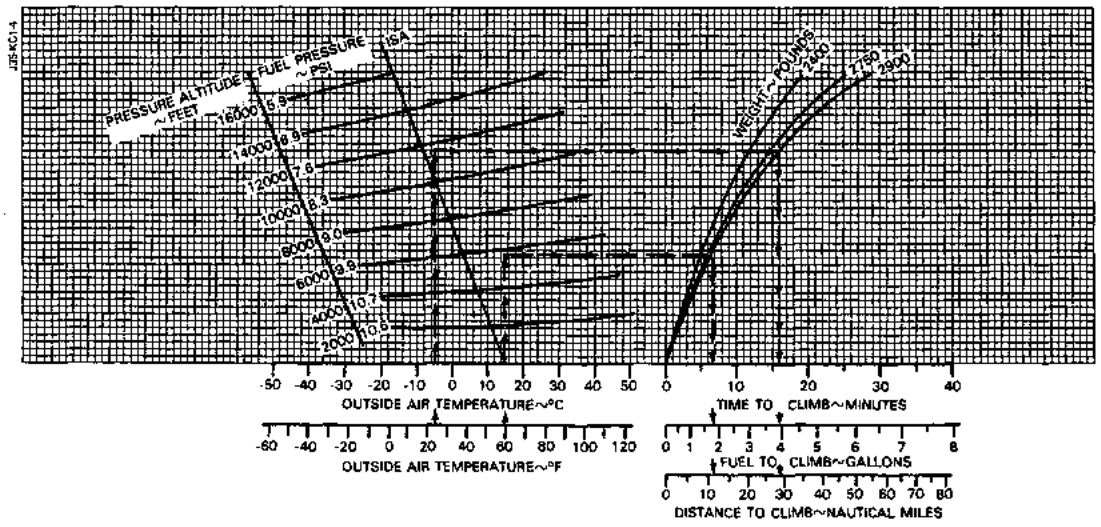
ASSOCIATED CONDITIONS

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

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	2900 LBS
TIME TO CLIMB (16-7)	9 MIN
FUEL TO CLIMB (3.9 - 1.8)	2.1 GAL
DISTANCE TO CLIMB (30-11)	19 NM



CRUISE POWER SETTINGS

75% MAXIMUM CONTINUOUS POWER (OR FULL THROTTLE)
2750 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	27	−3	2450	23.1	8.2	13.6	156	180	63	17	2450	23.8	8.2	13.6	159	183	99	37	2450	24.4	8.2	13.6	163	188
2000	20	−7	2450	22.8	8.2	13.6	159	183	56	13	2450	23.5	8.2	13.6	162	186	92	34	2450	24.2	8.2	13.6	165	190
4000	13	−11	2450	22.6	8.2	13.6	162	186	49	10	2450	23.3	8.2	13.6	165	190	85	30	2450	23.9	8.2	13.6	168	193
6000	6	−14	2450	22.3	8.2	13.6	164	189	42	6	2450	23.0	8.2	13.6	168	193	78	26	2450	23.4	8.0	13.4	170	196
8000	−1	−18	2450	21.8	8.0	13.3	166	191	35	2	2450	21.8	7.8	12.8	167	192	71	22	2450	21.8	7.2	12.3	168	193
10000	−8	−22	2450	20.3	7.2	12.3	164	189	29	−2	2450	20.3	6.8	11.8	165	190	64	18	2450	20.3	6.5	11.4	166	191
12000	−15	−26	2450	18.8	6.4	11.3	162	186	21	−6	2450	18.8	6.2	10.9	163	188	57	14	2450	18.8	5.9	10.6	163	188
14000	−23	−30	2450	17.4	5.8	10.5	160	184	13	−10	2450	17.4	5.6	10.1	160	184	49	10	2450	17.4	5.3	9.8	160	184
16000	−30	−34	2450	16.1	5.2	9.7	156	180	5	−14	2450	16.1	5.1	9.4	157	181	42	6	2450	16.1	4.9	9.1	156	180

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

CRUISE POWER SETTINGS

65% MAXIMUM CONTINUOUS POWER (OR FULL THROTTLE)
2750 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	27	−3	2450	20.7	6.6	11.5	147	169	63	17	2450	21.2	6.6	11.5	150	173	99	37	2450	21.8	6.6	11.5	153	176
2000	20	−7	2450	20.4	6.6	11.5	150	173	56	13	2450	21.0	6.6	11.5	153	176	92	33	2450	21.5	6.6	11.5	156	180
4000	13	−11	2450	20.1	6.6	11.5	152	175	49	9	2450	20.7	6.6	11.5	156	180	85	29	2450	21.3	6.6	11.5	159	183
6000	6	−15	2450	19.8	6.6	11.5	155	178	42	5	2450	20.4	6.6	11.5	159	183	78	26	2450	21.0	6.6	11.5	162	186
8000	−1	−19	2450	19.5	6.6	11.5	158	182	35	2	2450	20.2	6.6	11.5	161	185	71	22	2450	20.8	6.6	11.5	164	189
10000	−8	−22	2450	19.2	6.6	11.5	161	185	28	−2	2450	19.9	6.6	11.5	164	189	64	18	2450	20.3	6.5	11.4	166	191
12000	−15	−26	2450	18.8	6.4	11.3	162	186	21	−6	2450	19.6	6.3	10.9	165	190	57	14	2450	19.8	5.9	10.6	164	189
14000	−23	−30	2450	17.4	5.8	10.6	160	184	13	−10	2450	17.4	5.6	10.1	160	184	49	10	2450	17.4	5.4	9.8	160	184
16000	−30	−34	2450	16.1	5.3	9.7	156	180	6	−14	2450	16.1	5.1	9.4	157	181	42	6	2450	16.1	4.9	9.1	156	179

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

CRUISE POWER SETTINGS

55% MAXIMUM CONTINUOUS POWER (OR FULL THROTTLE)
2750 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	2300	19.8	5.3	9.7	137	158	62	17	2300	20.3	5.3	9.7	140	161	143	37	2300	20.8	5.3	9.7	143	165
2000	19	−7	2300	19.5	5.3	9.7	140	161	55	13	2300	20.0	5.3	9.7	143	165	145	33	2300	20.5	5.3	9.7	145	167
4000	12	−11	2300	19.2	5.3	9.7	142	163	48	9	2300	19.8	5.3	9.7	145	167	148	29	2300	20.3	5.3	9.7	148	170
6000	5	−15	2300	19.0	5.3	9.7	144	166	41	5	2300	19.5	5.3	9.7	147	169	150	25	2300	20.0	5.3	9.7	150	173
8000	−2	−19	2300	18.7	5.3	9.7	147	169	34	1	2300	19.2	5.3	9.7	150	173	152	21	2300	19.7	5.3	9.7	152	175
10000	−9	−23	2300	18.5	5.3	9.7	149	171	27	−3	2300	18.9	5.3	9.7	152	175	154	17	2300	19.4	5.3	9.7	154	177
12000	−16	−27	2300	18.2	5.3	9.7	151	174	20	−7	2300	18.7	5.3	9.7	154	177	156	13	2300	19.0	5.2	9.6	156	180
14000	−23	−31	2300	17.6	5.2	9.6	153	176	13	−11	2300	17.6	5.0	9.3	153	176	152	9	2300	17.6	4.8	9.0	152	175
16000	−30	−35	2300	16.3	4.7	8.9	149	171	6	−15	2300	16.3	4.6	8.7	149	171	147	5	2300	16.3	4.4	8.4	147	169

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

CRUISE POWER SETTINGS

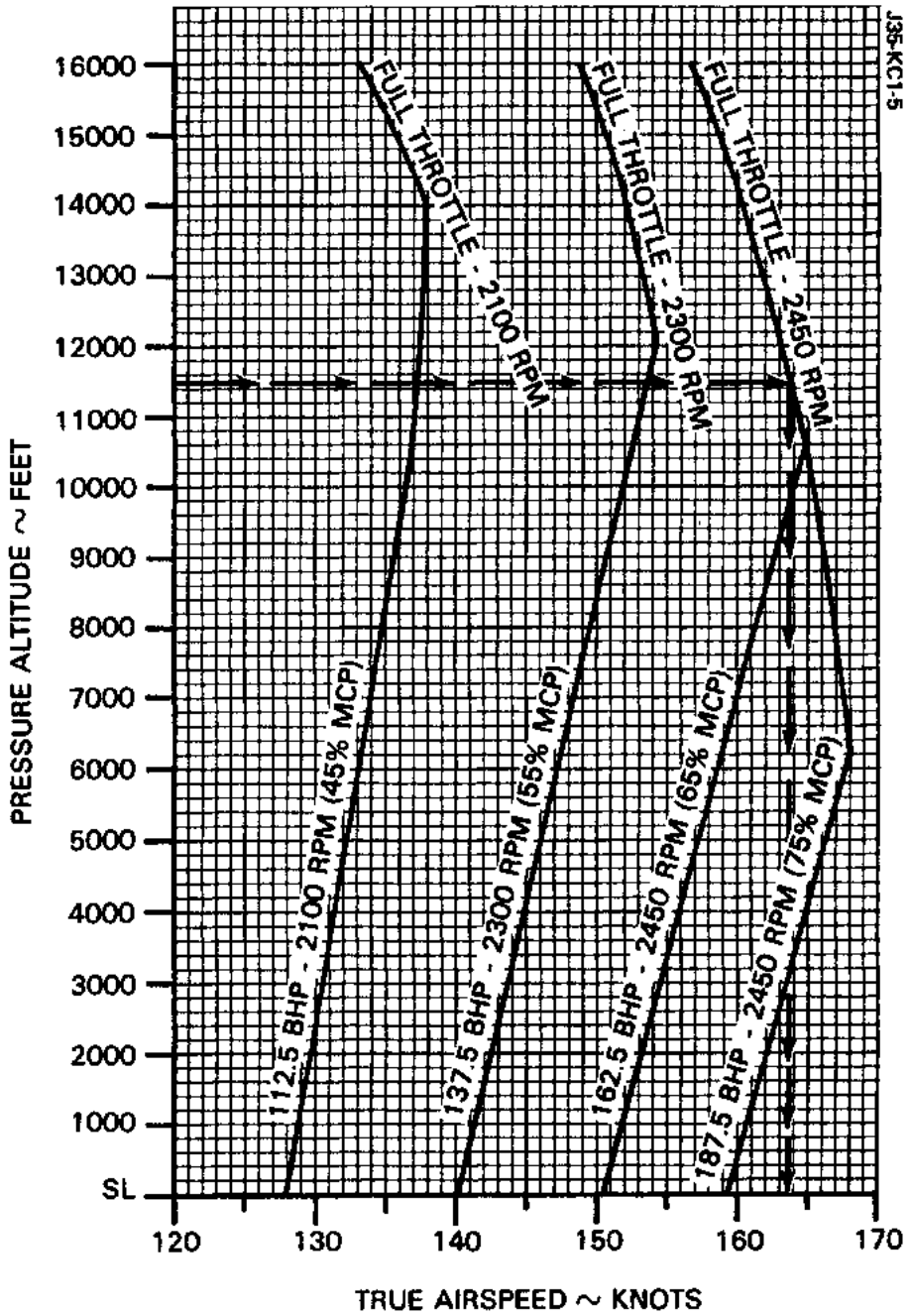
45% MAXIMUM CONTINUOUS POWER (OR FULL THROTTLE)
2750 LBS

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	2100	20.0	4.2	8.2	125	144	62	17	2100	20.4	4.2	8.2	128	147	98	37	2100	20.9	4.2	8.2	130	150
2000	19	−7	2100	19.6	4.2	8.2	127	146	55	13	2100	20.0	4.2	8.2	130	150	91	33	2100	20.5	4.2	8.2	132	152
4000	12	−11	2100	19.2	4.2	8.2	129	148	48	9	2100	19.6	4.2	8.2	132	152	84	29	2100	20.1	4.2	8.2	134	154
6000	4	−15	2100	18.8	4.2	8.2	131	151	41	5	2100	19.2	4.2	8.2	133	153	77	25	2100	19.7	4.2	8.2	135	155
8000	−3	−19	2100	18.4	4.2	8.2	133	153	34	1	2100	18.8	4.2	8.2	135	155	70	21	2100	19.3	4.2	8.2	137	158
10000	−10	−23	2100	17.9	4.2	8.2	135	155	26	−3	2100	18.4	4.2	8.2	136	157	63	17	2100	18.9	4.2	8.2	137	158
12000	−17	−27	2100	17.5	4.2	8.2	136	157	19	−7	2100	18.0	4.2	8.2	137	158	55	13	2100	18.5	4.2	8.2	138	159
14000	−24	−31	2100	17.1	4.2	8.2	137	158	12	−11	2100	17.6	4.2	8.2	138	159	48	9	2100	17.7	4.2	8.1	137	158
16000	−31	−35	2100	16.3	4.2	8.1	136	157	5	−15	2100	16.3	4.0	8.2	133	153	41	5	2100	16.3	4.0	7.8	128	147

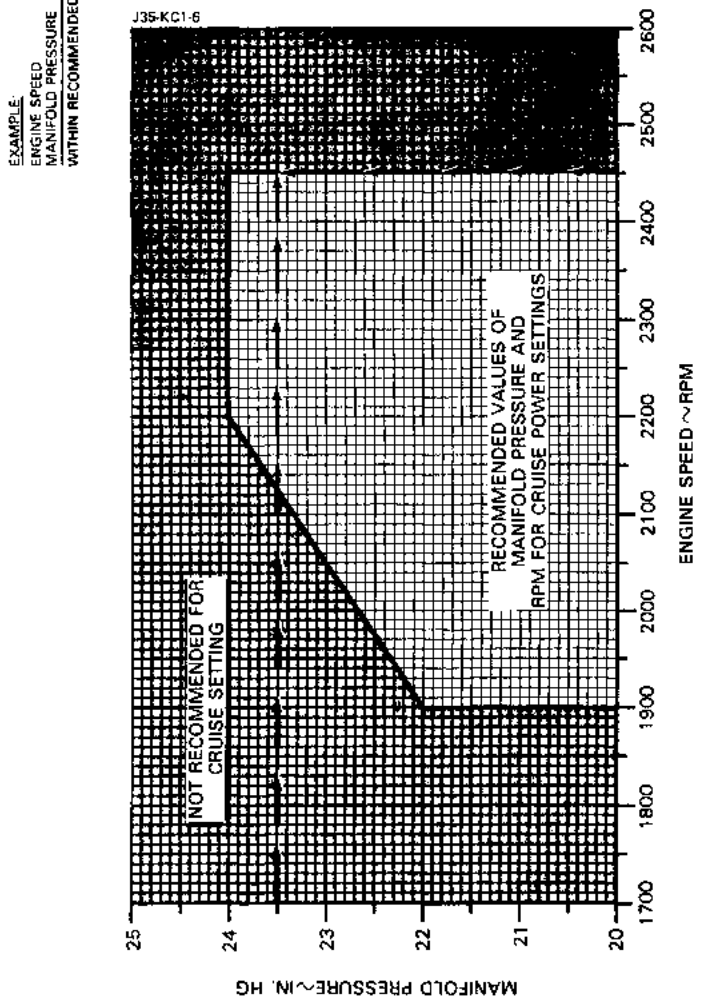
NOTES: 1. FULL THROTTLE SETTINGS ARE APPROXIMATE.
2. SHADED AREA REPRESENTS OPERATION WITH FULL THROTTLE.

CRUISE SPEEDS

ASSOCIATED CONDITIONS:		EXAMPLE:	
AVERAGE CRUISE WEIGHT	2750 LBS	PRESSURE ALTITUDE	11500 FT
TEMPERATURE	STANDARD DAY (ISA)	POWER SETTING	FULL THROTTLE 2450 RPM
		TRUE AIRSPEED	164 KNOTS

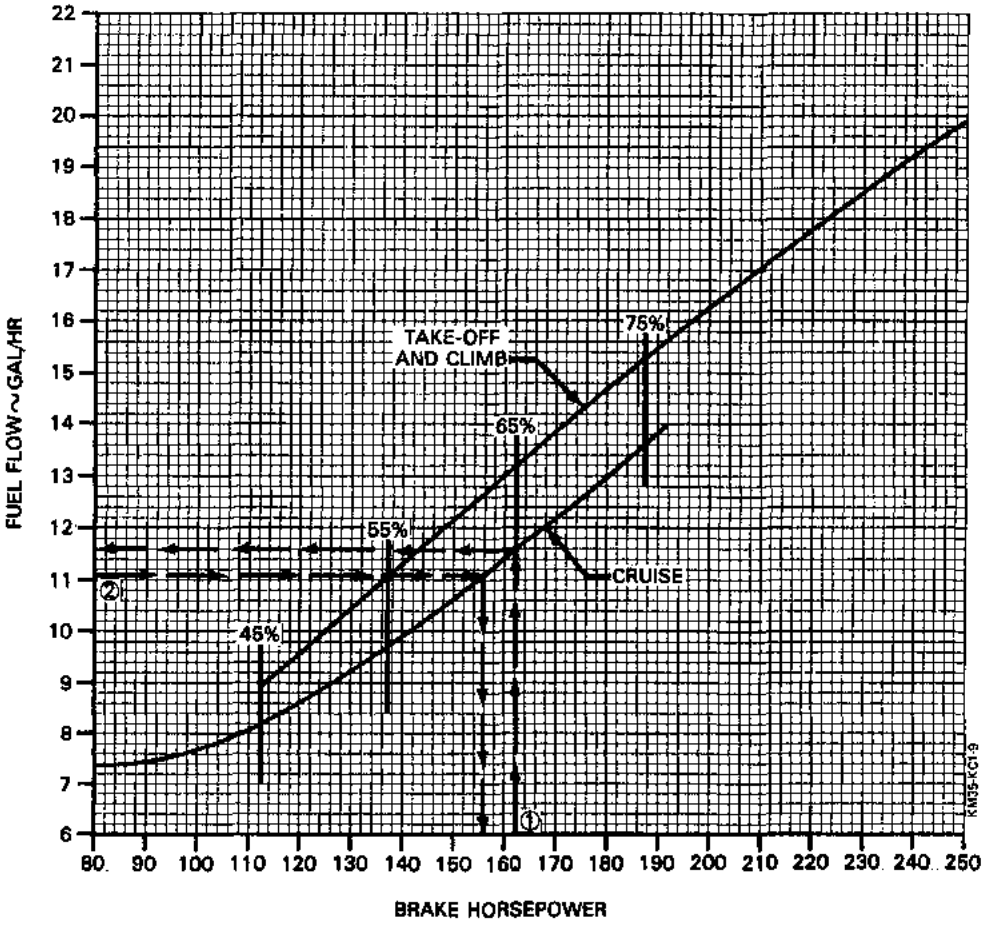


MANIFOLD PRESSURE vs RPM



FUEL FLOW vs BRAKE HORSEPOWER

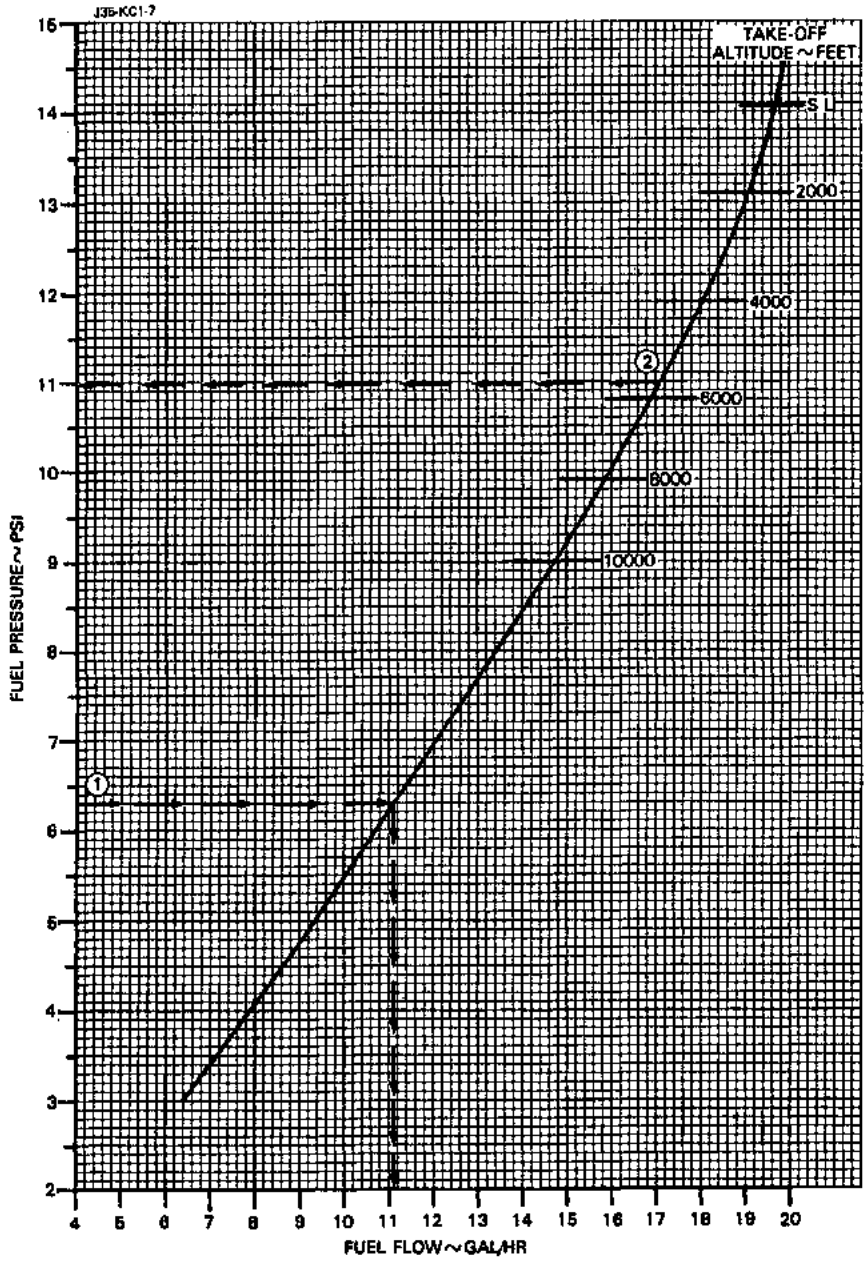
EXAMPLE:	
① BRAKE HORSEPOWER	162.5 (65% MCP)
CONDITION	LEVEL FLIGHT CRUISE LEAN
FUEL FLOW	11.6 GAL/HR
② FUEL FLOW CONDITION	11.1 GAL/HR LEVEL FLIGHT CRUISE LEAN
BRAKE HORSEPOWER	156



FUEL FLOW vs FUEL PRESSURE

EXAMPLE:

①	FUEL PRESSURE	6.3 PSI
	FUEL FLOW	11.1 GAL/HR
②	PRESSURE ALTITUDE AT TAKE-OFF	5650 FT
	FUEL PRESSURE TO SET FOR TAKE-OFF	11 PSI



RANGE PROFILE - 53 GALLONS

STANDARD DRY (ISA)

ASSOCIATED CONDITIONS:

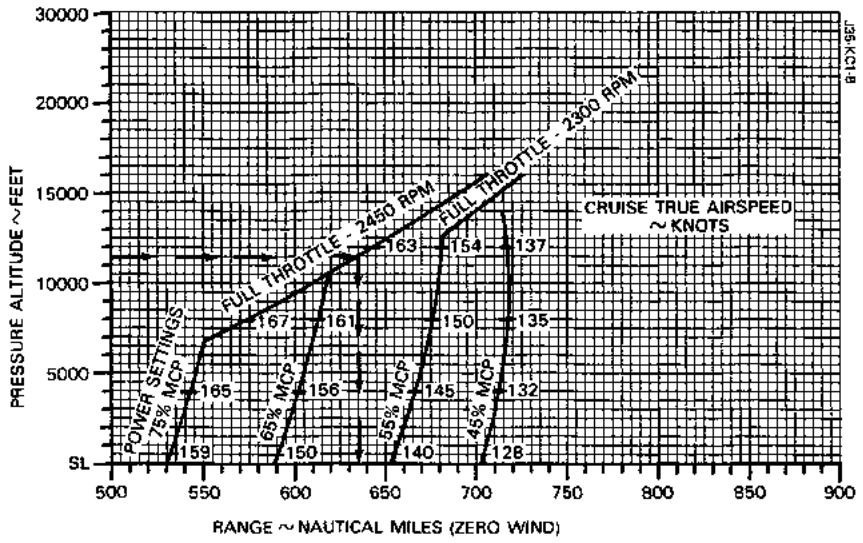
WEIGHT	2910 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	53 U.S. GAL (318 LBS)

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	635 NM



RANGE PROFILE - 34 GALLONS

STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

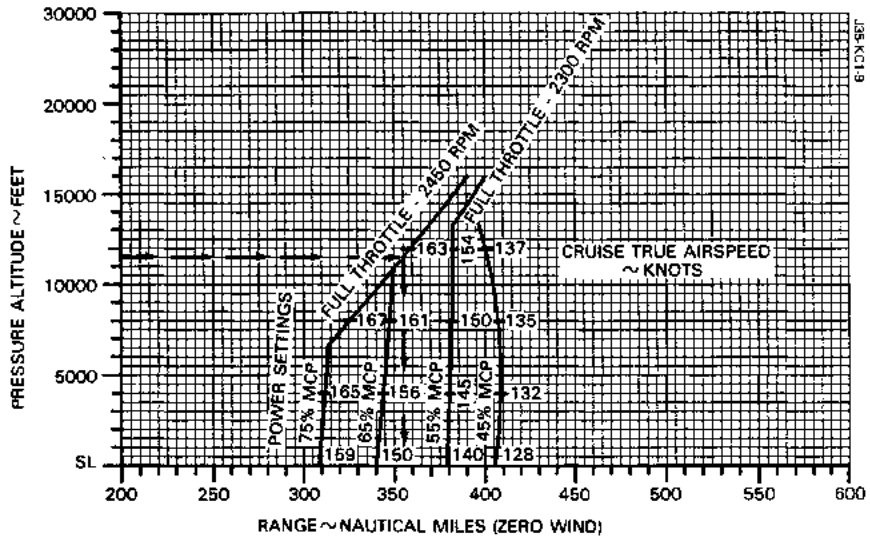
WEIGHT	2910 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	34 U.S. GAL (204 LBS)

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	355 NM



ENDURANCE PROFILE - 53 GALLONS

STANDARD DAY (ISA)

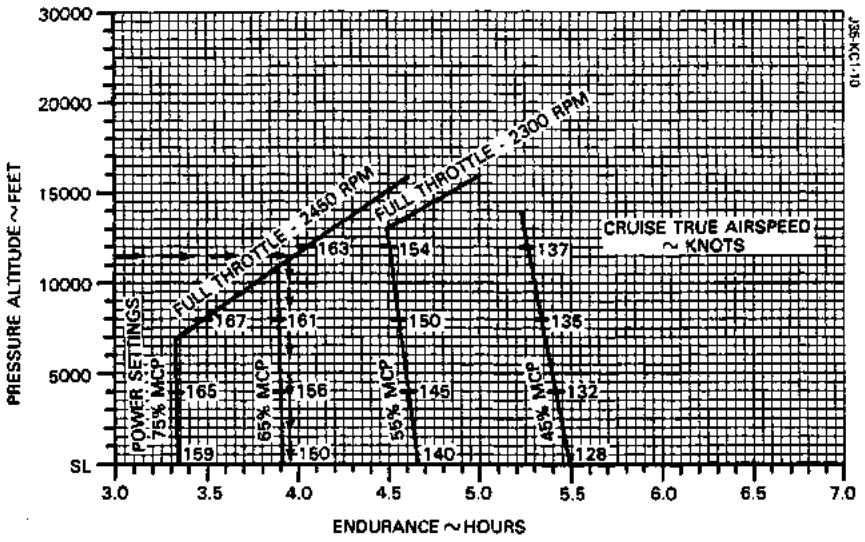
ASSOCIATED CONDITIONS:

WEIGHT	2910 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	53 U.S. GAL (318 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	3.9 HRS (3 HRS. 54 MIN)



ENDURANCE PROFILE - 34 GALLONS

STANDARD DAY (ISA)

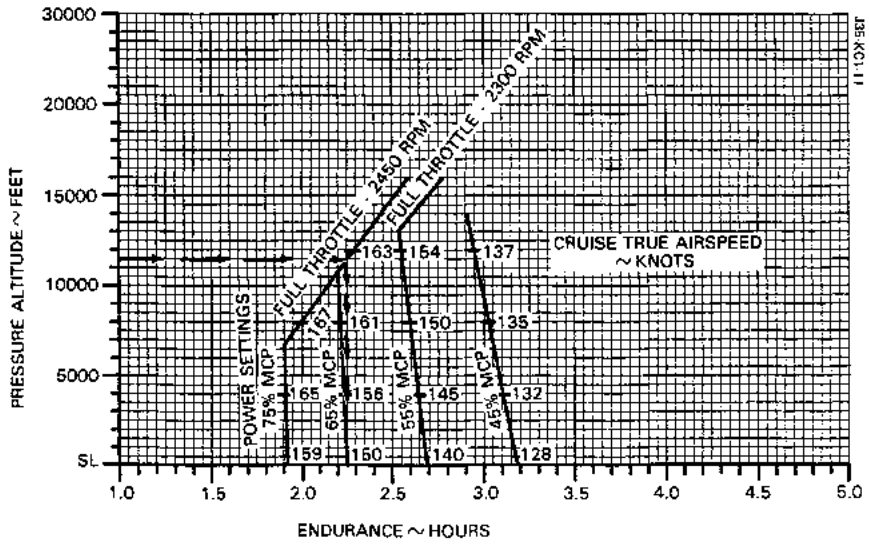
ASSOCIATED CONDITIONS:

WEIGHT	2910 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	34 U.S. GAL (204 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	2.25 HRS (2 HRS, 15 MIN)



LANDING DISTANCE

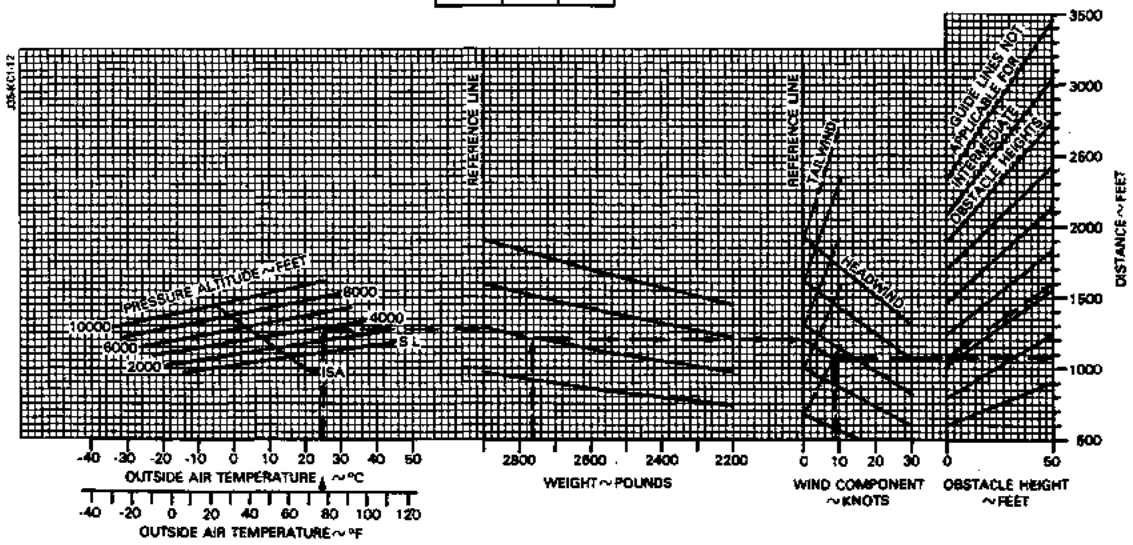
ASSOCIATED CONDITIONS:

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	SPEED AT 50 FT MPH
2900	69	79
2800	68	78
2600	65	75
2400	63	72
2200	60	69

EXAMPLE:

OAT	25°C (77°F)
PRESSURE ALTITUDE	3965 FT
WEIGHT	2764 LBS
WIND COMPONENT	9.0 KNOTS (HEADWIND)
GROUND ROLL	1075 FT
TOTAL OVER 50 FT OBSTACLE	1600 FT
APPROACH SPEED	67 KNOTS (77 MPH)



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SECTION VI

WEIGHT AND BALANCE/ EQUIPMENT LIST

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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 10 gallon auxiliary tanks installed.

3. Engine oil must be at the full level or completely drained. Total engine oil when full is 20 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. The airplane must be in a level attitude at the time of weighing. Leveling screws are located on the left side of the fuselage at Fuselage Station 152.25 (approximately). Level attitude is determined with a plumb bob.

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.

LOADING INSTRUCTIONS

WARNING

This airplane is easily loaded above the maximum takeoff weight and/or beyond the aft cen-

ter of gravity flight limits. Flight safety dictates that the airplane weight and center of gravity be within the approved envelope during flight.

Passengers, baggage and fuel should not be loaded indiscriminately. The operator is directed to the following loading instructions. A total airplane incremental weight and center of gravity loading for each flight should be prepared. In addition, it is recommended that additional loadings be computed to explore the potential problems associated with using the aft seats and compartments.

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 basic empty weight and moment of the airplane at the time of delivery are shown on the airplane Basic 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.

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 SUBTOTAL 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 Loading Condition 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 SUB-TOTAL Condition No. 3 and No. 5 as well as 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. (17 lbs. and 442 lb. in.)

WEIGHT AND BALANCE LOADING FORM

BONANZA J35_____ DATE _____

SERIAL NO. D-XXXX _____ REG NO. NXXX _____

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION	1996	1543
2. FRONT SEAT OCCUPANTS	340	292
3. REAR SEAT OCCUPANTS	170	201
4. BAGGAGE	86	120
5. CARGO	-	-
6. CARGO	-	-
7. SUB TOTAL ZERO FUEL CONDITION	2592	2156
8. FUEL - MAIN (34 GAL) FUEL - AUX. (19 GAL)	204 114	153 107
9. SUB TOTAL RAMP CONDITION	2910	2416
*10. LESS FUEL FOR START, TAXI, AND TAKE-OFF	-10	-8
11. SUB TOTAL TAKE-OFF CONDITION	2900	2408
12. LESS FUEL - LEFT MAIN (15 GAL)	-90	-68
13. SUB TOTAL	2810	2340
14. LESS FUEL - AUX (19 GAL)	-114	-107
15. SUB TOTAL	2696	2233
16. LESS FUEL - MAIN (10 GAL)	-60	-45
17. LANDING CONDITION	2636	2188

SAMPLE

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

WEIGHT AND BALANCE LOADING FORM

BONANZA _____ DATE _____

SERIAL NO._____ REG NO. _____

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.

SAMPLE LOADINGS

The following sample loadings show some of the problems associated with loading the aft seats and compartments. Similar loadings should be made for your airplane. Follow the loading instructions in the Pilot's Operating Handbook plus those on the sample loading form.

SAMPLE LOADING
Four 190-Pound Occupants
(Outside Flight C.G. Limits)

Item	Weight	ARM (C.G.**)	MOM/100**
Basic Empty Weight***	1963	78.2	1535
Occupant - Front (1)	190 2153	88.0 79.1	167 1702
Occupant - Front (1)	190 2343	88.0 79.8	167 1869
Occupant - Center (1)	190 2533	118.0 82.6	224 2093
Occupant - Center (1)	190 2723	118.0 85.1	224 2317
Baggage	120 2843	140.0 87.4	168 2485

SAMPLE
DO NOT FLY WITH
THIS LOADING

** Use the C.G., MOM/100 for the occupants as they are positioned in your airplane. Consult the POH Weight and Balance Section for the latest occupant positions. If the seats are adjustable fore and aft, use the position in which that seat is located during flight.

*** The Basic Empty Weight Data shall be current and accurate for the airplane as equipped.

NOTE: The addition of fuel to the above loading will move the center of gravity (C.G.) forward. Conversely, using fuel during flight will move the airplane center of gravity aft. Flight safety requires that during flight the airplane weight and center of gravity be within the approved limits.

NOTE: Four 190-pound occupants plus 30 pounds of baggage each cannot be loaded and remain within the aft C.G. limit of F.S. 85.2 (@ 2723 lb.). 115 pounds of baggage must be removed to place the airplane C.G. on the aft C.G. limit.

SAMPLE LOADING
4-Place Family Loading
(Within Flight C.G. Limits)

Item	Weight	ARM (C.G.**)	MOM/100**
Basic Empty Weight***	1963	78.2	1535
Occupant - Front (1)	190	88.0	167
	2153	79.1	1702
Occupant - Front (1)	130	88.0	114
	2283	79.5	1816
Occupant - Center (1)	100	118.0	118
	2383	81.2	1934
Occupant - Center (1)	90	118.0	106
	2473	82.5	2040
Baggage	136	140.0	190
	2609	85.5	2230

SAMPLE

** Use the C.G., MOM/100 for the occupants as they are positioned in your airplane. Consult the POH Weight and Balance Section for the latest occupant positions. If the seats are adjustable fore and aft, use the position in which that seat is located during flight.

*** The Basic Empty Weight Data shall be current and accurate for the airplane as equipped.

NOTE: The addition of fuel to the above loading will move the center of gravity (C.G.) forward. Conversely, using fuel during flight will move the airplane center of gravity aft. Flight safety requires that during flight the airplane weight and center of gravity be within the approved limits.

NOTE: With the reduced occupant weights 136 pounds of baggage places the airplane C.G. on the aft limit of F.S. 85.5.

SAMPLE LOADING FORM

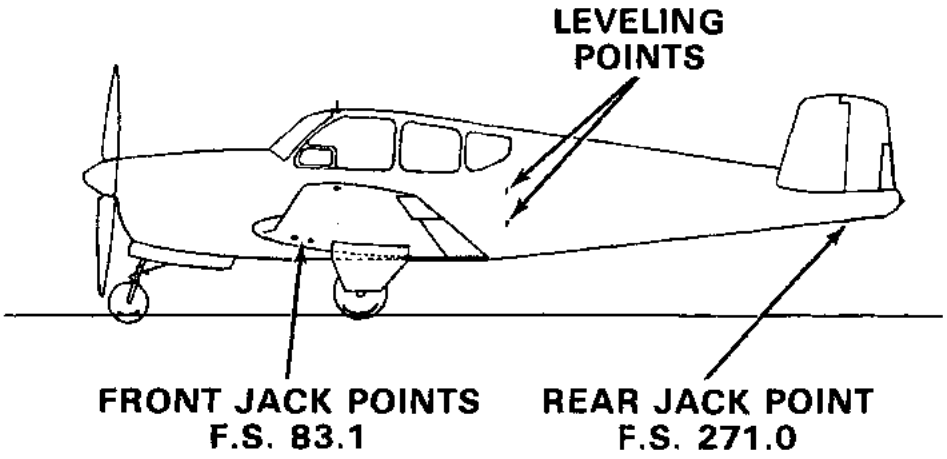
Item	Weight	ARM (C.G.*)	MOM/100*
Basic Empty Weight**			
Occupant - Front (1)			
Occupant - Front (1)			
Occupant - Center (1)			
Occupant - Center (1)			
Baggage			

* Use the C.G., MOM/100 for the occupants as they are positioned in your airplane. Consult the POH Weight and Balance Section for the latest occupant positions. If the seats are adjustable fore and aft, use the position in which that seat is located during flight.

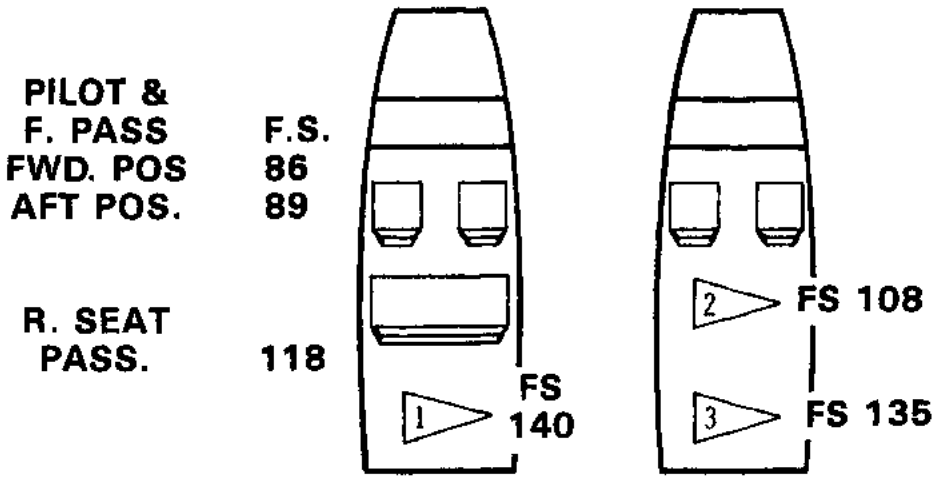
** The Basic Empty Weight Data shall be current and accurate for the airplane as equipped.

NOTE: The addition of fuel to the above loading will move the center of gravity (C.G.) forward. Conversely, using fuel during flight will move the airplane center of gravity aft. Flight safety requires that during flight the airplane weight and center of gravity be within the approved limits.

DIMENSIONAL AND LOADING DATA



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.

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
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
34	204	153

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
9	17	4

*Included in Basic Empty Weight

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
2900 lb. (take-off or landing)	82.1	84.7
2525 lb.	77.6	85.7
2475 lb. or less	77.0	85.7

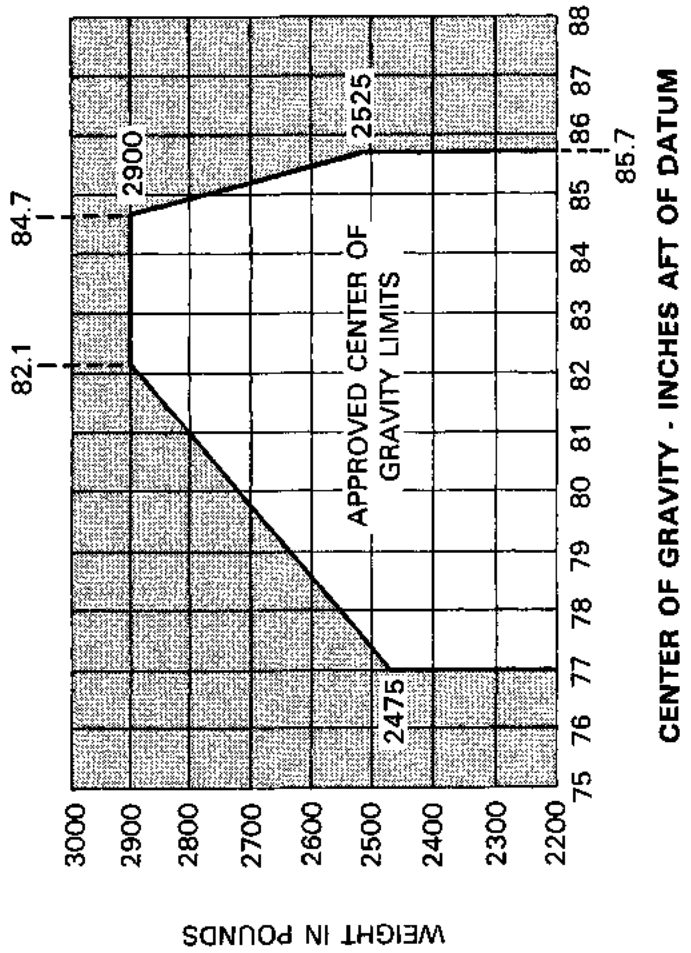
Weight	Minimum Moment / 100	Maximum Moment / 100
2100	1617	1800
2110	1625	1808
2120	1632	1817
2130	1640	1825
2140	1648	1834
2150	1656	1843
2160	1663	1851
2170	1671	1860
2180	1679	1868
2190	1686	1877
2200	1694	1885
2210	1702	1894
2220	1709	1903
2230	1717	1911
2240	1725	1920
2250	1733	1928
2260	1740	1937
2270	1748	1945
2280	1756	1954
2290	1763	1963

MOMENT LIMITS vs WEIGHT (Continued)

Weight	Minimum Moment 100	Maximum Moment 100
2300	1771	1971
2310	1779	1980
2320	1786	1988
2330	1794	1997
2340	1802	2005
2350	1810	2014
2360	1817	2023
2370	1825	2031
2380	1833	2040
2390	1840	2048
2400	1848	2057
2410	1856	2065
2420	1863	2074
2430	1871	2083
2440	1879	2091
2450	1887	2100
2460	1894	2108
2470	1902	2117
2480	1911	2125
2490	1921	2134
2500	1933	2143
2510	1943	2151
2520	1954	2160
2530	1965	2168
2540	1976	2176
2550	1986	2184
2560	1997	2192
2570	2008	2199
2580	2019	2207
2590	2030	2215

MOMENT LIMITS vs WEIGHT (Continued)

Weight	Minimum Moment 100	Maximum Moment 100
2600	2041	2223
2610	2052	2031
2620	2063	2239
2630	2074	2247
2640	2085	2254
2650	2096	2262
2660	2107	2270
2670	2118	2278
2680	2130	2286
2690	2141	2293
2700	2152	2301
2710	2163	2309
2720	2174	2317
2730	2186	2325
2740	2197	2332
2750	2208	2340
2760	2220	2348
2770	2231	2356
2780	2242	2364
2790	2254	2371
2800	2265	2379
2810	2277	2387
2820	2288	2395
2830	2300	2402
2840	2311	2410
2850	2323	2418
2860	2334	2425
2870	2346	2433
2880	2358	2441
2890	2369	2449
2900	2381	2456


WEIGHT IN POUNDS
3000
2900
2800
2700
2600
2500
2400
2300
2200
75
76
77
78
79
80
81
82
83
84
85
86
87
88
CENTER OF GRAVITY - INCHES AFT OF DATUM
APPROVED CENTER OF GRAVITY LIMITS
2900
2525
2475
84.7
82.1
85.7

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.

BASIC EMPTY WEIGHT AND BALANCE

BONANZA J35 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			20	-	505
UNUSABLE FUEL			36	79	2844
WITH AUX. TANKS INSTALLED			5	94	470
BASIC EMPTY WEIGHT					

SECTION VII

SYSTEMS DESCRIPTION

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AIRFRAME

The BEECHCRAFT J35 Bonanza is a four-place all-metal, low-wing, single-engine monoplane with fully retractable tricycle landing gear.

The Bonanza has "Vee" tail control surfaces which are arranged to act as both elevator and rudder. The two surfaces work together for elevator action and opposite each other in rudder action. The "Vee" tail operates like a conventional tail in response to elevator and rudder control action.

DOORS, WINDOWS AND EXITS

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.

OPENABLE CABIN WINDOWS

To Open Window For Ventilation (Only On Ground):

Release latch front of bar, pull bar at the bottom of the window out and upward. Window will open approximately two inches.

To Close Window:

Pull inward and down on the bar at the bottom of the window. Resistance will be felt as the bar moves downward. Continue moving bar downward to its lowest position. Check that bar is locked by the latch.

NOTE

Window is to be closed before and during flight. While closing window, ascertain that the emergency release pin (which allows the window to open fully for emergency exit) is securely in place.

EMERGENCY EXITS

To open the emergency exit provided by the openable window on each side of the cabin:

1. Lift the latch.
2. Pull out the emergency release pin and push the window out.

The above procedure is described on a placard installed below the left and right openable windows.

SEAT ADJUSTMENTS

Both of the individual front seats are adjustable fore-and-aft, by pulling up on the small lever just to the right of each seat cushion and pulling or pushing on the seat. In addition, the front seat backs are adjustable to three angles off vertical, providing a welcome change of position on long flights.

The rear seat has a single back which may be adjusted to three positions off vertical. To adjust the seat back, pull forward on the seat back to raise it. To lower it, pull forward on the seat back until the catch releases, then push back again to the desired position.

ARMRESTS AND HEADRESTS

Armrests for both front and rear seat passengers are built into the cabin sidewalls and the door; a cup in the door armrest forms a convenient handle for pulling the door closed. In addition, an armrest between the two front seats may be raised into position on a pedestal or lowered flush with the seat cushions.

In addition, a center arm rest in the rear seat back may be swung down or folded up into the seat back. All four seat positions have sockets for attaching large neck-pillow style headrests. Two are included as standard equipment.

SHOULDER HARNESS AND SEAT BELTS

The shoulder harness is standard equipment on all seats.

The BEECHCRAFT Bonanza has quick-release seat belt buckles which are easily adjusted and fastened. The nylon webbing, in colors complementing the upholstery, is strong, light, soil-resistant and easily cleaned.

BAGGAGE COMPARTMENT

Access to the baggage compartment may be obtained either through the baggage door on right side of the fuselage or by reaching over the rear seat.

WARNING

DO NOT CARRY CHILDREN IN THE BAGGAGE COMPARTMENT.

WARNING

DO NOT CARRY HAZARDOUS MATERIAL.

CAUTION

To prevent shifting of baggage or other objects they should be secured by straps or other suitable means.

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 immediately below the control column.

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

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.

WING FLAPS

The flaps are raised and lowered electrically by jackscrew actuators driven through flexible shafts from a single motor and gearbox under the front seat.

CONTROL SWITCH

The flaps are controlled by a three-position switch on the left side of the subpanel. A latch on the control switch must be moved aside to place the switch in the up position.

POSITION INDICATORS

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 for the up and down positions stop the flaps automatically at the proper point. Intermediate flap positions may be set by moving the control switch to off when the desired setting is reached.

INSTRUMENT PANEL

The instrument panel for this airplane consists of fixed and floating instrument 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.

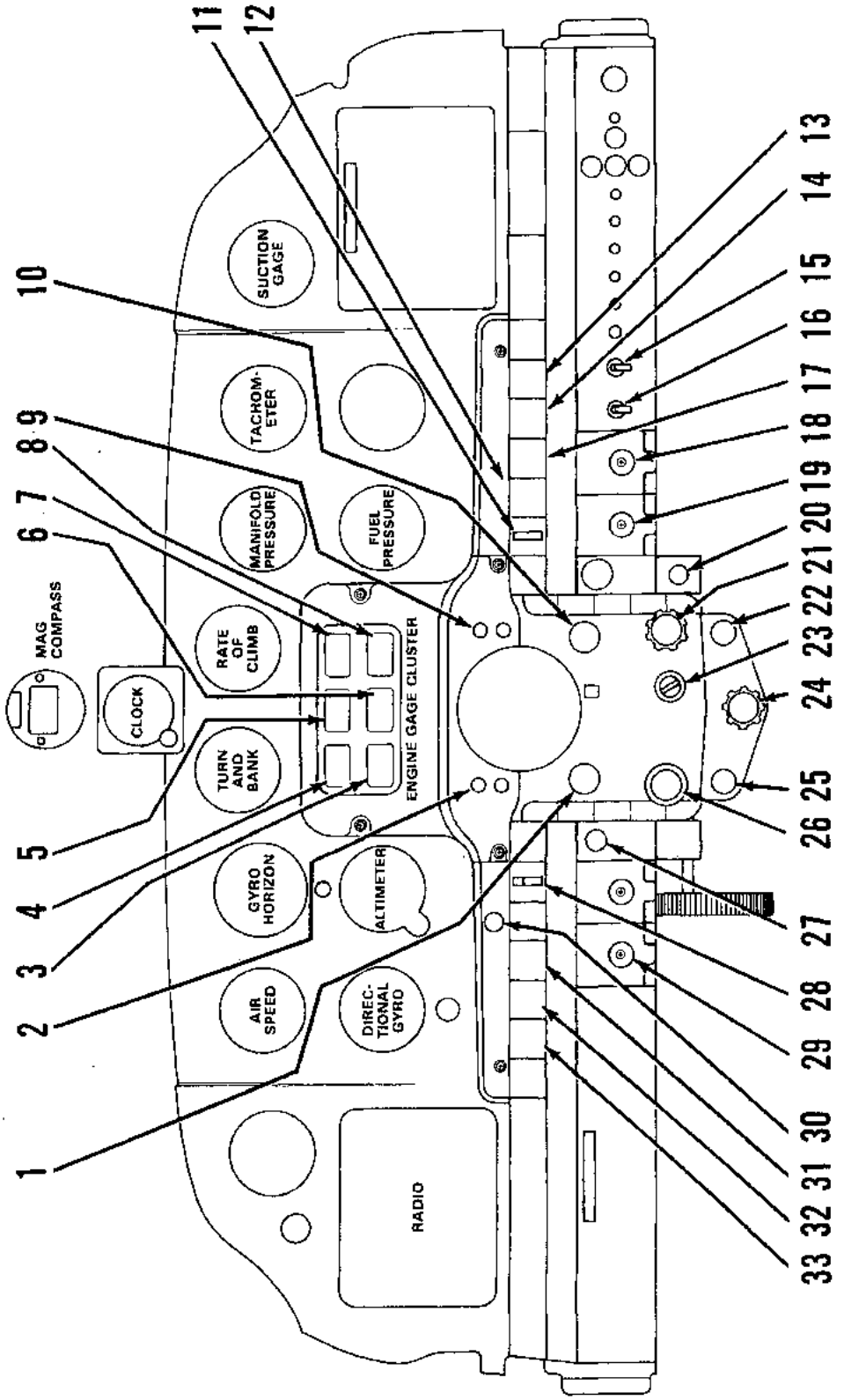
Standard instrumentation on the Bonanza includes an airspeed indicator, altimeter and electric turn-and-bank indicator mounted in the instrument panel; magnetic compass mounted on the windshield divider; a clock built into the instrument cowl pad, and outside air thermometer at the top of the divider.

In addition to several radio-navigation combinations, optional instruments for which openings are provided in the instrument panel include a vacuum-operated directional gyro and attitude gyro, and the suction gage necessary when these instruments are installed.

The battery master switch and generator switches are located under a door in a panel under the right side of the instrument panel. The key operated battery/ignition switch is located below the control column and the push button starter switch to the left of the control column.

Piano type key switches on the right and left subpanels operate landing gear, flaps, exterior lighting, auxiliary fuel pump 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.

All configurations of the instrument panel are similar in grouping and convenient arrangement.


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23
24
25
26
27
28
29
30
31
32
33
MAG COMPASS
CLOCK
RATE OF CLIMB
TURN AND BANK
ENGINE GAGE CLUSTER
MANIFOLD PRESSURE
FUEL PRESSURE
TACHOM-ETER
SUCTION GAGE
GYRO HORIZON
ALTIMETER
AIR SPEED
DIREC-TIONAL GYRO
RADIO

INSTRUMENT PANEL LEGEND

1. Radio Lights
2. Flap Indicator Lights
3. Aux Fuel
4. Main Fuel
5. Oil Temperature
6. Cylinder Head Temperature
7. Ammeter
8. Oil Pressure
9. Landing Gear Indicator Lights
10. Instrument Lights
11. Landing Gear Switch
12. Landing Light Switch - Left
13. Beacon Switch
14. Nav Lights Switch
15. Generator Switch
16. Battery Switch
17. Landing Light Switch - Right
18. Cabin Heat Control
19. Parking Brake Control
20. Pitot Heat
21. Propeller Control
22. Cabin Vent Control - Right
23. Battery/Ignition Key Switch
24. Mixture Control
25. Cabin Vent Control Left
26. Throttle
27. Starter Switch
28. Flap Switch
29. Cowl Flaps Control
30. Aux Fuel Pump Indicator
31. Aux Fuel Pump Switch
32. Aux Fuel Gage Switch
33. Main Fuel Gage Switch

POWER PLANT - DESCRIPTION

The BEECHCRAFT Bonanza J35 is powered by a Continental IO-470-C six-cylinder, horizontally opposed, fuel injected engine rated at 250 horsepower at 2600 rpm.

ENGINE INSTRUMENTS

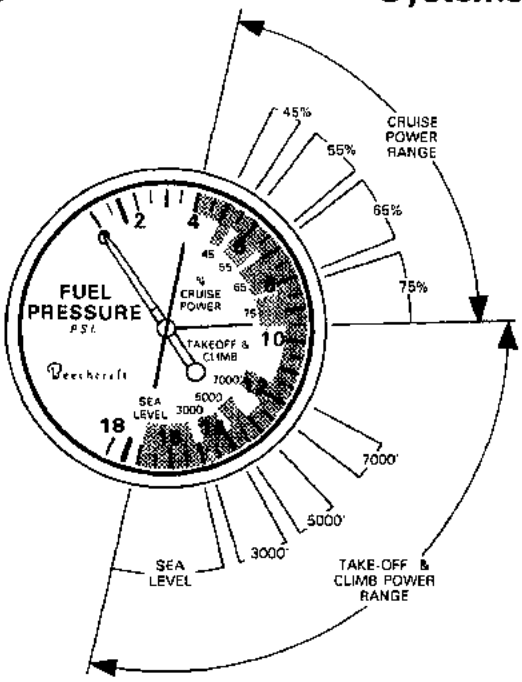
The engine instruments include: cylinder head temperature, oil temperature, oil pressure indicators, tachometer, manifold pressure, fuel pressure, and fuel quantity indicators and an ammeter.

CLUSTER TYPE ENGINE INSTRUMENTS

Except for the tachometer, manifold pressure gage and fuel pressure gage, the power plant instruments are grouped together immediately above the control console. The engine gage cluster includes the fuel quantity gages, oil pressure gage, the oil temperature and cylinder head temperature indicators and ammeter. The fuel quantity gage is a single instrument; a switch on the left subpanel selects the cell on which a reading is desired. When the two ten-gallon auxiliary wing tanks are installed, an auxiliary fuel quantity gage is added to the cluster. Like the main cell system, a switch on the subpanel selects the auxiliary cell to which the gage is connected.

MANIFOLD PRESSURE, TACHOMETER AND FUEL PRESSURE GAGE

The manifold pressure gage, fuel pressure 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 fuel pressure gage is calibrated in psi and marked for recommended pressure settings for various power requirements. The dial, marked in green, is divided into a cruise range and a take-off and climb range. The cruise portion has segments marked for various percentages of power, for cruise. The rest of the dial is marked to indicate the recommended mixture settings for take-off and climb at various altitudes.

Instrument markings are approximate and fuel pressure is provided in Section V.

ENGINE CONTROLS

THROTTLE, PROPELLER, AND MIXTURE

The push-pull throttle, propeller and mixture controls are located on the control console. These 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 counter-clockwise to decrease. Do not rotate clockwise with control fully advanced.

COWL FLAPS

The push-pull cowl flap control is located above and to the left of the control console on the subpanel. Except in extremely low temperatures, the cowl flaps should be open during ground operation, take-off, and climb.

OIL SYSTEM

The engine oil system is the full pressure, wet sump type and has a 9-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.

INDUCTION SYSTEM ICING

The possibility of induction system icing is reduced by the non-icing characteristics of the Bonanza's 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.

STARTER

The starter is relay-controlled to minimize the length of heavy cable required to carry the high amperage of the starter circuit. The starter is actuated by a push button type, momentary-on switch located on the left of the control column. To energize the starter circuit, rotate the magneto switch to the BOTH position, then press the starter button.

PROPELLER

Installed as standard equipment on the Bonanza is a constant speed, variable pitch, 82-inch diameter propeller with two aluminum alloy blades. The pitch setting at 33 inch station is 13.5° low and not under 30° high pitch.

NOTE

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

Propeller rpm is controlled by a Woodward 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 91/96 grade (blue) 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

Fuel supply is carried in two bladder-type cells with a total capacity of 20 gallons each, located in the wings just outboard of the fuselage. Usable fuel of each 20 gallon main tank is 17 gallons.

Fuel is fed from the cells to a selector valve just forward of the front seat, on the left side, then through a strainer to the fuel pump and the engine. The fuel tank fillers are located in the wing leading edges.

AUXILIARY FUEL CELLS

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 selector valve 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.

Individual liquidometer units in each auxiliary cell transmit fuel quantity information to the auxiliary fuel cell gage. The fuel level of either cell may be read by switching the auxiliary fuel gage selector switch on the left subpanel to the desired position, R (right) or L (left).

CAUTION

Do not allow the fuel cells to remain completely empty for any length of time, since this may result in cracking and checking of the inner liner of the cell. If fuel cells are to be left empty for longer than a week, a thin coating of light engine oil should be sprayed, flushed or rubbed on the inner liner of the cells.

FUEL QUANTITY

Fuel quantity is measured by float operated sensors, located in each fuel tank. These transmit electrical signals to the indicator through selector switches on the panel

that indicate fuel remaining in the tank selected. There are sensors in each fuel tank connected to the switches and indicator.

AUXILIARY FUEL PUMP

The electric auxiliary fuel pump is controlled by a 3 position switch on the left subpanel. 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 near maximum engine performance should the engine driven pump fail.

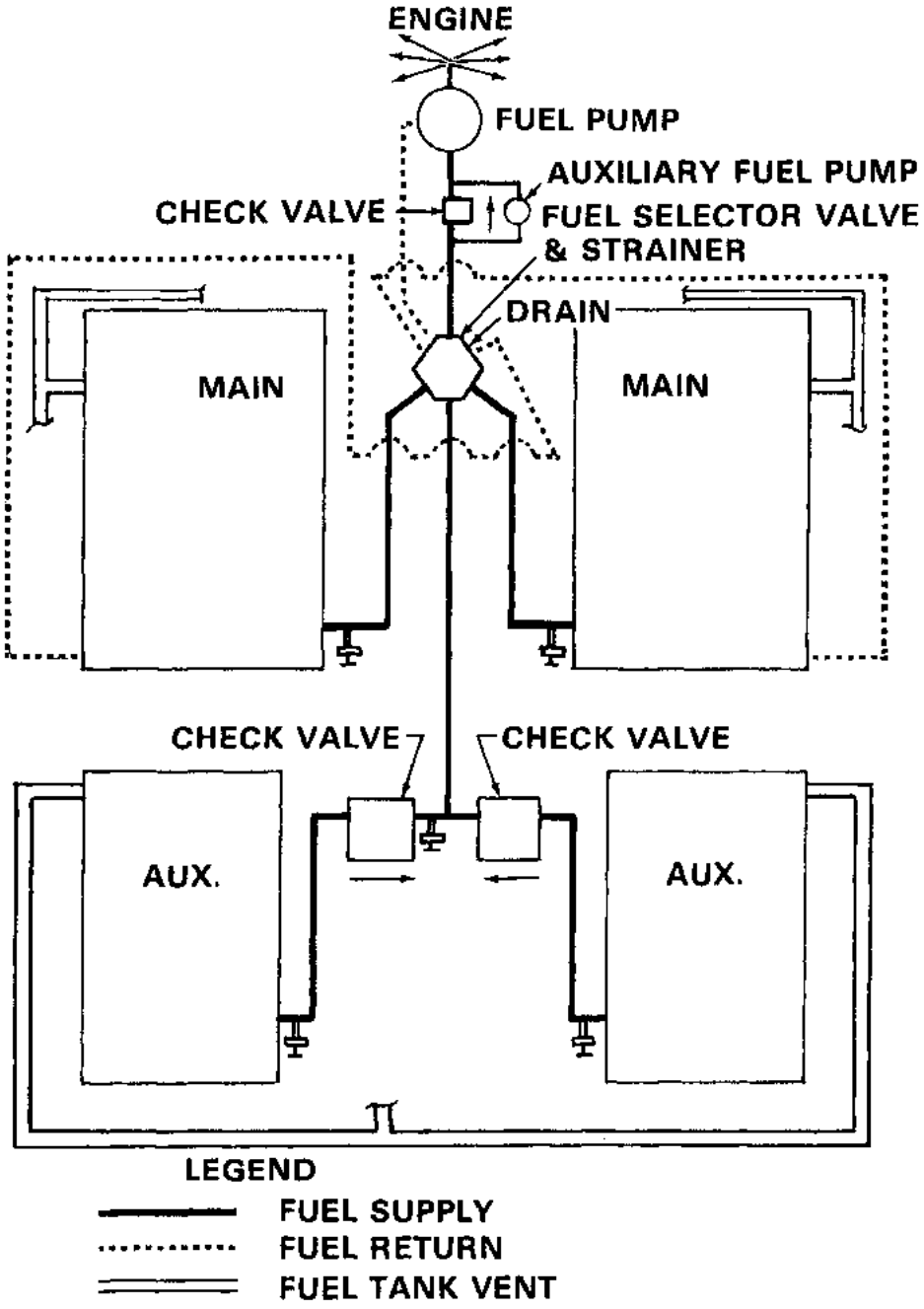
FUEL TANK SELECTION

The fuel selector valve handle is located forward and to the left of the pilot's seat. Take-offs should be made using the left main tank and 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 are in the yellow band or, with less than 10 gallons of fuel in each main tank.

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.

FUEL SYSTEM SCHEMATIC



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 10 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 10 gallons are in each tank, add necessary fuel so that the amount of fuel will be not less than 10 gallons per tank at takeoff. Plan for an ample margin of fuel for any flight.

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. A latch on the control switch must be moved aside to place the switch in the up 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.

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.

CAUTION

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.

CIRCUIT BREAKER

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

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.

BRAKES

The brakes on the main landing gear wheels are operated by applying toe pressure to the rudder pedals. The parking brake push-pull control is located on the right side of the lower subpanel. To set the parking brakes, pull control out and depress both toe pedals until firm. Push the control in to release the brakes.

NOTE

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.

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.

ELECTRICAL SYSTEM

The system circuitry is the single wire, ground return type, with the aircraft structure used as the ground return. The battery ON-OFF switch and the generator ON-OFF switch are located on the right subpanel. The BATTERY-IGNITION key switch is located below the control column. The circuit breaker panel is located on the right subpanel and contains the protective circuit breakers for the various electrical systems.

BATTERY

A 33 ampere-hour, 12-volt battery is located on the right aft side of the firewall. Battery servicing procedures are described in the SERVICING section.

EXTERNAL POWER RECEPTACLE

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

NOTE

A negative ground external power source is required. If the polarity is reversed, the reverse polarity relay will not close, thus preventing current flow to the airplane.

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

GENERATOR

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

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.

LIGHTING SYSTEM

INTERIOR LIGHTING

Lighting for the instrument panel is furnished by a light in the cabin ceiling. It is controlled by the INSTRUMENT LIGHTS rheostat control located below and to the right of the control column.

A RADIO LIGHTS control rheostat is located to the left of the instrument light rheostat. It controls the internal lights in the radio installation.

The cabin dome light is operated by an ON-OFF switch next to the 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, rotating beacon (optional), and landing lights. For longer battery and lamp life, use the landing lights 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.

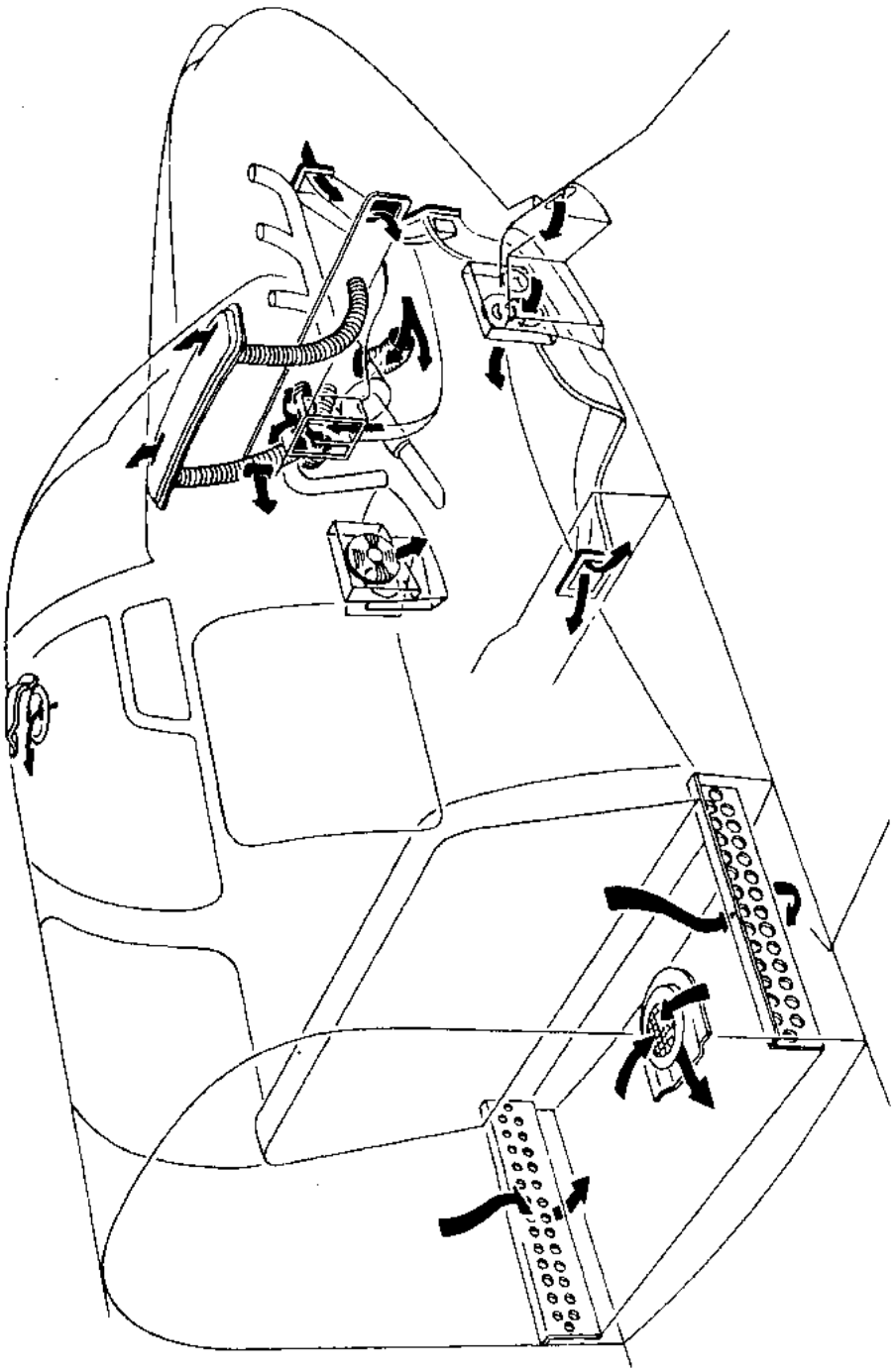
HEATING AND VENTILATION SYSTEM

CABIN HEATING

A heater muffler on the left exhaust stack provides for heated air to five 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. Two outlets provide heated air for windshield 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.

HEATING AND VENTILATION SYSTEM SCHEMATIC



HEATER 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 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 increased heated air for defrosting the windshield close the toe-pedal type valves on the front seat hot air outlets. To close off all air from the heater system, pull the red VENT SHUT-OFF control located to the extreme right of the pilot's 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 VENT SHUT-OFF control and use only the fresh air outlets described in the following paragraphs.

CABIN FRESH AIR OUTLETS

A duct in each wing root is connected directly to an adjustable outlet in the upholstery panel forward of each front seat. Airflow from the right outlet is controlled by a center knob. The volume of air from the left 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.

AIR CONDITIONER

Air is provided by an optional evaporative type air conditioner in the cabin overhead. The air conditioner takes in outside air through a scoop in the cabin roof and passes it over a set of mineral wicks which rest in a pan of water. Evaporation of water from the wicks cools the air passing over it, and the damp wicks trap dust and pollen. The air then is distributed to the cabin by four adjustable ball-and-socket outlets and an outlet centered in the overhead that is regulated by a center knob. The airscoop is hinged and may be opened, closed or placed in an intermediate position to provide the desired airflow, by adjusting a push-pull control placed overhead, just aft of the cabin loudspeaker. Rotating the control handle counterclockwise locks it in the desired postion.

The air conditioner will provide up to four hours cooling between refilling, the duration and the temperature drop depending on the relative humidity of the air. It requires only refilling and a seasonal draining and cleaning of the wicks and pan to keep it in good working order. Refer to the Beech Shop Manual for servicing instructions.

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, and through an adjustable vent in the overhead panel above the front seat. For additional ventilation on the ground, the rear cabin windows may be opened; these windows, however, must be closed and latched before the take-off run is started, and must not be opened in flight.

PITOT AND STATIC SYSTEM

The pitot and static system provides a source of impact and static air for the operation of the altimeter, rate of climb and airspeed indicator. The pitot mast is located on the leading edge of the left wing. 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.

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 in the upper right corner of the instrument panel. The vacuum should be maintained within the green arc for proper operation of the air driven instruments.

STALL WARNING INDICATOR

To help prevent accidental stalls, a stall warning indicator sounds a warning horn and flashes a red light on the instrument panel as an incipient stall develops, while there is ample time for the pilot to correct the attitude. The stall warning indicator, triggered by a sensing vane on the leading edge of the left wing, is equally effective in all flight attitudes and at all weights and airspeeds. Irregular and intermittent at first, the warning signal will become steady as the airplane approaches a complete stall.

COLD WEATHER OPERATION

PREFLIGHT INSPECTION

In addition to the normal preflight exterior inspection, remove ice, snow and frost from the wings, tail, control surfaces and hinges, propeller, windshield, pitot, fuel vents, and engine breather line. If you have no way of removing these formations of ice, snow, and frost leave the airplane on the ground, as these deposits will not blow off. The wing contour may be changed by these formations sufficiently that its lift qualities are considerably disturbed and sometimes completely destroyed. Complete your normal preflight procedures. Check the flight controls for complete freedom of movement, including trim tab controls.

Under very cold conditions, it may be necessary to preheat the engine prior to a start. Particular attention should be applied to the oil cooler, engine sump and propeller hub to insure 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 the airplane is equipped with the optional external power receptacle, it is advisable to use external power for starting, when available. Normal engine starting procedures will ordinarily be used, except it may be necessary to leave the auxiliary fuel pump on until the engine starts. Moisture forms quickly on the spark plug electrodes during cold weather starts; if the engine fails to start after three or four attempts, remove at least one spark

plug from each cylinder, heat the plugs to dry the electrodes, then attempt a start immediately after reinstalling the plugs.

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 or 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 or International Distributors or Dealers:

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

NOTICE

The following information may be provided to the holder of this manual automatically:

1. Original issues and revisions of Class I and Class II Service Instructions
2. Original issues and revisions of FAA Approved Airplane Flight Manual Supplements
3. Reissues and revisions of FAA Approved Airplane Flight Manuals, Flight Handbooks, Owner's Manuals, Pilot's Operating Manuals, and Pilot's Operating Handbooks

This service is free and will be provided only to holders of this handbook who are listed on the FAA Aircraft Registration Branch List or the BEECHCRAFT International Owners Notification Service List, and then only if listed by airplane serial number for the model for which this handbook is applicable. For detailed information on how to obtain "Revision Service" applicable to this handbook or other BEECHCRAFT Service Publications, consult a BEECHCRAFT Aero or Aviation Center, International Distributor or Dealer, or refer to the latest revision of BEECHCRAFT Service Instructions No. 0250-010.

AIRPLANE INSPECTION PERIODS

1. FAA Required 100 Hour and/or 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.
5. 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.

NOTE

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

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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.

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.

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 and the possibility of an underinflated nose strut or tire.

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 on the right side of the lower subpanel. To set the parking brakes, pull control out and depress both toe pedals until firm. Push the control in to release the brakes.

NOTE

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.
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.
4. When lowering the wheel, exercise care to prevent compression of the shock strut, which would force the landing gear door against the jack adapter.

NOTE

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

PROLONGED OUT OF SERVICE CARE

STORAGE

The 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.

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

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

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.

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.

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 and oil consumption has stabilized, drain the MIL-C-6529 oil (MIL-C-6529 is the TCM recommended oil for the first 25 hours of flight) after a ground warm-up and install Teledyne Continental Motors recommended oil.

Preflight the airplane.

SERVICING

FUEL SYSTEM

FUEL CELLS

See Consumable Materials for recommended fuel grades.

CAUTION

Never leave the fuel 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.

FUEL DRAINS

On the standard fuel system 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, 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. Prolonged 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 normal operating level is 9 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 specifies ashless dispersant oils only. However, a straight mineral oil should be used for the first oil change period of 20 to 30 hours or until oil consumption has stabilized in order to promote faster ring seating and oil control. Oils must meet Continental Motors Corporation Specification MHS-24A. Refer to APPROVED ENGINE OILS.

BATTERY

The battery is accessible by opening the right door of the engine cowling then through the access door on 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.

RECHARGING THE BATTERY
(USING EXTERNAL POWER)

1. Battery, Generator and Avionics Switches - OFF.
2. Auxiliary Power Unit (set for output of 13.75 to 14.25 volts) - OFF.
3. Connect auxiliary power unit to the external power receptacle of the airplane or to the battery terminals.
4. Battery Master Switch - ON.
5. Ignition Key Switch - ON BAT.
6. Auxiliary Power Unit - ON.
7. After battery has been charged, turn off the auxiliary power unit and disconnect it from the airplane.
8. Battery Switch - OFF.
9. Ignition Key Switch - OFF.

TIRES

An inflation pressure of 30 psi should be maintained on the 6.50 x 8 main wheel tires. The 5.00 x 5 nose wheel tire should be inflated to 30 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 (3-1/16 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. Remove the air valve cap, depress the valve core, and allow the strut to fully deflate.

2. Raise and block the strut 1 to 2 inches 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.

3. Carefully remove the valve body assembly.

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

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

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

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

SHOCK STRUT SHIMMY DAMPENER

The shimmy dampener has a reservoir of fluid carried in the piston rod. Two coil springs installed in the piston rod keep the fluid in shimmy dampener 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 dampener, 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 dampener 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 dampener 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. Clean the oil separator screen by backflushing or submerging the unit in cleaning fluid. Blow dry with high pressure air.

The filter assemblies in 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.

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.

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. A BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer will be glad to answer any questions concerning propeller blade repair.

WARNING

When working on a propeller, always make certain that 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.

CLEANING

EXTERIOR PAINTED SURFACES

WARNING

Do not expose control surface trim tab hinge lines and their pushrod systems to the direct stream or spray of high-pressure, soap-and-water washing equipment. Fluid dispensed at high pressure could remove the protective lubricant, allowing moisture from heavy or prolonged rain to collect at hinge lines, and then to freeze at low temperatures. After high-pressure or hand washing, and at each periodic inspection, lubricate trim tab hinge lines and trim tab pushrod end fittings (Brayco 300 per Federal Specification VV-L-800 preferred). See Consumable Materials.

CAUTION

When cleaning landing gear areas with solvent, especially if high-pressure equipment is used, exercise care to avoid washing away grease from landing gear components. After washing the landing gear areas with solvent, lubricate all lubrication points, or premature wear may result.

Do not apply wax, polish, rubbing compound, or abrasive cleaner to any uncured painted surface. Use of such items can permanently damage the surface finish. Also, waxes and polishes seal the paint from the air and prevent curing.

CAUTION

Alkyd enamel (sometimes called "automotive enamel"), acrylic enamel, lacquer, and dope finishes require a curing period of approximately 90 days; Acrylic urethane, polyester urethane, and epoxy finishes undergo a curing process for a period of 30 days after application. Wash uncured painted surfaces with a mild non-detergent soap (MILD detergents can be used on urethane finishes) and cold or lukewarm water only. Use soft cloths, keeping them free of dirt and grime. Any rubbing of the surface should be done gently and held to a minimum to avoid damaging the paint film. Rinse thoroughly with clear water. Stubborn oil or soot deposits may be removed with automotive tar removers.

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 all static air buttons before washing or waxing. Use special care to avoid removing lubricant from lubricated areas.

When using high-pressure washing equipment, keep the spray or stream clear of wheel bearings, propeller hub bearings, etc., and openings such as pitot tubes, static air buttons, and battery and avionics equipment cooling ducts, which should be securely covered or masked off. Avoid directing high-pressure sprays toward the fuselage, wings, and empennage from the rear, where moisture and chemicals might more easily enter the structure, causing corrosion damage to structural members and moving parts.

Hand washing may be accomplished by flushing away loose dirt with clean water, then washing with a mild soap and water, using soft cleaning cloths or a chamois. Avoid harsh, abrasive, or alkaline soaps or detergents which could cause corrosion or scratches. Thorough clear-water rinsing prevents buildup of cleaning agent residue, which can dull the paint's appearance. To remove oily residue or exhaust soot, use a cloth dampened with an automotive tar remover. Wax or polish the affected area, if necessary.

There is some variation in the procedures required for proper care of the several types of exterior paint. During the curing period, do not make prolonged flights in heavy rain or sleet, and avoid all operating conditions which might cause abrasion or premature finish deterioration. Alkyd enamel, lacquer, and dope finishes must be polished and waxed periodically to maintain luster, and to assure protection from the weather. Acrylic enamel should be waxed, and may be polished, if desired. Acrylic urethane may be waxed for protection from the elements, but should not be polished unless polishing or buffing is required to restore a damaged area. Waxing of polyester urethane finishes, although not required, is permitted; however, never use abrasive cleaner type waxes, polishes, or rubbing compounds, as these

products cause eventual deterioration of the characteristic urethane gloss. Epoxy finishes should be waxed on a regular basis, and may be polished and buffed to restore appearance should "chalking" occur. For waxing, select a high quality automotive or aircraft waxing product. Do not use a wax containing silicones, as silicone polishes are difficult to remove from surfaces. A buildup of wax on any exterior paint finish will yellow with age; therefore, wax should be removed periodically. Generally, alphatic naptha (see Consumable Materials) is adequate and safe for this purpose.

NOTE

Before returning the airplane to service, remove all maskings and coverings, and re-lubricate as necessary.

WINDSHIELD AND WINDOWS

Exercise extreme care to prevent scratches when cleaning the Plexiglas windshield and windows. Never wipe them when dry. Flush the surface with clean water or a mild soap solution, then rub lightly with a grit-free soft cloth, sponge, or chamois. Use trisodium phosphate completely dissolved in water to remove oil and grease film. To remove stubborn grease and oil deposits, use hexane, aliphatic naphtha, or methanol. Rinse with clean water; avoid prolonged rubbing.

CAUTION

Do not use gasoline, benzene, acetone, carbon tetrachloride, fire extinguisher fluid, deice fluid, or lacquer thinners on the windshield or windows, as these substances have a tendency to soften and craze the surface.

INTERIOR

The seats, rugs, upholstery panels, and headlining should be vacuum-cleaned frequently. Do not use water to clean fabric surfaces. Commercial foam-type cleaners or shampoos can be used to clean rugs, fabrics, and upholstery, however, the instructions on the container should be followed carefully.

ENGINE

Clean the engine with kerosene, solvent or any neutral engine cleaning solvent. Spray or brush the fluid over the engine, then wash off with water and allow to dry.

BULB REPLACEMENT GUIDE

LOCATION	NUMBER
Compass light	330
Direction indicator light	323
Dome light, cabin	89
Elevator tab position indicator light	53R
Fuel pump placard light	1813
Instrument flood light, overhead	89
Landing gear position light	1813
Landing gear visual position light	53
Landing light, wing	4522
Navigation light, tail cone	93
Navigation light, wing	1512
Rotating beacon (Grimes)	A7079-12
Stall warning light	1813

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	Bottom of fuselage, left side	-
	Service fuel cells, main	Top of wings, leading edge	6
	Service auxiliary fuel cells	Aft and outboard of main cells	6
25 Hrs.	Check battery electrolyte	Under right cowling door and thru access door in firewall	See Shop Manual
50 Hrs.	Change engine oil	Lower side of engine	5

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	LUBRICANT (Number refers to item on Consumable Materials)
50 Hrs. (Cont.)	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 bulkhead	
	Lubricate landing gear retract mechanism and uplock rollers	Wheel wells (L)	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 (K)	4
	Lubricate cabin door mechanism	Aft edge of cabin door (E)	4

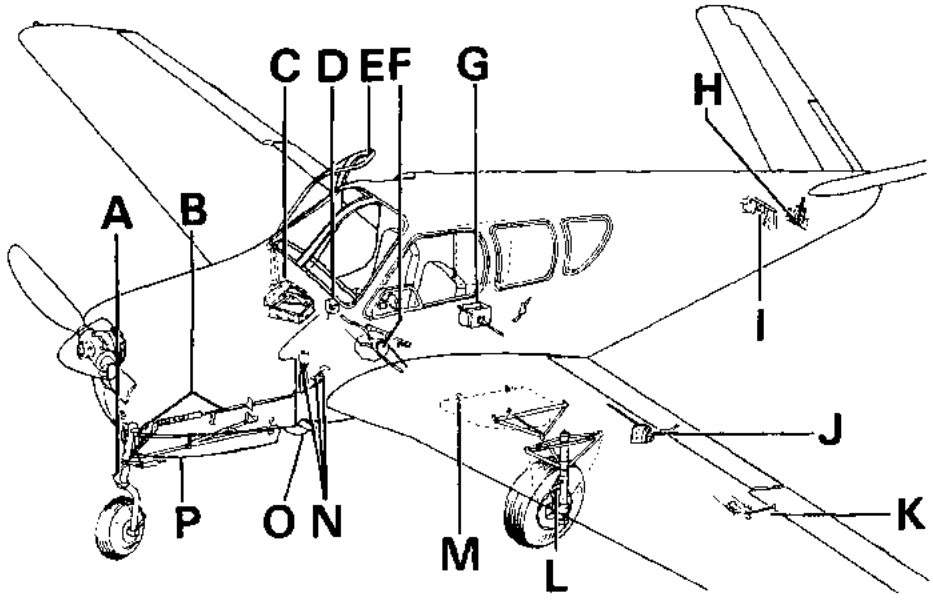
100 Hrs. (Cont.)	Lubricate control column linkage	Forward of instrument panel (D)	4
	Lubricate cowl flap hinges	Bottom of cowl (O)	4
	Lubricate cable attachment	Rudder tab horn	4
	Lubricate differential control mechanism	Forward of tail bulkhead (H)	3, 4
	Lubricate elevator tab mechanism	Forward of tail bulkhead (I)	3, 4
	Lubricate landing gear door hinges	Edge of wheel well (P) (M)	4
	Lubricate landing gear retract mechanism and uplock rollers	Wheel wells (L)	3, 4
	Lubricate nose gear retract mechanism	Nose wheel well (A)	3
	Lubricate nose wheel steering mechanism	Nose wheel well (B)	3
	Lubricate rudder pedals	Cockpit (N)	4
	Lubricate trim tab control	Control pedestal (C)	4
	Lubricate wheel bearings	Nose and main wheels (A, L)	1

RECOMMENDED SERVICING SCHEDULE

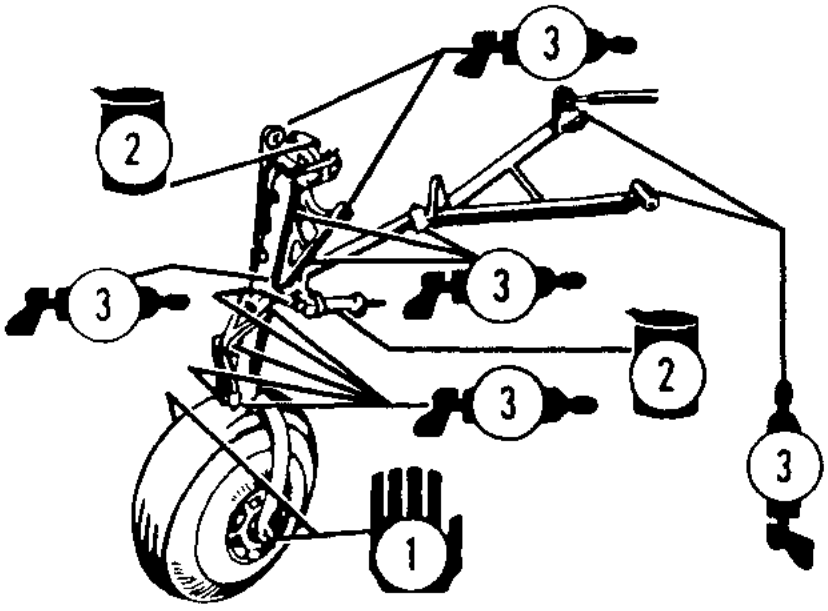
INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	LUBRICANT (Number refers to item on Consumable Materials)
300 Hrs.	Flap motor (brushes)	Under floor in cabin (G)	
	Service flap motor gear box	Under floor in cabin (G)	10
	Service landing gear actuator gear box	Under floor in cabin (F)	8
500 Hrs.	Service landing gear motor-reduction gears	Under floor in cabin (F)	3
1000 Hrs.	Lubricate flap actuators	Inside wing aft of wheel well (J)	9, 10
As Req.	Service main and nose shock struts	Landing gear	2

As Req. (Cont.)	Service shimmy dampener	Nose gear	2
	Drain static air lines	Behind aft cabin bulkhead	-
	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.		
As noted on battery	Replace emergency locator transmitter battery	At emergency locator	-

LUBRICATION POINTS

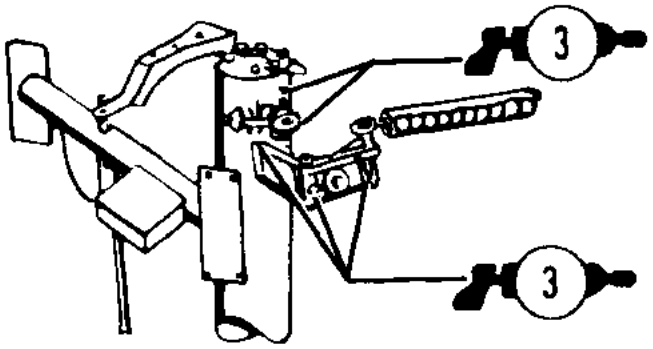


A



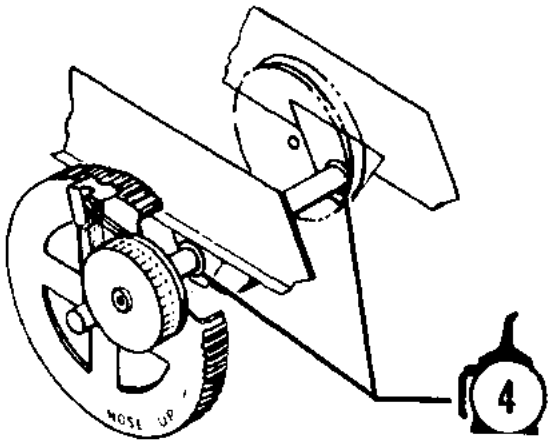
LANDING GEAR RETRACT

B



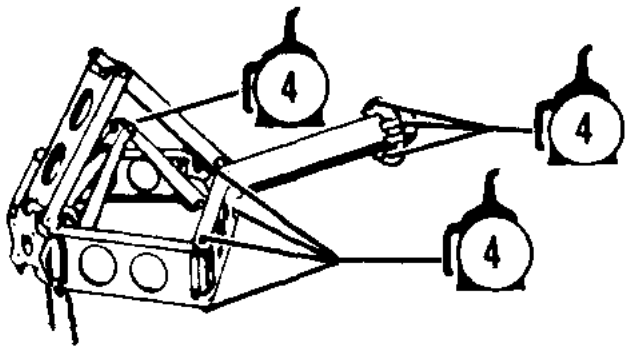
NOSE WHEEL STEERING

C



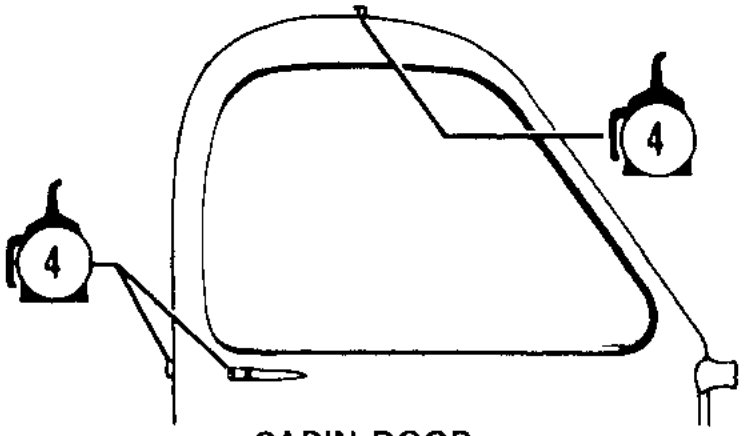
CONTROL COLUMN LINKAGE

D



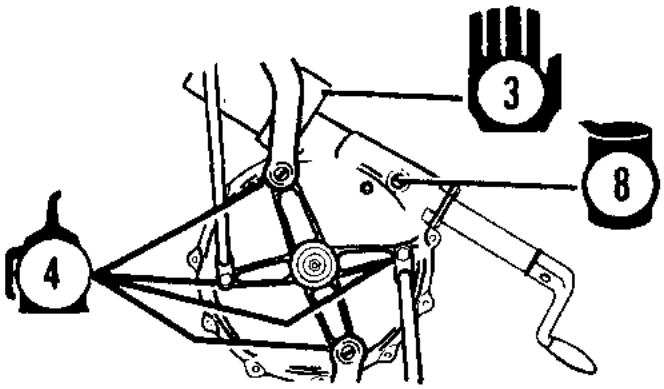
ELEVATOR TRIM CONTROL

E



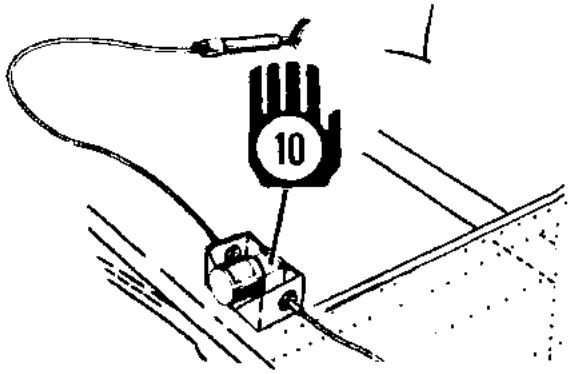
CABIN DOOR

F



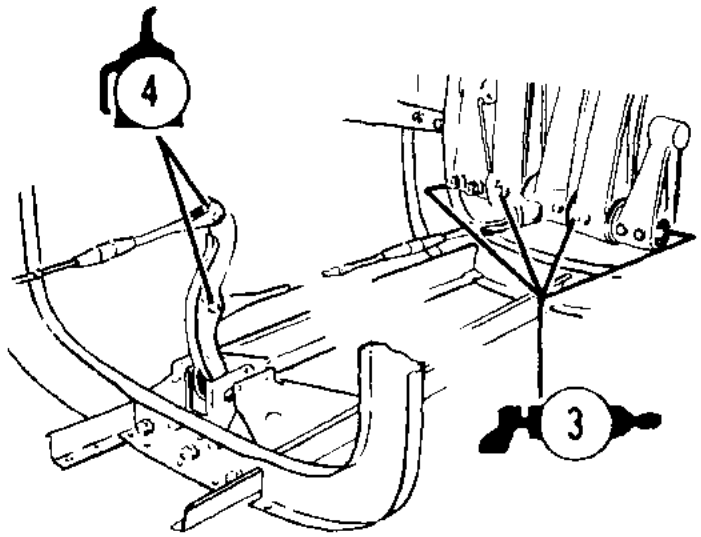
LANDING GEAR GEAR BOX

G



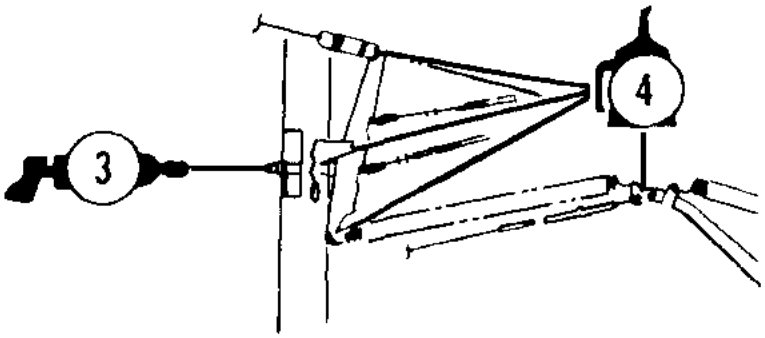
FLAP MOTOR GEAR BOX

H



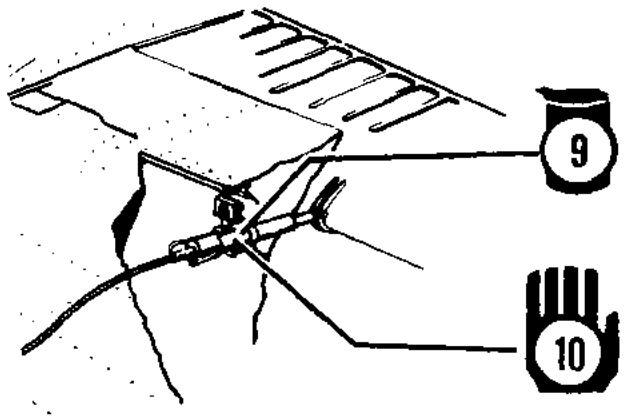
DIFFERENTIAL CONTROL MECHANISM

I



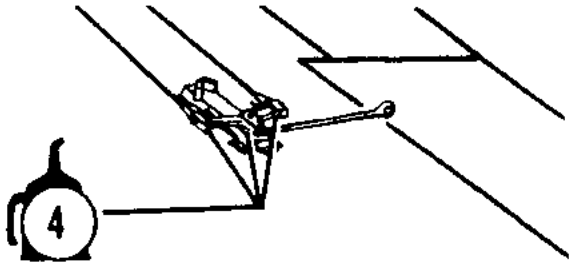
ELEVATOR TAB

J



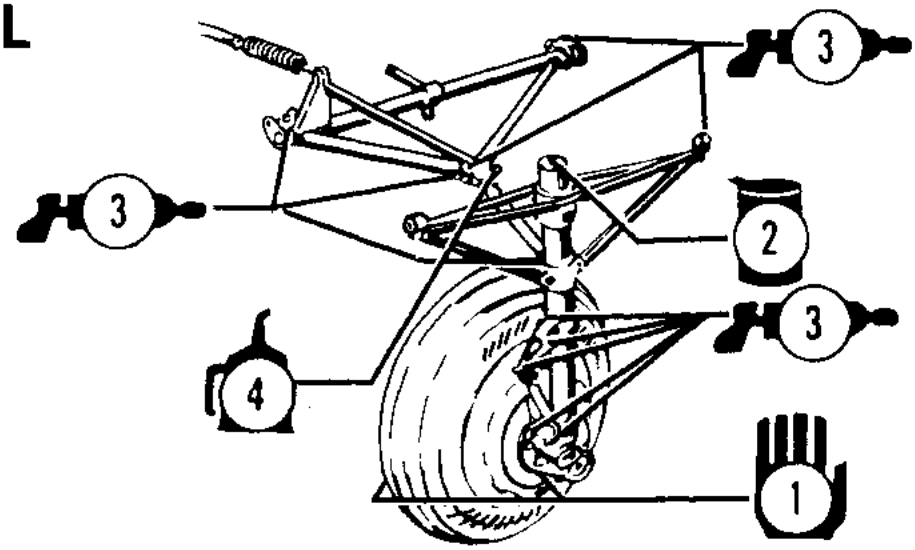
FLAP ACTUATOR

K



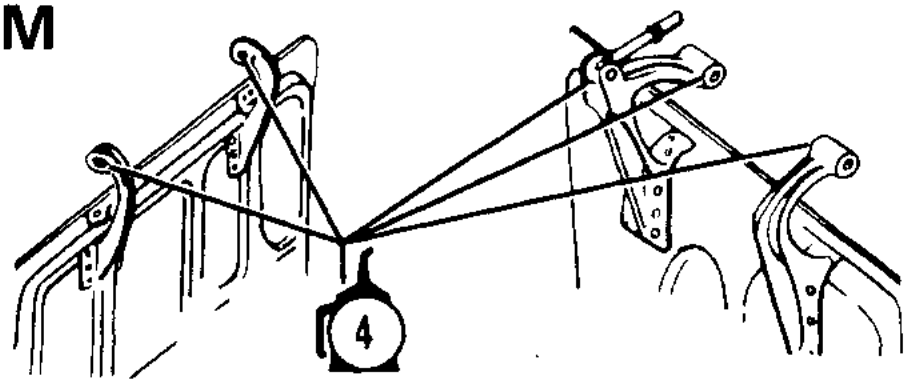
AILERON BELL CRANKS

L



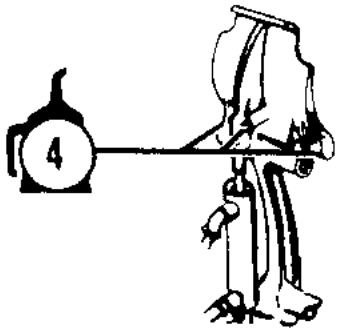
LANDING GEAR RETRACT

M



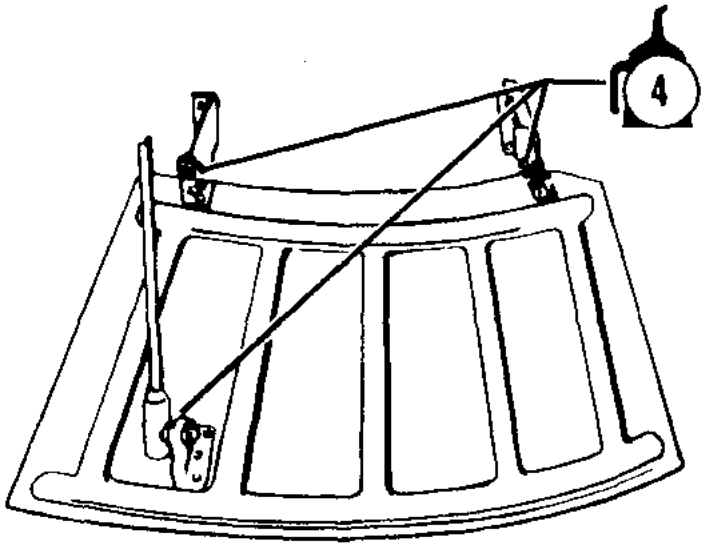
LANDING GEAR DOOR HINGES

N



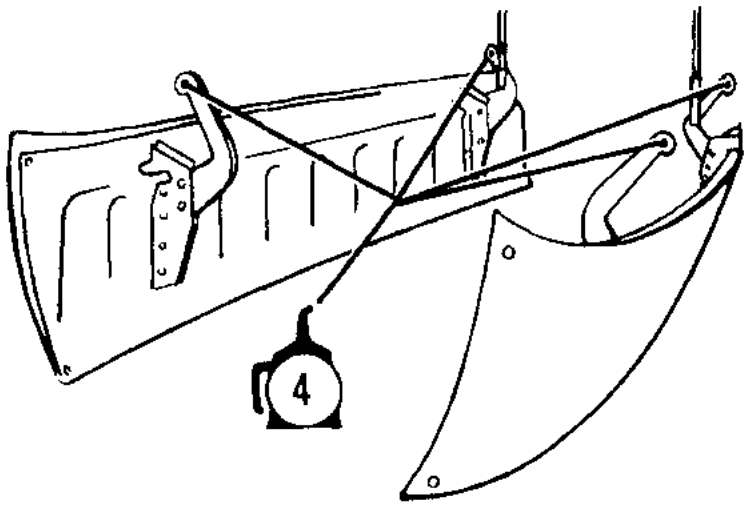
RUDDER PEDALS

O



COWL FLAP HINGES

P



LANDING GEAR DOORS

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

Only the basic number of each Military Specification is included in the Consumable Materials Chart. No attempt has been made to update the basic number with the letter suffix that designates the current issues of the various specifications.

Vendors listed as meeting Federal and Military Specifications are provided as reference only and are not specifically recommended by Beech Aircraft Corporation; consequently, any product conforming to the specification listed may be used. The products listed below have been tested and approved for aviation usage by Beech Aircraft

Corporation, by the vendor, or by compliance with the applicable specifications. Other products that are locally procurable which conform to the requirements of the applicable Military Specification may be used even though not specifically included herein.

It is the responsibility of the operator/user to determine the current revision of the applicable Military Specification prior to usage of that item. This determination may be made by contacting the vendor of a specific item.

CONSUMABLE MATERIALS

ITEM	MATERIAL	SPECIFICATION
1.	Lubricating Grease Wheel Bearing	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.	
2.	Hydraulic Fluid	MIL-H-5606
*3.	Lubricating Grease, General Purpose, Wide Temperature	MIL-G-81322
4.	Lubricating Oil	SAE No. 20 or SAE 10W-30
**5.	Engine Oil	SAE No. 30 (Below 40°F) SAE No. 50 (Above 40°F) Approved Multiviscosity Oils

CONSUMABLE MATERIALS

ITEM	MATERIAL	SPECIFICATION
***6.	Engine Fuel	Grade 91/96 (Blue)
7.	Solvent	Federal Specification, PD680
8.	Lubricant	Mobil Compound GG or Mobil 636
9.	Lubricating Oil, Gear	MIL-L-10324 or MIL-L-2105C, Grade 75W
10.	Grease, Aircraft and Instrument	MIL-G-23827
†11.	Lubricant, Rubber Seal	Oakite 6 Compound
12.	Naptha, Aliphatic	Federal Specification, TT-N-95
13.	Lubricating Oil, General Purpose, Preservative (Water-Displacing, Low Temperature)	●Brayco 300 per Federal Specification VV-L-800 (Preferred)

Alternates for Brayco 300:

Lubricant	●●CRC 3-36
	●●●LPS No. 1
	●●●●WD-40

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

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

*** If 91/96 (BLUE) grade fuel not available, use 100LL (BLUE) or 100 (GREEN) grade fuel.

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

● Product of Bray Oil Co.,
1925 North Marianna
Los Angeles, Calif. 90032

●● Product of CRC Chemicals, Inc.,
Warminster, Pa. 18974

●●● Product of LPS Research Laboratories, Inc.,
2050 Cotner Ave,
W. Los Angeles, Calif. 90025

●●●● Product of WD-40 Company,
1061 Cudahy Place,
San Diego, Calif. 92110

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	
P/N 35-810075-7	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 dampener	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
ELECTRICAL SYSTEM	
Battery master relay	On condition
All other relays	On condition
Voltage regulator	On condition
Starter relay	On condition
POWER PLANT	
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	On condition
Oil cooler	On condition (replace when contaminated)
Beech propeller	At engine overhaul or at engine failure 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

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

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 pressure 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
MISCELLANEOUS	
Seat belts or Shoulder Harnesses	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.

APPROVED ENGINE OILS

COMPANY	BRAND AND WEIGHT
BP Oil Corporation	B/P Aero Oil D65/80
Castrol Limited (Australia)	Grade 40, Castrolaero AD, Type III Gradee 50, Castrolaero AD, Type II
Continental Oil Co.	*Conoco Aero S No. 65 (SAE 30) *Conoco Aero S No. 80 (SAE 40) *Conoco Aero S SAE 10W30
Delta Petroleum Co.	Delta Avoil - Grades 30, 40 - 50
Gulf Oil Corporation	*Gulfpride Aviation Series D
Exxon Oil Co.	Exxon Aviation Oils In Grades E65, E80, E100, E120 and A100
Kendall Refining Co.	*Kendall Aviation Oil Type D
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

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
Sinclair Refining Co.	Sinclair Avoil 20W-40
Socony-Mobil	*Aero Red Band HD (SAE 50) *Aero Gray Band HD (SAE 40) *Aero White Band HD (SAE 30) Mobil (Aero Oil 65) Ashless Mobil (Aero Oil 80) Dispersant Mobil (Aero Oil 100) Aviation Mobil (Aero Oil 120) Engine Oil
Std Oil of California	*RPM Aviation Oil (Compounded)
Texaco, Inc.	*Texaco Aircraft Engine Oil D100 *Texaco Aircraft Engine Oil D80 Texaco Aircraft Engine Oil - Premium AD, Grades 65, 80, 100
Union Oil Co. of California	*Union Engine Oil HD Grades 80 - 100

The oil designated with an * are ash residue type oils. The balance of the oils are ashless.

NOTE

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

Beechcraft



Bonanza J35

Pilot's Operating Handbook and

FAA Approved Airplane Flight Manual

Supplement Pack

The supplements contained in this supplement pack may not have been approved yet by foreign regulatory agencies. To determine approval status, view our web page at http://pubs.beechcraft.com and perform a search for the supplement part number. Any information pending foreign regulatory approval will be listed in the description.

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35-590079-5 Supplement Pack

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. Airplane Flight Manual 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 Airplane Flight Manual Supplements for other equipment that was installed after the airplane was delivered new from the factory should be placed in this Supplemental Data Section IX, 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

LOG OF SUPPLEMENTS

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

Supp. No.	Part Number	Subject	Rev. No.	Date

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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 airspeeds, 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 counter-roll 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 lightheaded 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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