Beechcraft®

Baron®

(Serials TH-1 thru TH-772)

58

And

58A*

**Special Reduced Gross Weight Configuration*

Pilot's Operating Handbook

and

FAA Approved Airplane Flight Manual

FAA Approved in the Normal 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 FAR PART 23.

Mfr's Serial No. ______________________

Registration No. ______________________

FAA Approved by Donald St. Peter

for W. H. SCHULTZ
BEECH AIRCRAFT CORPORATION
DOA CE-2

THIS HANDBOOK SUPERSEDES ALL BEECH PUBLISHED OWNERS 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

Where Beech Aircraft Corporation or Beechcraft is referred to in this publication, it will be taken to read Raytheon Aircraft Company.

Raytheon Aircraft

Beech
Hawker

Member of GAMA

GAMA General Aviation Manufacturers Association

Baron 58
(TH-1 thru TH-772)
Pilot's Operating Handbook
and FAA Approved
Airplane Flight Manual

Original (A) . . . . May 1979
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Baron 58
(TH-1 thru TH-772)
Pilot's Operating Handbook
and FAA Approved
Airplane Flight Manual

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 non-BEECHCRAFT approved parts.

Baron 58
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SECTION I

GENERAL

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SUBJECT *PAGE*

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 Baron 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 Baron. The handbook presents suggestions and recommendations to help obtain safe and maximum performance without sacrificing economy. The BEECHCRAFT Baron 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 Baron. 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

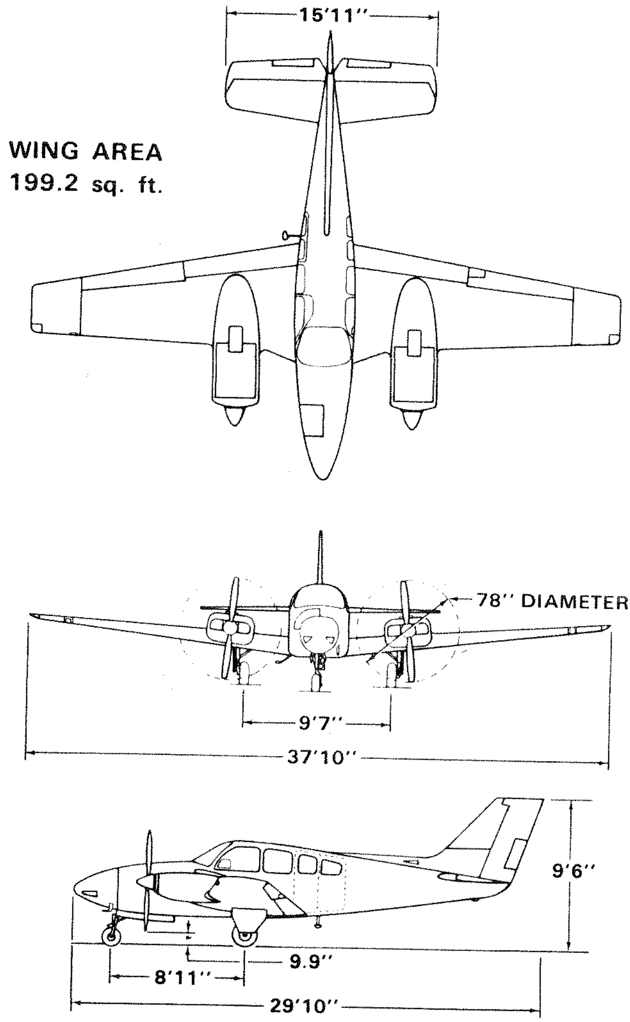
Section IX contains the FAA Approved Airplane Flight Manual Supplements headed by a Log of Supplements page. On the "Log" page is a listing of the FAA Approved Supplemental Equipment available for installation on the airplane. When new supplements are received or existing supplements are revised, a new "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.

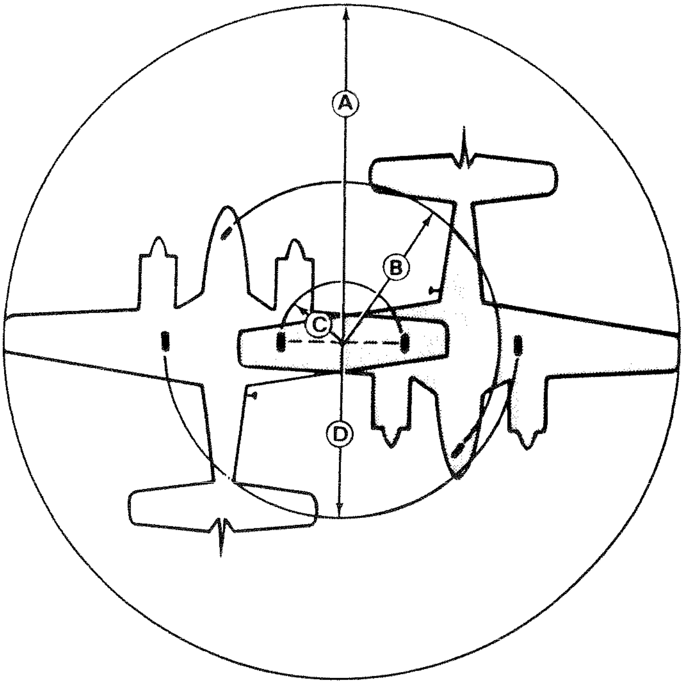
VENDOR-ISSUED STC SUPPLEMENTS

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.



AIRPLANE THREE VIEW

GROUND TURNING CLEARANCE



Ⓐ Radius for Wing Tip	31 feet 6 inches
Ⓑ Radius for Nose Wheel	15 feet 6 inches
Ⓒ Radius for Inside Gear	7 feet 11 inches
Ⓓ Radius for Outside Gear	17 feet 6 inches

TURNING RADII ARE PREDICATED ON THE USE OF PARTIAL BRAKING ACTION AND DIFFERENTIAL POWER.

DESCRIPTIVE DATA

ENGINES

Two Continental IO-520-C fuel injected, air cooled six-cylinder, horizontally opposed engines each rated at 285 horsepower at 2700 rpm.

Take-off and Maximum
Continuous Power .... Full throttle and 2700 rpm

Maximum One-Engine
Inoperative Power .... Full throttle and 2700 rpm

Cruise Climb Power .... 25.0 in. Hg at 2500 rpm

Maximum Cruise Power ..... 24.5 in. Hg at 2500 rpm

PROPELLERS

HARTZELL

2 Blade Hubs: BHC-J2YF-2CF
Blades: FC8475-6
Pitch Setting at 30 inch Station:
Low 14.5°; Feathered 80.0°
Diameter: 78 inches maximum, 76 inches minimum

3 Blade Hubs: PHC-J3YF-2F
Blades: FC7663-2R
Pitch Setting at 30 inch Station:
Low 13.0°; Feathered 82.0°
Diameter: 76 inches maximum, 74 inches minimum

McCAULEY

2 Blade Hubs: D2AF34C30
Blades: 78FF-0
Pitch Setting at 30 inch Station:
Low 15.0°; Feathered 79.0°
Diameter: 78 inches maximum, 76 inches minimum

3 Blade Hubs: D3AF32C35
Blades: 82NB-6
Pitch Setting at 30 inch Station:
Low 14.0° ± .2°; Feathered 81.2° ± 3°
Diameter: 76 inches, no cut-off permitted

FUEL

Aviation Gasoline 100LL (blue) preferred, 100 (green) minimum grade.

STANDARD SYSTEM:
Total Capacity .... 142 Gallons
Total Usable .... 136 Gallons

OPTIONAL SYSTEMS:
Total Capacity .... 172 Gallons
Total Usable .... 166 Gallons

or

Total Capacity .... 200 Gallons
Total Usable .... 194 Gallons

OIL

The oil capacity is 12 quarts for each engine.

WEIGHTS

58

Maximum Ramp Weight	5424 lbs
Maximum Take-Off Weight	5400 lbs
Maximum Landing Weight	5400 lbs

58A

Maximum Ramp Weight	5014 lbs
Maximum Take-Off Weight	4990 lbs
Maximum Landing Weight	4990 lbs

CABIN AND ENTRY DIMENSIONS

Length	12 ft 7 in.
Height (Max.)	4 ft 2 in.
Width (Max.)	3 ft 6 in.
Entrance Door	37 in. x 36 in.

BAGGAGE SPACE AND ENTRY DIMENSIONS

Main Cabin Compartment	37 cu ft
Extended Aft Compartment	10 cu ft
Utility Door Opening	45 in. x 35 in.
Nose Compartment	18 cu ft

SPECIFIC LOADINGS

Wing Loading	27.1 lbs/sq ft
Power Loading	9.47 lbs/hp

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

The following Abbreviations and Terminologies have been listed for convenience and ready interpretation where used within this handbook. Whenever possible, they have been categorized for ready reference.

AIRSPEED TERMINOLOGY

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. IAS values published in this handbook assume zero instrument error.

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

V_{MCA} Air minimum control speed is the minimum flight speed at which the airplane is directionally controllable as determined in accorddance with Federal Aviation Regulations. The airplane certification conditions include one engine becoming inoperative and windmilling; a 5° bank towards the operative engine; takeoff power on operative engine; landing gear up; flaps in take-off position; and most rearward C.G. For some conditions of weight and altitude, stall can be encountered at speeds above V_{MCA} as established by the certification procedure described above, in which event stall speed must be regarded as the limit of effective directional control.

V_{SSE} The Intentional One-Engine-Inoperative Speed is a speed above both V_{MCA} and stall speed, selected to provide a margin of lateral and directional control when one engine is suddenly rendered inoperative. Intentional failing of one engine below this speed is not recommended.

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

V_F Design flap speed is the highest speed permissible at which wing flaps may be actuated.

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} Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air and then only with caution.

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

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

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

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

METEOROLOGICAL TERMINOLOGY

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

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

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

POWER TERMINOLOGY

Take-off	The highest power rating to be used for takeoff.
Maximum Continuous	The highest power rating not limited by time. To be used only for conditions which warrant the use of this rating.
Cruise Climb	Power recommended for cruise climb.
Maximum Cruise	The highest power settings recom-mended for cruise.

Recommended Cruise	Intermediate power settings for which cruise power settings are presented.
Economy Cruise	The lowest power setting for which cruise power settings are presented.

ENGINE CONTROLS AND INSTRUMENTS TERMINOLOGY

Throttle Control	The lever used to control the introduction of a fuel-air mixture into the intake passages of an engine.
Propeller Control	This lever requests the governor to maintain rpm at a selected value and, in the maximum decrease rpm position, feathers the propellers.
Mixture Control	This lever, in the idle cut-off position, stops the flow of fuel at the injectors and in the intermediate thru the full rich positions, regulates the fuel air mixture.
Propeller Governors	The governors maintain the selected rpm requested by the propeller control levers.
Manifold Pressure Gage	An instrument that measures the absolute pressure in the intake manifold of an engine, expressed in inches of mercury (in. Hg).
Tachometer	An instrument that indicates the rotational speed of the propeller (and engine) in revolutions per minute (rpm).

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 takeoff and landing was actually demonstrated during certification tests. The value shown is not limiting.
Accelerate-Stop Distance	The distance required to accelerate to a specified speed and, assuming failure of an engine at the instant that speed is attained, to bring the airplane to a stop.
Accelerate-Go Distance	The distance required to accelerate to a specified speed and, assuming failure of an engine at the instant that speed is attained, feather inoperative propeller and continue takeoff on the remaining engine to a height of 50 feet.
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.
Unusable Fuel	Fuel remaining after a runout test has been completed in accordance with governmental regulations.

Usable Fuel	Fuel available for flight planning.
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 ramp weight 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.

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SECTION II

LIMITATIONS

TABLE OF CONTENTS

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The limitations included in this section have been approved by the Federal Aviation Administration and must be observed in the operation of this airplane.

AIRSPEED LIMITATIONS

SPEED	CAS		IAS		REMARKS
	KNOTS	MPH	KNOTS	MPH	
Never Exceed V_{NE}	223	257	223	257	Do not exceed this speed in any operation
Maximum Structural Cruising V_{NO}	195	225	195	225	Do not exceed this speed except in smooth air and then only with caution
Maneuvering V_A	156	180	156	180	Do not make full or abrupt control movements above this speed
Maximum Flap Extension/ Extended V_{FE} (Approach 15°) (Full down 30°)	152 122	175 140	152 122	175 140	Do not extend flaps or operate with flaps extended above this speed
Maximum Landing Gear Operating/ Extended V_{LO} and V_{LE}	152	175	152	175	Do not extend, retract or operate with landing gear extended above this speed
Air Minimum Control Speed V_{MCA}	81	93	81	93	Minimum speed for directional controllability after sudden loss of engine
Maximum With Utility Doors Removed	174	200	174	200	Utility door removal kit must be installed

*AIRSPEED INDICATOR MARKINGS

MARKING	CAS		IAS		SIGNIFICANCE
	KNOTS	MPH	KNOTS	MPH	
White Arc	72-122	83-140	74-122	85-140	Full Flap Operating Range
Blue Radial	100	115	100	115	One-Engine-Inoperative Best Rate-of-Climb Speed
Green Arc	83-195	95-225	84-195	96-225	Normal Operating Range
Yellow Arc	195-223	225-257	195-223	225-257	Operate with caution only in smooth air
Red Radial	223	257	223	257	Maximum speed for ALL operations

*The Airspeed Indicator is marked in CAS values

POWER PLANT LIMITATIONS

ENGINES

Two Continental IO-520-C fuel injected, air cooled six-cylinder, horizontally opposed engines each rated at 285 horsepower at 2700 rpm.

Take-off and Maximum
continuous power .... Full throttle, 2700 rpm

Maximum Cylinder Head Temperature .... 460°F
Maximum Oil Temperature .... 240°F
Minimum Take-off Oil Temperature .... 75°F
Minimum Oil Pressure (Idle) .... 30 psi
Maximum Oil Pressure .... 100 psi

FUEL

Aviation Gasoline 100LL (blue) preferred, 100 (green) minimum grade.

OIL

Ashless Dispersant oils must meet latest revision of Teledyne Continental Motors Corporation Specification MHS-24. Refer to Approved Engine Oils, Section VIII, HANDLING, SERVICING, and MAINTENANCE.

PROPELLERS

HARTZELL

2 Blade Hubs: BHC-J2YF-2CF
Blades: FC8475-6
Pitch Setting at 30 inch Station:
Low 14.5°; Feathered 80.0°
Diameter: 78 inches maximum, 76 inches minimum

3 Blade Hubs: PHC-J3YF-2F
Blades: FC7663-2R
Pitch Setting at 30 inch Station:
Low 13.0°; Feathered 82.0°
Diameter: 76 inches maximum, 74 inches minimum

McCAULEY

2 Blade Hubs: D2AF34C30
Blades: 78FF-0
Pitch Setting at 30 inch Station:
Low 15.0°; Feathered 79.0°
Diameter: 78 inches maximum, 76 inches minimum

3 Blade Hubs: D3AF32C35
Blades: 82NB-6
Pitch Setting at 30 inch Station:
Low 14.0° ± .2°; Feathered 81.2° ± 3°
Diameter: 76 inches, no cut-off permitted

STARTERS - TIME FOR CRANKING

Do not operate starter continuously for more than 30 seconds. Allow starter to cool before cranking again.

POWER PLANT INSTRUMENT MARKINGS

OIL TEMPERATURE

Caution (Yellow Radial)	75°F
Operating Range (Green Arc)	75° to 240°F
Maximum (Red Radial)	240°F

OIL PRESSURE

Minimum (Red Radial)	30 psi
Operating Range (Green Arc)	30 to 60 psi
Maximum (Red Radial)	100 psi

FUEL FLOW AND PRESSURE

Minimum (Red Radial)	1.5 psi
Cruise Power (Green Arc)	9.7 gph to 17.0 gph
Take-off and Climb Power (Wide Green Arc)	17.8 gph to 24.3 gph
Maximum (Red Radial)	17.5 psi

MANIFOLD PRESSURE

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

TACHOMETER

Operating Range (Green Arc)	2000 to 2700 rpm
Maximum (Red Radial)	2700 rpm

CYLINDER HEAD TEMPERATURE

Operating Range (Green Arc)	200° to 460°F
Maximum (Red Radial)	460°F

MISCELLANEOUS INSTRUMENT MARKINGS

INSTRUMENT PRESSURE

Caution (Yellow Arc) .... 2.5 to 3.5 in. Hg
Normal (Green Arc) .... 3.5 to 5.5 in. Hg
Caution (Yellow Arc) .... 5.5 to 6.5 in. Hg
Red Button Source Failure Indicators

or

Normal (Green Arc) .... 4.3 to 5.9 in. Hg
Red Button Source Failure Indicators

PROPELLER DEICE AMMETER

Normal Operating Range
(Green Arc) .... 7 to 12 amps (2 blade)
Normal Operating Range
(Green Arc) .... 14 to 18 amps (3 blade)

FUEL QUANTITY

Yellow Arc .... E to 1/8 Full

WEIGHTS

58

Maximum Ramp Weight .... 5424 lbs
Maximum Take-Off Weight .... 5400 lbs
Maximum Landing Weight .... 5400 lbs

58A

Maximum Ramp Weight .... 5014 lbs
Maximum Take-Off Weight .... 4990 lbs
Maximum Landing Weight .... 4990 lbs

Maximum Baggage/Cargo Compartment Weights:

Main Cabin Compartment
(less occupants and equipment) .... 400 lbs
Extended Aft Compartment .... 120 lbs
Nose Compartment (baggage less
equipment) .... 300 lbs

Refer to Weight and Balance section for additional information.

CG LIMITS

Baron 58

Forward Limits: 74 inches aft of datum at 4200 lbs and under, then straight line variation to 78.0 inches aft of datum at gross weight of 5400 lbs.

Aft Limits: 86 inches aft of datum at all weights.

Baron 58A

Forward Limits: 74 inches aft of datum at 4200 lbs and under, then straight line variation to 76.6 inches aft of datum at gross weight of 4990 lbs.

Aft Limits: 86 inches aft of datum at all weights.

REFERENCE DATUM

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

MAC leading edge is 67.2 inches aft of datum.
MAC length is 63.1 inches.

MANEUVER LIMITS

This is a normal category airplane. Acrobatic maneuvers, including spins, are prohibited.

FLIGHT LOAD FACTORS (5400 POUNDS)

Positive maneuvering load factors:

Flaps Up 4.2G
Flaps Down 2.0G

MINIMUM FLIGHT CREW .... One (1) Pilot

KINDS OF OPERATION LIMITS

This airplane is approved for the following type operations when the required equipment is installed and operational as defined herein:

1. VFR day and night
2. IFR day and night
3. FAR 91 operations when all pertinent limitations and performance considerations are complied with.

WARNING

FLIGHT IN ICING CONDITIONS IS PROHIBITED.

NOTE

Refer to "REQUIRED EQUIPMENT FOR VARIOUS CONDITIONS OF FLIGHT" at the end of this Section.

FUEL

TOTAL FUEL with left and right wing fuel systems full:

Standard Fuel System

Capacity	142 Gallons
Usable	136 Gallons

Optional Fuel System

Capacity	172 Gallons
Usable	166 Gallons

or

Capacity	200 Gallons
Usable	194 Gallons

Do not take off if Fuel Quantity Gages indicate in Yellow Arc or with less than 13 gallons in each wing fuel system.

The fuel crossfeed system to be used during emergency conditions in level flight only.

Maximum slip duration: 30 seconds

OXYGEN REQUIREMENTS

Refer to FAR 91 for oxygen requirements.

MAXIMUM PASSENGER SEATING CONFIGURATION

Five (5) passengers and one (1) pilot

SEATING

All seats must be in the upright position for takeoff and landing.

PLACARDS

ALL AIRSPEEDS shown on placards are Calibrated Airspeeds (CAS)

On Pilot's Left Sidewall Panel (58): TH-1 thru TH-732

THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY
AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS
STATED IN THE FORM OF PLACARDS, MARKINGS, AND MANUALS.
(PILOT'S CHECK LIST)
OCCUPIED SEATS MUST BE IN UPRIGHT POSITION DURING
TAKE-OFF AND LANDING
MAXIMUM WEIGHT 5400 LBS.
NO ACROBATIC MANEUVERS INCLUDING SPINS APPROVED
AIRSPEED LIMITATIONS
MAX. SPEED WITH LDG GEAR EXTENDED (NORMAL) 175 MPH (152 KTS)
MAX. SPEED WITH FLAPS EXTENDED (15° DOWN) 175 MPH (152 KTS)
MAX. SPEED WITH FLAPS EXTENDED (NORMAL) 140 MPH (122 KTS)
MAX DESIGN MANEUVER SPEED 180 MPH (156 KTS)
MIN CONTROL SPEED SINGLE ENGINE 93 MPH (81 KTS)
NEVER EXCEED SPEED 257 MPH (223 KTS)
MAX. STRUCTURAL CRUISE SPEED 225 MPH (195 KTS)

On Pilot's Left Sidewall Panel (58): TH-733 thru TH-772

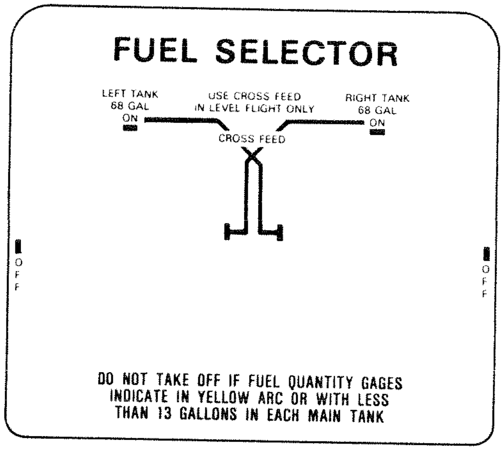
THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY
AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS
STATED IN THE FORM OF PLACARDS, MARKINGS, AND MANUALS.
(PILOT'S CHECK LIST)
OCCUPIED SEATS MUST BE IN UPRIGHT POSITION DURING
TAKE OFF AND LANDING
MAXIMUM WEIGHT 5400 LBS
NO ACROBATIC MANEUVERS INCLUDING SPINS APPROVED
AIRSPEED LIMITATIONS
MAX. SPEED WITH LDG GEAR EXTENDED (NORMAL) 152 KTS
MAX. SPEED WITH FLAPS EXTENDED (15° DOWN) 152 KTS
MAX. SPEED WITH FLAPS EXTENDED (NORMAL) 122 KTS
MAX DESIGN MANEUVER SPEED 156 KTS
MIN CONTROL SPEED SINGLE ENGINE 81 KTS
NEVER EXCEED SPEED 223 KTS
MAX. STRUCTURAL CRUISE SPEED 195 KTS

On Pilot's Left Sidewall Panel (58A):

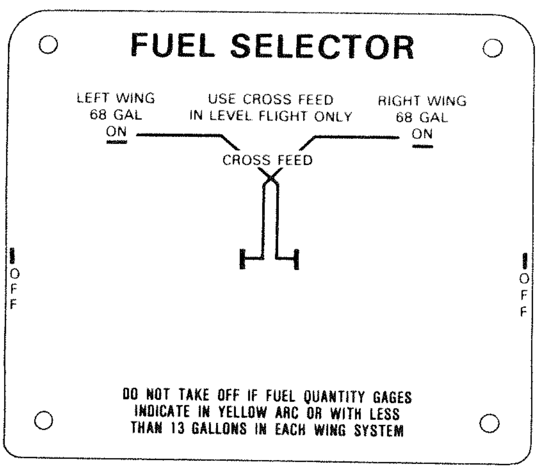
THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY
AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS
STATED IN THE FORM OF PLACARDS, MARKINGS, AND MANUALS.
(PILOT'S CHECK LIST)
OCCUPIED SEATS MUST BE IN UPRIGHT POSITION DURING
TAKE-OFF AND LANDING
MAXIMUM WEIGHT 4990 LBS
NO ACROBATIC MANEUVERS INCLUDING SPINS APPROVED
AIRSPEED LIMITATIONS
MAX. SPEED WITH LDG GEAR EXTENDED (NORMAL) 175 MPH (152 KTS)
MAX. SPEED WITH FLAPS EXTENDED (15° DOWN) 175 MPH (152 KTS)
MAX. SPEED WITH FLAPS EXTENDED (NORMAL) 140 MPH (122 KTS)
MAX. DESIGN MANEUVER SPEED 180 MPH (156 KTS)
MIN CONTROL SPEED SINGLE ENGINE 93 MPH (81 KTS)
NEVER EXCEED SPEED 257 MPH (223 KTS)
MAX. STRUCTURAL CRUISE SPEED 225 MPH (195 KTS)

Between Fuel Selector Handles:

Standard 136 Gallon System TH-1 thru TH-384



TH-385 thru TH-772

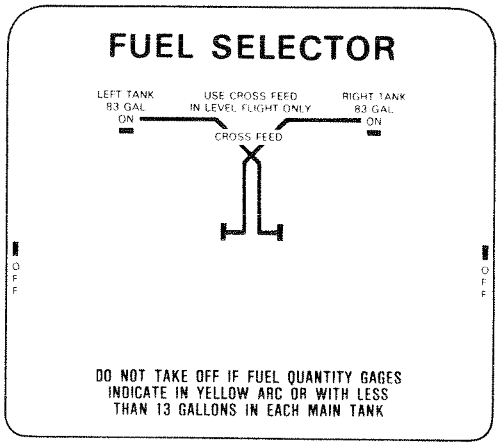


PLACARDS (Cont'd)

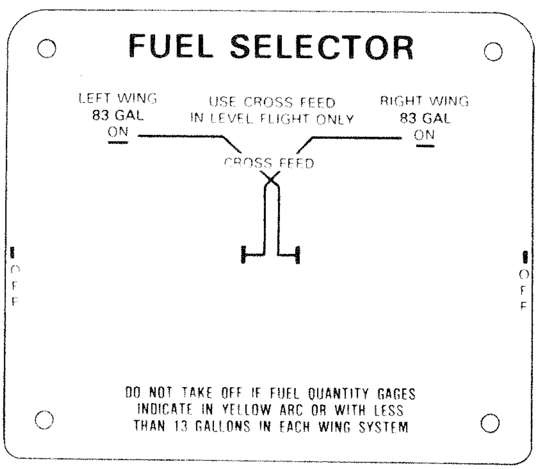
Between Fuel Selector Handles Con't.

Optional 166 Gallon System

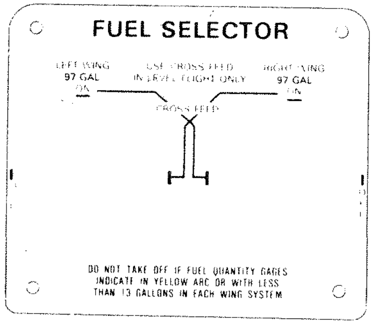
TH-1 thru TH-384



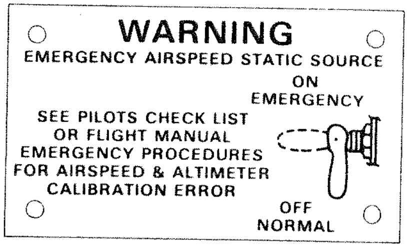
TH-385 thru TH-772



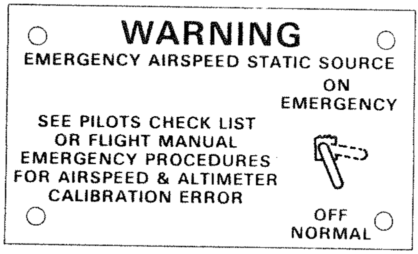
Between Fuel Selector Handles Con't.
Optional 194 Gallon System



On Lower Sidewall Adjacent to Pilot:
(Standard TH-1 thru TH-106)



On Lower Sidewall Adjacent to Pilot: (Standard - TH-107 thru TH-174) (Optional - TH-175 thru TH-772)

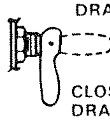


PLACARDS (Cont'd)

On Lower Sidewall Adjacent to Pilot:
(Standard - TH-175 thru TH-772)

WARNING

STATIC AIR DRAIN
VALVE TO BE CLOSED
BEFORE FLIGHT



OPEN
DRAIN

CLOSE
DRAIN

Adjacent To Cabin Door Handle and Utility Door Handle:
(TH-1 thru TH-384)

ROTATE
HANDLE TO FULL
LOCKED POSITION

Adjacent To Cabin Door Handle and Utility Door Handle:
(TH-385 thru TH-772)

ROTATE HANDLE TO
FULL LOCKED POSITION

On Openable Cabin Windows:

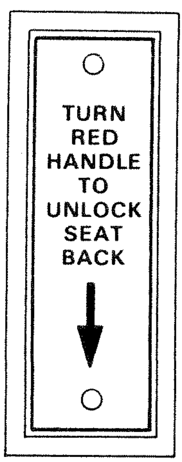
DO NOT OPEN
IN FLIGHT

LATCH WINDOW
BEFORE TAKE-OFF

Below Left and Right Middle Windows after compliance with BEECHCRAFT Service Instructions 1241:

EMERGENCY EXIT
LIFT LATCH - PULL PIN
PUSH WINDOW OUT

On Inboard Side Of Seat Backs For 3rd And 4th Seats: (TH-733 thru TH-772)



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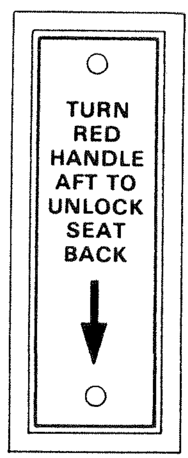


PLACARDS (Cont'd)

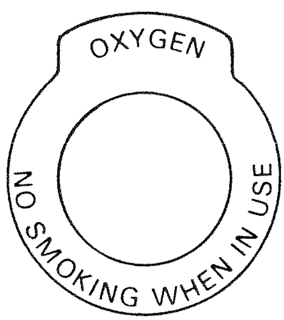
On Oxygen Panel on Left Sidewall: (TH-1 thru TH-174)

**HOSE PLUG MUST BE PULLED OUT TO
STOP FLOW OF OXYGEN**

*On Oxygen Panel on Left Sidewall:
(TH-175 thru TH-772)*

OXYGEN
NO SMOKING WHEN IN USE
HOSE PLUG MUST BE PULLED OUT TO STOP OXYGEN FLOW

Around Each Oxygen Outlet:



On Each Oxygen Mask Stowage Container:

OXYGEN MASKS

On Windows Adjacent to Pilot's and Copilot's Seat: (TH-233 thru TH-732)

WHEN SHOULDER HARNESS IS IN USE, SNUG LAP BELT WITH BUCKLE CENTERED IN FRONT OF OCCUPANT WITH SEAT BACK UPRIGHT

On Windows Adjacent to Pilot's and Copilot's Seat: (TH-733 thru TH-772)

SHOULDER HARNESS MUST BE WORN AT ALL TIMES WHILE AT PILOT POSITIONS

On Windows Adjacent to 5th & 6th Seats And 3rd & 4th Forward Facing Seats: (TH-733 thru TH-772)

SHOULDER HARNESS MUST BE WORN DURING TAKE-OFF AND LANDING WITH SEAT BACK UPRIGHT

On Windows Adjacent to 3rd & 4th Aft Facing Club Seats: (TH-733 thru TH-772)

SHOULDER HARNESS MUST BE WORN DURING TAKE-OFF AND LANDING WITH SEAT BACK UPRIGHT AND AFT FACING SEATS MUST HAVE HEADREST FULLY EXTENDED

PLACARDS (Cont'd)

On Inside of Utility Door or on Left Sidewall of Utility Compartment:

BAGGAGE COMPARTMENTS

LOAD IN ACCORDANCE WITH
WEIGHT AND BALANCE DATA

MAXIMUM STRUCTURAL CAPACITY
MAIN COMPARTMENT - 400 POUNDS
AFT COMPARTMENT - 120 POUNDS

On Floating Panel when Utility Doors are Removed:

WHEN UTILITY DOORS ARE
REMOVED AIR SPEED IS NOT TO
EXCEED 200 MPH (174 KNOTS) CAS

On Left Sidewall of Utility Compartment (with utility door removal kit):

BAGGAGE COMPARTMENTS

LOAD IN ACCORDANCE WITH
WEIGHT AND BALANCE DATA

MAXIMUM STRUCTURAL CAPACITY
MAIN COMPARTMENT - 400 POUNDS
AFT COMPARTMENT - 120 POUNDS

WHEN UTILITY DOORS ARE REMOVED THE FOLLOWING
RESTRICTIONS APPLY TO CABIN AREA:

1. NO SMOKING
2. ALL LOOSE OBJECTS MUST BE SECURED
3. PERSONNEL NOT SECURED IN SEATS BY SAFETY
   BELTS MUST WEAR PARACHUTES

In Plain View When Nose Baggage Compartment Door Is Open:

BAGGAGE COMPARTMENT

LOAD IN ACCORDANCE WITH
WEIGHT AND BALANCE DATA

MAXIMUM STRUCTURAL CAPACITY - 300 POUNDS

On Left Cabin Sidewall: (TH-35 thru TH-732)

ALL AFT FACING SEATS MUST HAVE
BACK UPRIGHT AND HEADREST FULLY
RAISED DURING TAKEOFF AND LANDING

On Left Side Panel When Airplane Is Equipped With Strobe Lights:

TURN STROBE LIGHTS OFF WHEN TAXIING IN
VICINITY OF OTHER AIRCRAFT OR WHEN
FLYING IN FOG OR CLOUDS STANDARD POSITION LIGHTS
TO BE USED FOR ALL NIGHT OPERATIONS

On Instrument Panel When Anti-Collision Lights Are Not Installed:

THIS AIRCRAFT NOT FULLY

EQUIPPED FOR NIGHT FLIGHT

PLACARDS (Cont'd)

On Top of Front Spar Carry-Thru Structure Between Front Seats:

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

On Emergency Crank Access Cover:
(TH-385 thru TH-772)

LANDING GEAR EMERGENCY CRANK **PULL OUT** **LIFT UP**

REQUIRED EQUIPMENT FOR VARIOUS CONDITIONS OF FLIGHT

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

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

For the sake of brevity, the Required Equipment Listing does not include obviously required items such as wings, rudders, flaps, engine, landing gear, etc. Also the list does not include items which do not affect the airworthiness of the airplane such as entertainment systems, passenger convenience items, etc. However, it is important to note that ALL ITEMS WHICH ARE RELATED TO THE AIR-WORTHINESS 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.

LEGEND

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

(-) Indicates that the item may be inoperative for the specified condition.

(*) Refers to the REMARKS AND/OR EXCEPTIONS column for explicit information or reference.

Required Equipment Charts are to be found on the pages that follow.

SYSTEM and/or COMPONENT	Number Installed	VFR Day	VFR Night	IFR Day	IFR Night	Remarks and/or Exceptions
GENERAL						
Overwater flight	*	*	*	*	*	-*Per FAR 91
COMMUNICATIONS						
VHF communications system	*	*	*	*	*	-*Per FAR 91
ELECTRICAL POWER						
Battery	1	1	1	1	1	-
DC alternator	2	1	2	2	2	-
DC loadmeter	2	2	2	2	2	-
Alternator-out light	2	2	2	2	2	- One may be inoperative provided corresponding loadmeter is operative and monitored.
Alternate battery bus	*	*	*	*	*	-*Optional

SYSTEM and/or COMPONENT	Number Installed	VFR Day	VFR Night	IFR Day	IFR Night	Remarks and/or Exceptions
EQUIPMENT AND FURNISHINGS						
Seat belts and shoulder harness	*	*	*	*	*	-*Per FAR 91
Emergency locator transmitter	1	1	1	1	1	- Per FAR 91
FIRE PROTECTION						
Portable fire extinguisher	*	*	*	*	*	-*Optional
FLIGHT CONTROLS						
Trim tab indicators - Rudder, aileron, and elevator	3	3	3	3	3	-
Flap position indicator	1	1	1	1	1	-
Stall warning	1	1	1	1	1	

FUEL EQUIPMENT						
Engine driven fuel	2	2	2	2	2	-
Electrically driven aux fuel pump	2	2	2	2	2	-
Fuel quantity indicator	2	2	2	2	2	-
Fuel flow indicator	1	1	1	1	1	- Dual indicating
ICE AND RAIN PROTECTION						
Pitot heater	1(2)	-	-	1	1	-
Heated fuel vent	2	-	-	2	2	-
LANDING GEAR						
Landing gear motor	1	1	1	1	1	-
Landing gear position indication lights	4	4	4	4	4	- 2 on TH-1 thru TH-384
Landing gear aural warning horn	1	1	1	1	1	

SYSTEM and/or COMPONENT	Number Installed	VFR Day	VFR Night	IFR Day	IFR Night	Remarks and/or Exceptions
LIGHTS						
Cockpit and instrument lights	*	-	*	-	*	-*Lights must illuminate all instruments and controls.
Taxi light	1	-	-	-	-	
Landing light	2	-	*	-	*	-*Per FAR 91
Rotating beacon	1(2)	-	1	-	1	- Top beacon must be operative
Strobe light	3	-	-	-	-	
Position light	3	-	3	-	3	

NAVIGATION INSTRUMENTS						
Altimeter	1	1	1	1	1	-
Airspeed indicator	1	1	1	1	1	
Vertical speed	1	-	-	-	-	-
Magnetic compass	1	1	1	1	1	-
Attitude indicator	1	-	-	1	1	-
Turn and slip indicator	1	-	-	1	1	-
Directional gyro	1	-	-	1	1	
Clock	1	-	-	1	1	
Transponder	*	*	*	*	*	-*Per FAR 91
Distance measuring equipment	*	*	*	*	*	-*Per FAR 91
Navigation equipment	*	-	-	*	*	-*Per FAR 91
OXYGEN						
Oxygen system	-	*	*	*	*	-*Per FAR 91

SYSTEM and/or COMPONENT	*Number Installed*	*VFR Day*	*VFR Night*	*IFR Day*	*IFR Night*	*Remarks and/or Exceptions*
VACUUM						
Instrument air source	2	-	2	2	2	-
Instrument air indicator	1	1	1	1	1	- Dual indicating
Deicing pressure indicator	*	*	*	*	*	-*One required with optional surface deice installation.
ENGINE INDICATING INSTRUMENTS						
Engine tachometer	1	1	1	1	1	- Dual indicating
Manifold pressure indicator	1	1	1	1	1	- Dual indicating
Cylinder head temp gage	2	2	2	2	2	-

ENGINE OIL INSTRUMENTS						
Oil pressure indicator	2	2	2	2	2	-
Oil temperature indicator	2	2	2	2	2	-

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SECTION III

EMERGENCY PROCEDURES

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

SUBJECT *PAGE*

All airspeeds quoted in this section are indicated airspeeds (IAS) and assume zero instrument error.

EMERGENCY AIRSPEEDS

Air Minimum Control Speed (V_{MCA}) ... 81 kts/93 mph
Intentional One-Engine
Inoperative Speed (V_{SSE}) .... 86 kts/99 mph
Best Rate-of-Climb Speed
One-Engine Inoperative (V_Y) .... 100 kts/115 mph
Best Angle-of-Climb Speed
One-Engine Inoperative (V_X) ..... 96 kts/111 mph
Landing - One Engine Inoperative:
Maneuvering to Final
Approach (minimum) .... 100 kts/115 mph
Final Approach (minimum) .... 90 kts/104 mph

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. In order to supply one safe speed for each type of emergency situation, the airspeeds presented were derived at 5400 lbs.

ONE ENGINE OPERATION

Two major factors govern one engine operations; airspeed and directional control. The airplane can be safely maneuvered or trimmed for normal hands-off operation and sustained in this configuration by the operative engine AS LONG AS SUFFICIENT AIRSPEED IS MAINTAINED.

DETERMINING INOPERATIVE ENGINE

The following checks will help determine which engine has failed.

1. DEAD FOOT - DEAD ENGINE. The rudder pressure required to maintain directional control will be on the side of the good engine.

2. THROTTLE. Partially retard the throttle for the engine that is believed to be inoperative; there should be no change in control pressures or in the sound of the engine if the correct throttle has been selected. AT LOW ALTITUDE AND AIRSPEED THIS CHECK MUST BE ACCOMPLISHED WITH EXTREME CAUTION.

Do not attempt to determine the inoperative engine by means of the tachometers or the manifold pressure gages. These instruments often indicate near normal readings.

ONE-ENGINE INOPERATIVE PROCEDURES

ENGINE FAILURE DURING TAKE-OFF

1. Throttles - CLOSED
2. Braking - MAXIMUM

If insufficient runway remains for stopping:

3. Fuel Selector Valves - OFF
4. Battery, Alternator, and Magneto/Start Switches - OFF

ENGINE FAILURE AFTER LIFT-OFF AND IN FLIGHT

An immediate landing is advisable regardless of take-off weight. Continued flight cannot be assured if take-off weight exceeds the weight determined from the TAKE-OFF WEIGHT graph. Higher take-off weights will result in a loss of altitude while retracting the landing gear and feathering the propeller. Continued flight requires immediate pilot response to the following procedures.

1. Landing Gear and Flaps - UP
2. Throttle (inoperative engine) - CLOSED
3. Propeller (inoperative engine) - FEATHER
4. Power (operative engine) - AS REQUIRED
5. Airspeed - MAINTAIN SPEED AT ENGINE FAILURE (100 KTS/115 MPH MAX.) UNTIL OBSTACLES ARE CLEARED.

After positive control of the airplane is established:

6. Secure inoperative engine:
   a. Mixture Control - IDLE CUT-OFF
   b. Fuel Selector - OFF
   c. Auxiliary Fuel Pump - OFF
   d. Magneto/Start Switch - OFF
   e. Alternator Switch - OFF
   f. Cowl Flap - CLOSED
7. Electrical Load - MONITOR (Maximum load of 1.0 on remaining engine)

NOTE

The most important aspect of engine failure is the necessity to maintain lateral and directional control. If airspeed is below 81 kts (93 mph), reduce power on the operative engine as required to maintain control. Refer to the SAFETY INFORMATION Section for additional information regarding pilot technique.

AIR START

CAUTION

The pilot should determine the reason for engine failure before attempting an air start.

1. Fuel Selector Valve - ON
2. Throttle - SET approximately 1/4 travel
3. Mixture Control - FULL RICH, below 5000 ft (1/2 travel above 5,000 ft)
4. Aux Fuel Pump - LOW
5. Magnetos - CHECK ON
6. Propeller:

   WITH UNFEATHERING ACCUMULATORS:
   a. Move propeller control full forward to accomplish unfeathering. Use starter momentarily if necessary.
   b. Return control to high pitch (low rpm) position, when windmilling starts, to avoid overspeed.

If propeller does not unfeather or engine does not turn, proceed to WITHOUT UNFEATHERING ACCUMULATORS procedure.

   WITHOUT UNFEATHERING ACCUMULATORS:
   a. Move propeller control forward of the feathering detent to midrange
   b. Engage Starter to accomplish unfeathering
   c. If engine fails to run, clear engine by allowing it to windmill with mixture in IDLE CUT-OFF. When engine fires, advance mixture to FULL RICH

7. When Engine Starts - ADJUST THROTTLE, PROPELLER and MIXTURE CONTROLS
8. Aux Fuel Pump - OFF (when reliable power has been regained)

9. Alternator Switch - ON
10. Oil Pressure - CHECK
11. Warm Up Engine (approximately 2000 rpm and 15 in. Hg)
12. Set power as required and trim

ENGINE FIRE

ON THE GROUND

1. Mixture Controls - IDLE CUT-OFF
2. Continue to crank affected engine
3. Fuel Selector Valves - OFF
4. Battery and Alternator Switches - OFF
5. Extinguish with Fire Extinguisher

IN FLIGHT

Shut down the affected engine according to the following procedure and land immediately. Follow the applicable single-engine procedures in this section.

1. Fuel Selector Valve - OFF
2. Mixture Control - IDLE CUT-OFF
3. Propeller - FEATHERED
4. Aux Fuel Pump - OFF
5. Magneto/Start Switch - OFF
6. Alternator Switch - OFF

EMERGENCY DESCENT

1. Propellers - 2700 RPM
2. Throttles - CLOSED
3. Airspeed - 152 kts (175 mph)
4. Landing Gear - DOWN
5. Flaps - APPROACH (15°)

GLIDE

1. Propellers - FEATHER
2. Flaps - UP
3. Landing Gear - UP
4. Cowl Flaps - CLOSED

The glide ratio in this configuration is approximately 2 nautical miles of gliding distance for each 1000 feet of altitude above the terrain at an airspeed of 120 kts (138 mph). .

LANDING EMERGENCIES

GEAR-UP LANDING

If possible, choose firm sod or foamed runway. When assured of reaching landing site:

1. Cowl Flaps - CLOSED
2. Wing Flaps - AS DESIRED
3. Throttles - CLOSED
4. Fuel Selectors - OFF
5. Mixture Controls - IDLE CUT-OFF
6. Battery, Alternator and Magneto/Start Switches - OFF
7. Keep wings level during touchdown.
8. Get clear of the airplane as soon as possible after it stops.

NOTE

The gear up landing procedures are based on the best available information and no actual tests have been conducted.

ONE ENGINE INOPERATIVE LANDING

On final approach and when it is certain that the field can be reached:

1. Landing Gear - DOWN
2. Flaps - APPROACH (15°)
3. Airspeed - 90 kts/104 mph
4. Power - AS REQUIRED to maintain 800 ft/min rate of descent

When it is certain there is no possibility of go-around:

5. Flaps - DOWN
6. Execute normal landing

ONE ENGINE INOPERATIVE GO-AROUND

WARNING

Level flight might not be possible for certain combinations of weight, temperature and altitude. In any event, DO NOT attempt a one engine inoperative go-around after flaps have been fully extended.

1. Power - MAXIMUM ALLOWABLE
2. Landing Gear - UP
3. Flaps - UP
4. Airspeed - MAINTAIN 100 kts (115 mph) MINIMUM

SYSTEMS EMERGENCIES

ONE-ENGINE INOPERATIVE OPERATION ON CROSSFEED

NOTE

The fuel crossfeed system is to be used only during emergency conditions in level flight only.

Left engine inoperative:

1. Right Aux Fuel Pump - LOW
2. Left Fuel Selector Valve - OFF
3. Right Fuel Selector Valve - CROSSFEED
4. Right Aux Fuel Pump - LOW or OFF as required

Right engine inoperative:

1. Left Aux Fuel Pump - LOW
2. Right Fuel Selector Valve - OFF
3. Left Fuel Selector Valve - CROSSFEED
4. Left Aux Fuel Pump - LOW or OFF as required

ELECTRICAL SMOKE OR FIRE

Action to be taken must consider existing conditions and equipment installed:

1. Battery and Alternator Switches - OFF

WARNING

Electrically driven flight instruments will become inoperative.

2. Oxygen - AS REQUIRED
3. All Electrical Switches - OFF
4. Battery and Alternator Switches - ON

5. Essential Electrical Equipment - ON (Isolate defective equipment:

NOTE

Ensure fire is out and will not be aggravated by draft. Turn off CABIN HEAT switch and push in the CABIN AIR control. Open pilot's storm window, if required.

ILLUMINATION OF ALTERNATOR OUT LIGHT

In the event of the illumination of a single ALTERNATOR OUT light:

1. Check the respective loadmeter for load indication
   a. No Load - Turn off affected alternator
   b. Regulate load

In the event of the illumination of both ALTERNATOR OUT lights:

1. Check loadmeters for load indication
   a. No load indicates failure of regulator
      (1) Switch regulators
      (2) System should indicate normal
   b. If condition recurs
      (1) Switch to original regulator
      (2) System returns to normal, indicates overload condition causing malfunction
      (3) Reduce load
   c. If condition indicates malfunction of both alternator circuits
      (1) Both ALT Switches - OFF
      (2) Minimize electrical load since only battery power will be available

UNSCHEDULED ELECTRIC ELEVATOR TRIM

Incorporated in the system is an emergency release button located on the left handle grip of the pilot's control wheel. This button can be depressed to deactivate the system quickly in case of a malfunction in the system. The system will remain deactivated only while the release button is being held in the depressed position.

1. Airplane Attitude - MAINTAIN using elevator control
2. Trim Release (under pilot's thumb adjacent to control wheel trim switch) - HOLD IN DEPRESSED POSITION
3. Trim - MANUALLY RE-TRIM AIRPLANE
4. Electric Trim - OFF
5. Trim Release - RELEASE
6. Circuit Breaker - PULL

NOTE

Do not attempt to operate the electric trim system until the cause of the malfunction has been determined and corrected.

LANDING GEAR MANUAL EXTENSION

Reduce airspeed before attempting manual extension of the landing gear.

1. LDG GR MOTOR Circuit Breaker - PULL
2. Landing Gear Handle - DOWN
3. Remove cover from handcrank at rear of front seats. Engage handcrank and turn counterclockwise as far as possible (approximately 50 turns). Stow handcrank.
4. If electrical system is operative, check landing gear position lights and warning horn (check LDG GR RELAY circuit breaker engaged.)

CAUTION

The manual extension system is designed only to lower the landing gear; do not attempt to retract the 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 with the airplane 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 Handle - UP

ICE PROTECTION

SURFACE DEICE SYSTEM

a. Failure of AUTO Operation
   (1) Surface Deice Switch - MANUAL (Do not hold more than 8 seconds)

CAUTION

The boots will inflate only as long as the switch is held in the MANUAL position. When the switch is released the boots will deflate.

b. Failure of boots to deflate
   (1) Pull circuit breaker on pilot's side panel.

ELECTROTHERMAL PROPELLER DEICE SYSTEM

1. Loss of one alternator; turn off unnecessary electrical equipment. Turn the prop deice system off while operating the cabin heater blower or the landing gear motor. Monitor electrical loads so as not to exceed alternator capacity of 1.0 on the loadmeter.

An abnormal reading on the Propeller Deice Ammeter indicates need for the following action:

a. Zero Amps:

   Check prop deice circuit breaker. If the circuit breaker has tripped, a wait of approximately 30 seconds is necessary before resetting. If ammeter reads 0 and the circuit breaker has not tripped or if the ammeter still reads 0 after the circuit breaker has been reset, turn the switch off and consider the prop deice system inoperative.

b. Zero to 7 Amps, 2 Blade Propeller; Zero to 14 Amps, 3 Blade Propeller:

   If the prop deice system ammeter occasionally or regularly indicates less than 7 amps for 2 blade, (or 14 amps for 3 blade), operation of the prop deice system can continue unless serious propeller imbalance results from irregular ice throw-offs.

c. 12 to 15 Amps, 2 Blade Propeller; 18 to 23 Amps, 3 Blade Propeller:

   If the prop deicing system ammeter occasionally or regularly indicates 12 to 15 amps for 2 blade (or 18 to 23 amps for 3 blade), operation of the prop deice system can continue unless serious propeller imbalance results from irregular ice throw-offs.

d. More than 15 Amps, 2 Blade Propeller, More than 23 amps, 3 Blade Propeller:

   If the prop deice system ammeter occasionally or regularly indicates more than 15 amps for 2 blade, or more than 23 amps for 3 blade, the system should not be operated unless the need for prop deicing is urgent.

ALTERNATE (EMERGENCY) STATIC AIR SOURCE SYSTEM

THE EMERGENCY STATIC AIR SOURCE SHOULD BE USED FOR CONDITIONS WHERE THE NORMAL STATIC SOURCE HAS BEEN OBSTRUCTED. When the airplane has been exposed to moisture and/or icing conditions (especially on the ground), the possibility of obstructed static ports should be considered. Partial obstructions will result in the rate of climb indication being sluggish during a climb or descent. Verification of suspected obstruction is possible by switching to the emergency system and noting a sudden sustained change in rate of climb. This may be accompanied by abnormal indicated airspeed and altitude changes beyond normal calibration differences.

Whenever any obstruction exists in the Normal Static Air System or the Emergency Static Air System is desired for use:

1. Emergency Static Air Source - Switch to ON-EMERGENCY. (lower sidewall adjacent to pilot)
2. For Airspeed Calibration and Altimeter Corrections, refer to the PERFORMANCE section.

CAUTION

The emergency static air valve should remain in the OFF NORMAL position when system is not needed.

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 and the utility door. An emergency exit placard, "EMERGENCY EXIT, LIFT LATCH - PULL PIN, PUSH WINDOW OUT," is installed below the left and right middle windows after compliance with BEECHCRAFT Service Instructions 1241. To open each emergency exit:

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

NOTE

On TH-733 and after, for access past the 3rd and/or 4th seats, rotate the red handle, located on the lower inboard side of the seat back, and fold the seat back over.

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 to 4 inches open. Flight characteristics of the airplane will not be affected except for a reduction in performance. 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.

SIMULATED ONE ENGINE INOPERATIVE

ZERO THRUST (Simulated Feather)

Use the following power setting (only on one engine at a time) to establish zero thrust. Use of this power setting avoids the difficulties of restarting an engine and preserves the availability of engine power.

The following procedure should be accomplished by alternating small reductions of propeller and then throttle, until the desired setting has been reached.

1. Propeller Lever - RETARD TO FEATHER DETENT
2. Throttle Lever - SET 12 in. Hg MANIFOLD PRESSURE

NOTE

This setting will approximate Zero Thrust using recommended One-Engine Inoperative Climb speeds.

SPINS

If a spin is entered inadvertently:

Immediately move the control column full forward, apply full rudder opposite to the direction of the spin and reduce power on both engines to idle. These three actions should be done as near simultaneously as possible; then continue to hold this control position until rotation stops and then neutralize all controls and execute a smooth pullout. Ailerons should be neutral during recovery.

NOTE

Federal Aviation Administration Regulations do not require spin demonstration of airplanes of this weight; therefore, no spin tests have been conducted. The recovery technique is based on the best available information.

SECTION IV

NORMAL PROCEDURES

TABLE OF CONTENTS

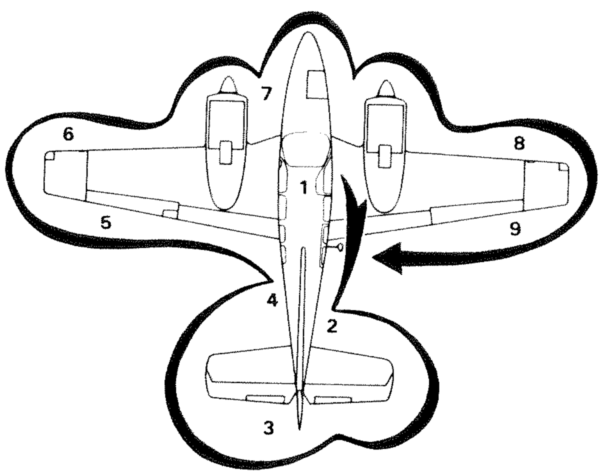
TABLE OF CONTENTS (Continued)

All airspeeds quoted in this section are indicated airspeeds (IAS) and assume zero instrument error.

AIRSPEEDS FOR SAFE OPERATION

(Settings established at 5400 lbs.)

Two-Engine Best Angle-of-Climb	86 kts/99 mph
Two-Engine Best Rate-of-Climb	104 kts/120 mph
Single-Engine Best Angle-of-Climb ...	96 kts/111 mph
Single-Engine Best Rate-of-Climb ...	100 kts/115 mph
Air Minimum Control (V_{MCA})	81 kts/93 mph
Intentional One Engine Inoperative (V_{SSE})	86 kts/99 mph
Cruise Climb	139 kts/160 mph
Balked Landing Climb	95 kts/109 mph
Landing Approach Flaps 30°	96 kts/110 mph
Turbulent Air Penetration	156 kts/180 mph
Maximum Demonstrated Crosswind	22 kts/25 mph



PREFLIGHT INSPECTION

1. COCKPIT:
   a. Control Lock - REMOVE AND STOW
   b. Parking Brake - SET
   c. All Switches - OFF
   d. Trim Tabs - SET TO ZERO
2. RIGHT FUSELAGE:
   a. Load Distribution - CHECK AND SECURED
   b. Utility Door - SECURE
   c. Static Port - UNOBSTRUCTED
   d. Emergency Locator Transmitter - ARMED
3. EMPENNAGE:
   a. Control Surfaces, Tabs and Deice Boots - CHECK CONDITION, SECURITY, AND ATTACHMENT
   b. Tail Cone, Tail Light, and Beacon - CHECK
   c. Tie Down - REMOVE
   d. Cabin Air Inlet - CHECK
4. LEFT FUSELAGE:
   a. Cabin Air Outlet - CHECK
   b. Static Port - UNOBSTRUCTED
   c. All Antennas and Lower Beacon - CHECK
5. LEFT WING TRAILING EDGE:
   a. Fuel Sump Aft of Wheel Well - DRAIN
   b. Fuel Vents - CHECK
   c. Flaps - CHECK GENERAL CONDITION
   d. Aileron - CHECK CONDITION AND FREEDOM OF MOVEMENT, TAB NEUTRAL WHEN AILERON NEUTRAL
6. LEFT WING LEADING EDGE
   a. Lights and Deice Boot - CHECK FOR CONDITION
   b. Stall Warning Vane - CHECK FREEDOM OF MOVEMENT
   c. Fuel - CHECK QUANTITY AND SECURE CAP(S). ALWAYS CHECK WING TIP TANK FIRST (IF IN-

STALLED); DO NOT REMOVE INBOARD CAP IF FUEL IS VISIBLE IN TIP TANK.

d. Wing Tip Tank (if installed) Sump - DRAIN
e. Fuel Sight Gage - CHECK (if installed)
f. Tie Down, Chocks - REMOVE
g. Engine Oil - CHECK QUANTITY, SECURE CAP AND DOOR
h. Engine Cowling and Doors - CHECK CONDITION AND SECURITY
i. Engine Air Intake - REMOVE COVER AND EXAMINE FOR OBSTRUCTIONS
j. Propeller - EXAMINE FOR NICKS, SECURITY AND OIL LEAKS
k. Cowl Flap - CHECK
l. Wheel Well Doors, Tire, Brake Line and Shock Strut - CHECK
m. Landing Gear Uplock Roller - CHECK
n. Fuel Drains - DRAIN

7. NOSE SECTION
   a. Wheel Well Doors, Tire and Shock Strut - CHECK
   b. Heater Fuel Strainer - DRAIN (if installed)
   c. Pitot(s) - REMOVE COVER, EXAMINE FOR OBSTRUCTIONS
   d. Taxi/Landing Light - CHECK
   e. Heater Air Inlets - CLEAR
   f. Oxygen - CHECK
   g. Baggage Door - SECURE

8. RIGHT WING LEADING EDGE
   a. Wheel Well Doors, Tire, Brake Line, and Shock Strut - CHECK
   b. Landing Gear Uplock Roller - CHECK
   c. Cowl Flap - CHECK
   d. Fuel Drains - DRAIN
   e. Engine Oil - CHECK QUANTITY, SECURE CAP AND DOOR

f. Engine Cowling and Doors - CHECK CONDITION AND SECURITY
g. Propeller - EXAMINE FOR NICKS, SECURITY AND OIL LEAKS
h. Engine Air Intake - REMOVE COVER AND EXAMINE FOR OBSTRUCTIONS
i. Fuel Sight Gage - CHECK (if installed)
j. Fuel - CHECK QUANTITY AND SECURE CAP(S). ALWAYS CHECK WING TIP TANK FIRST (IF INSTALLED); DO NOT REMOVE INBOARD CAP IF FUEL IS VISIBLE IN TIP TANK.
k. Wing Tip Tank (if installed) Sump - DRAIN
l. Tie Down and Chocks - REMOVE
m. Lights and Deice Boot - CHECK FOR CONDITION

9. RIGHT WING TRAILING EDGE
   a. Aileron - CHECK CONDITION AND FREEDOM OF MOVEMENT
   b. Fuel Vents - CHECK
   c. Fuel Sump Aft of Wheel Well - DRAIN
   d. Flaps - CHECK GENERAL CONDITION

NOTE

Check operation of lights if night flight is anticipated.

CAUTION

DO NOT TAXI WITH A FLAT SHOCK STRUT.

BEFORE STARTING

1. Seats - POSITION AND LOCK; Seat Backs - UPRIGHT
2. Rudder Pedals - ADJUST
3. Seat Belts and Shoulder Harnesses - FASTEN AND ADJUST
4. Parking Brake - SET
5. All Avionics - OFF
6. Oxygen - CHECK QUANTITY AND OPERATION
7. Landing Gear Handle - DOWN
8. Cowl Flaps - CHECK, OPEN
9. Fuel Selector Valves - CHECK OPERATION THEN ON
10. All Circuit Breakers, Switches and Equipment Controls - CHECK
11. Battery Switch and Alternator Switches - ON (If external power is used, Alternator switches - OFF)
12. Fuel Quantity Indicators - CHECK QUANTITY (See LIMITATIONS for take-off fuel)
13. Landing Gear Position Lights - CHECK

STARTING

1. Throttle Position - APPROXIMATELY 1/2 IN. OPEN
2. Propeller Control - LOW PITCH (High RPM)
3. Mixture Control - FULL RICH

NOTE

If the engine is hot, and the ambient temperature is 90°F or above, place mixture control in IDLE CUT-OFF, switch aux fuel pump to HIGH for 30 to 60 seconds, then OFF. Return mixture control to FULL RICH.

4. Aux Fuel Pump - HIGH (until pressure stabilizes then - OFF)
5. Magneto/Start Switch - START (Observe Starter Limits)

CAUTION

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

NOTE

In the event of a balked start (or overprime condition) place mixture control in IDLE CUT-OFF and open the throttle; operate the starter to remove excess fuel. As engine starts, reduce the throttle to idle rpm and place the mixture control in FULL RICH.

6. Warm-up - 1000 to 1200 RPM
7. Oil Pressure - 25 PSI WITHIN 30 SECONDS
8. External Power (if used) - DISCONNECT

WARNING

When using external power, start the right engine first, since the external power receptacle is on the left nacelle. Disconnect external power before starting left engine.

9. Alternator Switch - ON
10. All Engine Indicators - CHECK

CAUTION

If the total of both loadmeters exceeds .2 after two minutes at 1000-1200 rpm, with no additional electrical equipment on, and the indication shows no signs of decreasing, an electrical malfunction is indicated. The battery master and both alternator switches should be placed in the OFF position. Do not take off.

CAUTION

Low voltage, high ammeter or loadmeter readings, dimming of lights, or excessive noise in radio receivers could be indications that problems are developing in the starter system. A noted change in such normal conditions could indicate prolonged starter motor running and the engine should be shut down. No further flight operations should be attempted until the cause is determined and repaired.

11. Using the same procedure, start other engine.

AFTER STARTING AND TAXI

NOTE

Do not operate engine above 1200 RPM until oil temperature reaches 75°F.

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

BEFORE TAKEOFF

1. Seat Belts and Shoulder Harnesses - CHECK
2. Parking Brake - SET
3. Aux Fuel Pumps - OFF (If ambient temperature is 90°F or above, use LOW pressure boost)
4. All Instruments - CHECKED
5. Fuel Selector Valves - CHECK ON
6. Mixture - FULL RICH (or as required by field elevation)
7. Propellers - EXERCISE AT 2200 RPM

CAUTION

When exercising propellers in their governing range, do not move the control lever aft past the detent. To do so will allow the propeller to change rapidly to the full feathered position, imposing high stresses on the blade shank and engine.

8. Loadmeters - CHECK for proper indication
9. Throttles - 1700 RPM
10. Magnetos - CHECK (Variance between individual magnetos should not exceed 50 rpm, max. drop 150 rpm)
11. Throttles - 1500 RPM
12. Propellers - FEATHERING CHECK (Do not allow an rpm drop of more than 500 rpm)
13. Throttles - IDLE
14. Electric Trim - CHECK OPERATION
15. Trim - AS REQUIRED FOR TAKEOFF
16. Flaps - CHECK AND SET FOR TAKEOFF
17. Controls - CHECK PROPER DIRECTION, FULL TRAVEL, AND FREEDOM OF MOVEMENT
18. Doors and Windows - LOCKED
19. Parking Brake - OFF

TAKEOFF

Take-Off Power .... Full Throttle, 2700 rpm

Minimum Take-Off Oil Temperature .... 75°F

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

MAXIMUM PERFORMANCE CLIMB

1. Power - SET MAXIMUM CONTINUOUS POWER
2. Mixtures - LEAN TO APPROPRIATE FUEL FLOW
3. Cowl Flaps - OPEN
4. Airspeed - ESTABLISH 104 KTS/120 MPH

CRUISE CLIMB

1. Power - SET (25.0 in. Hg or Full Throttle - 2500 RPM)
2. Mixture - LEAN TO APPROPRIATE FUEL FLOW
3. Airspeed - 139 KTS/160 MPH
4. Cowl Flaps - AS REQUIRED

NOTE

In high ambient temperatures, low pressure boost may be required to prevent excessive fuel flow fluctuations.

CRUISE

Maximum Cruise Power	24.5 in. Hg at 2500 rpm
Recommended Cruise Power .	24.0 in. Hg at 2300 rpm
Recommended Cruise Power .	21.0 in. Hg at 2300 rpm
Economy Cruise Power	20.5 in. Hg at 2100 rpm

1. Power - SET AS DESIRED (Use Tables in PERFORMANCE section)
2. Fuel Flow - LEAN AS REQUIRED
3. Cowl Flaps - AS REQUIRED

LEANING USING THE EXHAUST GAS TEMPERATURE INDICATOR (EGT)

A thermocouple type exhaust gas temperature (EGT) probe is mounted in the system. This probe is connected to an indicator on the instrument panel. The indicator is calibrated in degrees Fahrenheit. Use EGT system to lean the fuel/air mixture when cruising at maximum cruise power or less.

1. Lean the mixture and note the point on the indicator that the temperature peaks and starts to fall.
   a. CRUISE (LEAN) MIXTURE - Increase the mixture until the EGT shows a drop of 25°F below peak on the rich side of peak.

   b. BEST POWER MIXTURE - Increase the mixture until the EGT shows a drop of 100°F below peak on the rich side of peak.

CAUTION

Do not continue to lean mixture beyond that necessary to establish peak temperature.

2. Continuous operation is recommended at 25°F or more below peak EGT only on the rich side of peak.

3. Changes in altitude and power settings require the peak EGT to be rechecked and the mixture reset.

DESCENT

1. Altimeter - SET
2. Cowl Flaps - CLOSED
3. Windshield Defroster - AS REQUIRED
4. Power - AS REQUIRED (avoid prolonged idle settings and low cylinder head temperatures)

Recommended descent speeds:

Smooth air .... 175 kts/201 mph
Rough air .... (Max.) 156 kts/180 mph

BEFORE LANDING

1. Seat Belts and Shoulder Harnesses - FASTENED, SEAT BACKS UPRIGHT
2. Fuel Selector Valves - CHECK ON
3. Aux. Fuel Pumps - OFF, OR LOW AS PER AMBIENT TEMPERATURE
4. Cowl Flaps - AS REQUIRED
5. Mixture Controls - FULL RICH (or as required by field elevation)
6. Flaps - APPROACH 15° POSITION (Maximum extension speed 152 kts/175 mph)
7. Landing Gear - DOWN (Gear extension speed 152 kts/175 mph)
8. Flaps - FULL DOWN (30°) (Maximum extension speed, 122 kts/140 mph)
9. Airspeed - ESTABLISH NORMAL LANDING APPROACH SPEED.
10. Propellers - LOW PITCH (high rpm)

BALKED LANDING

1. Propellers - LOW PITCH (high rpm)
2. Power - MAXIMUM ALLOWABLE
3. Airspeed - BALKED LANDING CLIMB SPEED (95 KTS/109 MPH)
4. Flaps - UP (0°)
5. Landing Gear - UP
6. Cowl Flaps - AS REQUIRED

AFTER LANDING

1. Landing and Taxi Lights - AS REQUIRED
2. Flaps - UP
3. Trim Tabs - SET TO ZERO
4. Cowl Flaps - OPEN
5. Aux Fuel Pumps - AS REQUIRED

SHUTDOWN

1. Parking Brake - SET
2. Propellers - HIGH RPM
3. Throttles - 1000 RPM
4. Aux Fuel Pumps - OFF
5. Electrical and Avionics Equipment - OFF
6. Mixture Controls - IDLE CUT-OFF
7. Magneto/Start Switches - OFF, AFTER ENGINES STOP
8. Battery and Alternator Switches - OFF
9. Controls - LOCKED
10. If airplane is to be parked for an extended period of time, install wheel chocks and release the parking brake as greatly varying ambient temperatures may build excessive pressures on the hydraulic system.

NOTE

Induction air scoop covers, included in the loose tools and accessories, are to prevent foreign matter from entering the air scoops while the aircraft is parked.

OXYGEN SYSTEM

WARNING

NO SMOKING permitted when using oxygen.

PREFLIGHT

1. Check Oxygen Pressure Gage for pressure reading.
2. Determine percent of full system.
3. Multiply oxygen duration in minutes by percent of full system.

EXAMPLE:

People	5
Gage Pressure	1500 psi
Percent Capacity (from chart)	80%
Cylinder Capacity (full)	49 cu ft
Altitude (planned flight)	15,000 feet
Duration (full cylinder)	149 minutes
Duration (80% full)	119 minutes

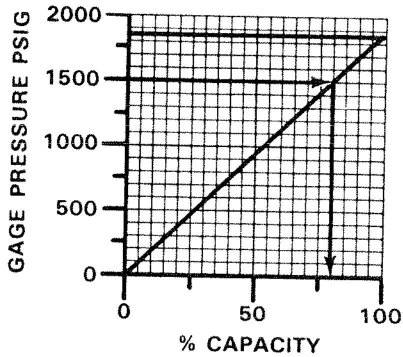
OXYGEN DURATION

The recommended masks are provided with the system. They are designed to be adjustable to fit the average person, with minimum leakage of oxygen.

CAUTION

Since 90% of the system efficiency is determined by the fit of the oxygen mask, make certain the masks fit properly and are in good condition.

OXYGEN AVAILABLE WITH PARTIALLY FULL BOTTLE



OXYGEN DURATION CHART

Duration in minutes at the following altitudes:

	Persons Using	12,500	15,000	20,000
49 cu ft	1	1014	746	507
	2	507	373	253
	3	338	248	169
	4	253	186	126
	5	202	149	101
	6	169	124	84
66 cu ft	1	1344	988	672
	2	672	494	336
	3	448	329	224
	4	336	247	168
	5	268	197	134
	6	224	164	112

IN FLIGHT

The use of oxygen is recommended to be in accordance with current FAR operating rules.

1. Oxygen Control Valve - OPEN SLOWLY
2. Mask - INSERT FITTING, DON MASK (adjust mask for proper fit)
3. Oxygen Flow Indicator - CHECK (red plunger lifts from its seat when the hose is inserted into the oxygen coupling)

AFTER USING

1. Discontinue use by unplugging mask from outlet.

NOTE

Closing the control valve while in flight is not necessary due to automatic sealing of the outlet when the mask is unplugged.

2. Oxygen Control Valve - CLOSE (may be accomplished during shut-down).

ELECTRIC ELEVATOR TRIM

1. ON-OFF switch - ON
2. Control Wheel Trim Switch - Forward for nose down, aft for nose up, (when released the switch returns to the center - OFF position)

Malfunction procedures are given in the EMERGENCY PROCEDURES section.

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, propellers, windshield, fuel cell filler caps and fuel vents, and crankcase breathers. 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.

Conditions for accumulating moisture in the fuel tanks are most favorable at low temperatures due to the condensation increase and the moisture that enters as the system is serviced. Therefore, close attention to draining the fuel system will assume particular importance during cold weather.

ENGINES

Use engine oil in accordance with Consumable Materials in the SERVICING section. Always pull the propeller through by hand several times to clear the engine and "limber up" the cold, heavy oil before using the starter. This will also lessen the load on the battery if an auxiliary power unit is not used.

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, and engine sump 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 engines are hot and stored in a warm area until the next flight.

If there is no oil pressure within the first 60 seconds of running, or if oil pressure drops after a few minutes of ground operation, shut down and check for broken oil lines, oil cooler leaks or the possibility of congealed oil.

NOTE

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

During warm-up, watch engine temperatures closely, since it is quite possible to exceed the cylinder head temperature limit in trying to bring up the oil temperature. Exercise the propellers several times to remove cold oil from the pitch change mechanisms. The propellers should also be cycled occasionally in flight.

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

EXTERNAL POWER

It is very important that the following precautions be observed while using external power.

1. The airplane has a negative ground system. Be sure to connect the positive lead of the auxiliary power unit to the positive terminal of the airplane's external power receptacle and the negative lead of the auxiliary power unit to the negative terminal of the external power receptacle.

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

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

STARTING ENGINES USING AUXILIARY POWER UNIT

1. Battery switch - ON
2. Alternators, Electrical, and Avionics Equipment - OFF
3. Auxiliary Power Unit - CONNECT
4. Auxiliary Power Unit - SET OUTPUT (27.0 to 28.5 volts)
5. Auxiliary Power Unit - ON
6. Right Engine - START (use normal start procedures)
7. Auxiliary Power Unit - OFF (after engine has been started)
8. Auxiliary Power Unit - DISCONNECT (before starting left engine)
9. Alternator Switches - ON

TAXIING

Avoid taxiing through water, slush or muddy surfaces if possible. In cold weather, water, slush or mud, when splashed onto landing gear mechanisms or control surface hinges may freeze, preventing free movement and resulting in structural damage.

ICE PROTECTION SYSTEMS

Airplanes are approved for flight into light-to-moderate icing conditions in accordance with operational practices of Bureau of Flight Standards Release No. 434 when the following equipment is installed and operable: Emergency Static Air Source, Surface Deice System, Propeller Deice or Anti-Ice System, Pitot Heat, Heated Stall Warning, Heated Fuel Vents, Windshield Defogging or Storm Window, Alternate Induction Air, and External Antenna Mast capable of withstanding ice loads as well as the equipment normally required for IFR flight.

WARNING

> Stalling airspeeds should be expected to increase due to the distortion of the wing airfoil when ice has accumulated on the airplane. For the same reason, stall warning devices are not accurate and should not be relied upon. With ice on the airplane, maintain a comfortable margin of airspeed above the normal stall airspeed.

1. EMERGENCY STATIC AIR SOURCE

If the Emergency Static Air Source is desired for use:

a. Emergency Static Air Source - ON EMERGENCY (lower sidewall adjacent to pilot)

b. For Airspeed Calibration and Altimeter Corrections, refer to PERFORMANCE section

CAUTION

The emergency static air valve should be in the OFF NORMAL position when the system is not needed.

2. SURFACE DEICE SYSTEM

a. *BEFORE TAKE-OFF*

(1) Throttles - 2000 RPM
(2) Surface Deice Switch - AUTO (UP)
(3) Deice Pressure - 9 to 20 PSI (while boots are inflating)
(4) Wing Boots - CHECK VISUALLY FOR INFLATION AND HOLD DOWN

b. *IN FLIGHT*

When ice accumulates 1/2 to 1 inch

(1) Surface Deice Switch - AUTO (UP)
(2) Deice Pressure - 9 to 20 PSI (while boots are inflating)
(3) Repeat - AS REQUIRED

CAUTION

Rapid cycles in succession or cycling before at least 1/2 inch of ice has accumulated may cause the ice to grow outside the contour of the inflated boots and prevent ice removal.

Stall speeds are increased 4 kts/5 mph in all configurations with surface deice system operating.

NOTE

Either engine will supply sufficient vacuum and pressure for deice operation.

c. For Emergency Operation refer to the EMERGENCY PROCEDURES section.

3. ELECTROTHERMAL PROPELLER DEICE

CAUTION

Do not operate the propeller deice when propellers are static.

a. *BEFORE TAKEOFF*

(1) Propeller Deice Switch - ON
(2) Propeller Deice Ammeter - CHECK, 7 to 12 amps (2 Blade), 14 to 18 amps (3 Blade)

b. *IN FLIGHT*

(1) Propeller Deice Switch - ON. The system may be operated continuously in flight and will function automatically until the switch is turned OFF.

(2) Relieve propeller imbalance due to ice by increasing rpm briefly and returning to the desired setting. Repeat as necessary.

CAUTION

If the propeller deice ammeter indicates abnormal reading, refer to the Emergency Procedures section.

4. PROPELLER AND WINDSHIELD ANTI-ICE SYSTEM (FLUID FLOW)

CAUTION

This anti-ice system is designed to PREVENT the formation of ice. Always turn the system ON before entering icing conditions.

a. *PREFLIGHT*

(1) Check the quantity in reservoir
(2) Check slinger ring and lines for obstructions
(3) Check propeller boots for damage

b. *IN FLIGHT*

(1) Prop Anti-ice Switch - ON
(2) Windshield Anti-ice Switch - CYCLE AS REQUIRED
(3) Anti-ice Quantity Indicator - MONITOR

NOTE

See SYSTEM description for endurance.

5. PITOT HEAT AND HEATED STALL WARNING

a. Pitot Heat Switch(es) - ON (Note deflection on Loadmeter) Heated Stall Warning is activated by the left pitot heat switch.

NOTE

Switches may be left on throughout flight. Prolonged operation on the ground could damage the Pitot Heat System.

6. FUEL VENT HEAT

   a. Fuel Vent Switch - ON (If ice is encountered)

7. WINDSHIELD DEFOGGING

   a. Defrost Control - PUSH ON

   b. Pilot's Storm Window - OPEN, AS REQUIRED

ENGINE BREAK-IN INFORMATION

Refer to Systems section.

PRACTICE DEMONSTRATION OF V_{MCA}

V_{MCA} demonstration may be required for multi-engine pilot certification. The following procedure shall be used at a safe altitude of at least 5000 feet above the ground in clear air only.

WARNING

INFLIGHT ENGINE CUTS BELOW V_{SSE} SPEED OF 86 kts/99 mph ARE PROHIBITED.

1. Landing Gear - Up
2. Flaps - Up
3. Airspeed - Above 86 kts/99 mph (V_{SSE})
4. Propeller Levers - High RPM
5. Throttle (Simulated inoperative engine) - Idle
6. Throttle (Other engine) - Maximum Manifold Pressure
7. Airspeed - Reduce approximately 1 knot per second until either V_{MCA} or stall warning is obtained.

CAUTION

Use rudder to maintain directional control (heading) and ailerons to maintain 5° bank towards the operative engine (lateral attitude). At the first sign of either V_{MCA} or stall warning (which may be evidenced by: inability to maintain heading or lateral attitude, aerodynamic stall buffet, or stall warning horn sound) immediately initiate recovery: reduce power to idle on the operative engine and immediately lower the nose to regain V_{SSE}.

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SECTION V

PERFORMANCE

TABLE OF CONTENTS

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SUBJECT *PAGE*

INTRODUCTION TO PERFORMANCE AND FLIGHT PLANNING

All airspeeds quoted in this section are indicated airspeeds (IAS) except as noted and assume zero instrument error.

The graphs and tables in this section present performance information for takeoff, climb, landing and flight planning at various parameters of weight, power, altitude, and temperature. FAA approved performance information is included in this section. Examples are presented on all performance graphs. In addition, the calculations for flight time, block speed, and fuel required are presented using the conditions listed.

Performance with a gross weight of 4990 lbs (Baron 58A) will be equal to or better than that of the higher gross weight Baron 58.

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 .... 10,000 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.

Maximum Allowable Take-off Weight = 5400 lbs

Ramp Weight = 5400 + 24 = 5424 lbs

NOTE

Fuel for start, taxi and take-off is normally 24 pounds.

Enter the Take-Off Weight graph at 5650 feet pressure altitude and 15°C.

The take-off weight to achieve a positive rate-of-climb at lift-off for one engine inoperative is:

Take-off Weight = 4850 pounds

Enter the Take-Off Distance graph at 15°C, 5650 feet pressure altitude, 5400 pounds, and 9.5 knots headwind component.

Ground Roll .... 1900 ft
Total Distance over 50 ft Obstacle .... 3090 ft
Lift-off Speed .... 86 kts (99 mph)
50 Foot Speed .... 94 kts (108 mph)

Enter the Accelerate-Stop graph at 15°C, 5650 feet pressure altitude, 5400 pounds, and 9.5 knots headwind component:

Accelerate-Stop Distance .... 3960 ft
Engine Failure Speed .... 86 kts (99 mph)

NOTE

Since 3960 feet is less than the available field length (10,010 ft), the accelerate-stop procedure can be performed at any weight.

Take-off at 5400 lbs can be accomplished. However, if an engine failure occurs before becoming airborne, the accelerate-stop procedure must be performed.

The following example assumes the airplane is loaded so that the take-off weight is 4850 pounds.

Although not required by regulations, information has been presented to determine the take-off weight, field requirements and take-off flight path assuming an engine failure occurs during the take-off procedure. The following illustrates the use of these charts.

Enter the Accelerate-Go graph at 15°C, 5650 feet pressure altitude, 4850 pounds, and 9.5 knots headwind component:

Ground Roll .... 1775 ft
Total Distance Over 50 ft Obstacle .... 8071 ft
Lift-off Speed .... 86 kts (99 mph)
50 Foot Speed .... 94 kts (108 mph)

Enter the graph for Take-off Climb Gradient - One Engine Inoperative at 15°C, 5650 feet pressure altitude, and 4850 pounds.

Climb Gradient 2.1%
Climb Speed .... 94 kts (108 mph)

A 2.1% climb gradient is 21 feet of vertical height per 1000 feet of horizontal distance.

NOTE

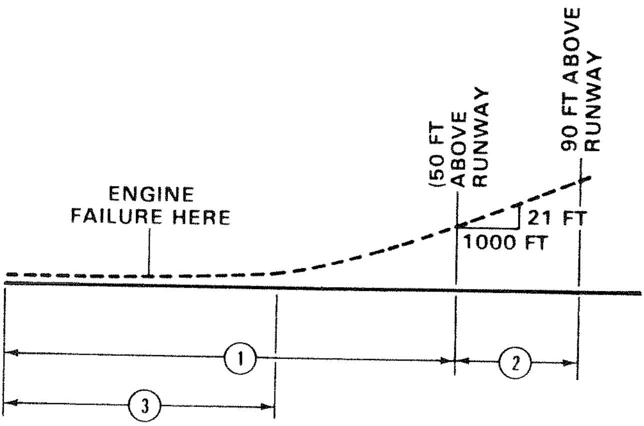
The Climb Gradient - One Engine Inoperative graph assumes zero wind conditions. Climbing into a headwind will result in higher angles of climb, and hence, better obstacle clearance capabilities.

Calculation of horizontal distance to clear an obstacle 90 feet above the runway surface:

Horizontal distance used to climb from 50 feet to 90 feet = (90-50) (1000 ÷ 21) = 1905 feet

Total Distance = 8071 + 1905 = 9976 feet

The above results are illustrated below:



(1) ACCELERATE - GO TAKE-OFF DISTANCE = 8071 FT

(2) DISTANCE TO CLIMB FROM 50 FT TO 90 FT ABOVE RUNWAY = 1905 FT

(3) ACCELERATE - STOP DISTANCE FOR 5400 LBS TAKE-OFF WEIGHT = 3960 FT

The following calculations provide information for the flight planning procedure. All examples are presented on the performance graphs. A take-off weight of 5400 pounds has been assumed.

Enter the Time, Fuel, and Distance to Climb graph at 15°C to 5650 feet and to 5400 pounds. Also enter at -5°C to 11,500 feet and to 5400 pounds. Read:

Time to Climb = (22 -7) = 15 min
Fuel Used to Climb = (12.7 -4.7) = 8 gal
Distance Traveled = (55 -17) = 38 NM

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 table for recommended cruise power - 24 in. Hg, 2300 rpm at 10,000 ft, 12,000 ft, ISA and ISA + 20°C.

	TEMPERATURE					
	ISA			ISA + 20°C		
ALTITUDE FEET	MAN. PRESS. IN. HG	FUEL FLOW GPH/ ENG	TAS KTS/ MPH	MAN. PRESS. IN. HG	FUEL FLOW GPH/ ENG	TAS KTS/ MPH
10000	20.1	12.3	187/ 215	20.1	11.8	187/ 215
12000	18.5	11.6	184/ 212	18.5	11.2	185/ 213

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

ROUTE SEGMENT	MAN. PRESS. IN. HG	FUEL FLOW GPH/ENG	TAS KTS/ MPH
DEN-PUB	18.9	11.7	186/ 214
PUB-TBE	18.9	11.6	186/ 214
TBE-DHT	18.9	11.5	185/ 213
DHT-AMA	18.9	11.4	185/ 213

NOTE

The preceding are exact values for the assumed conditions.

Enter the graph for Descent at 11,500 feet to the descent line, and enter again at 3965 feet to the descent line, and read:

Time to Descend = (23-8) = 15 min
Fuel Used to Descend = (9.7 -3.3) = 6.4 gal
Descent Distance = (72-25) = 47 NM

Time and fuel used were calculated at Recommended Cruise Power - 24 in. Hg. 2300 RPM as follows:

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

Fuel Used = (Time) (Total Fuel Flow)

Results are:

ROUTE SEGMENT	DISTANCE NM	EST GROUND SPEED KTS/ MPH	TIME AT CRUISE ALTITUDE HRS: MIN	FUEL USED FOR CRUISE GAL
DEN-COS	*17	215/ 247	: 05	1.9
COS-PUB	40	213/ 245	: 11	4.4
PUB-TBE	74	171/ 197	: 26	10.0
TBE-DHT	87	173/ 199	: 30	11.6
DHT-AMA	*18	176/ 203	: 06	2.3

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

TIME - FUEL - DISTANCE

ITEM	TIME HRS: MINS	FUEL GAL	DISTANCE NM
Start, Runup, Taxi and Take-off	0:00	4.0	0
Climb	0:15	8.0	38
Cruise	1:18	30.2	236
Descent	0:15	6.4	47
Total	1:48	48.6	321

Total Flight Time: 1 hour, 48 minutes

Block Speed: 321 NM ÷ 1 hour, 48 minutes = 178 kts/205 mph

Reserve Fuel: (45 minutes at Economy Cruise Power):

Enter the cruise power settings table for Economy Cruise Power at 11,500 feet for ISA (assume ISA Fuel Flow Rate).

Fuel Flow Per Engine = 10.3 gal/hr

Total Fuel Flow = 20.6 gal/hr (124 lbs/hr)

Reserve Fuel = (45 min) (124 lbs/hr) = 93 lbs (15.5 gal)

Total Fuel = 48.6 + 15.5 = 64.1 gallons

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

Assumed ramp weight = 5424 lbs

Estimated fuel from DEN to AMA = 64.1 gal (385 lbs)

Estimated landing weight = 5424 -385 = 5039 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.

Enter the graph for Landing Distance - Flaps 30 degrees at 25°C, 3965 feet pressure altitude, 5039 pounds and 9.5 kts headwind component:

Ground Roll .... 1450 ft
Total Distance over 50 ft Obstacle .... 2500 ft
Approach Speed .... 91 kts (105 mph)

Enter the graph for Climb-Balked Landing at 25°C, 3965 feet pressure altitude and 5039 pounds:

Rate-of-Climb .... 640 ft/min
Climb Gradient 6.5%

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.

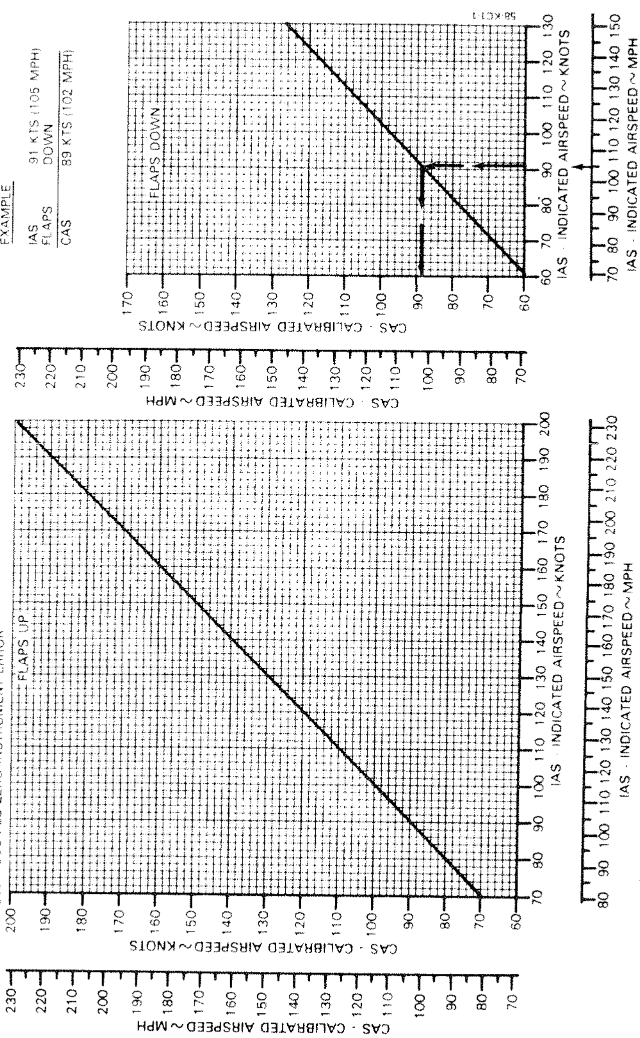
3. Indicated airspeeds (IAS) were obtained by using the Airspeed Calibration-Normal System.

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

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

AIRSPEED CALIBRATION - NORMAL SYSTEM

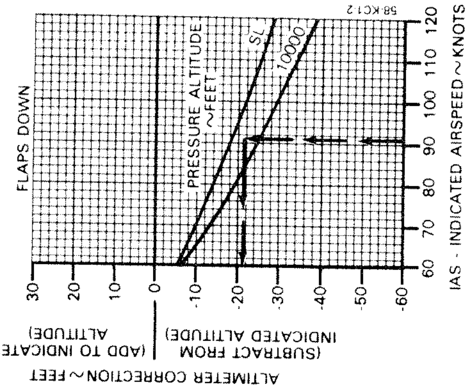
NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR

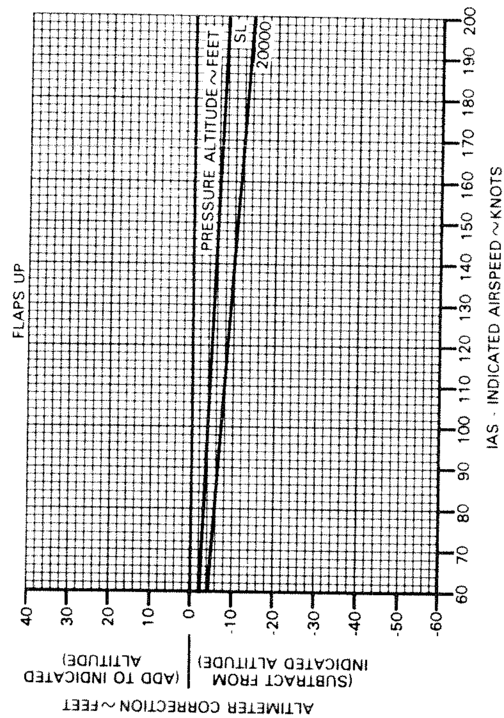


ALTIMETER CORRECTION - NORMAL SYSTEM

EXAMPLE:

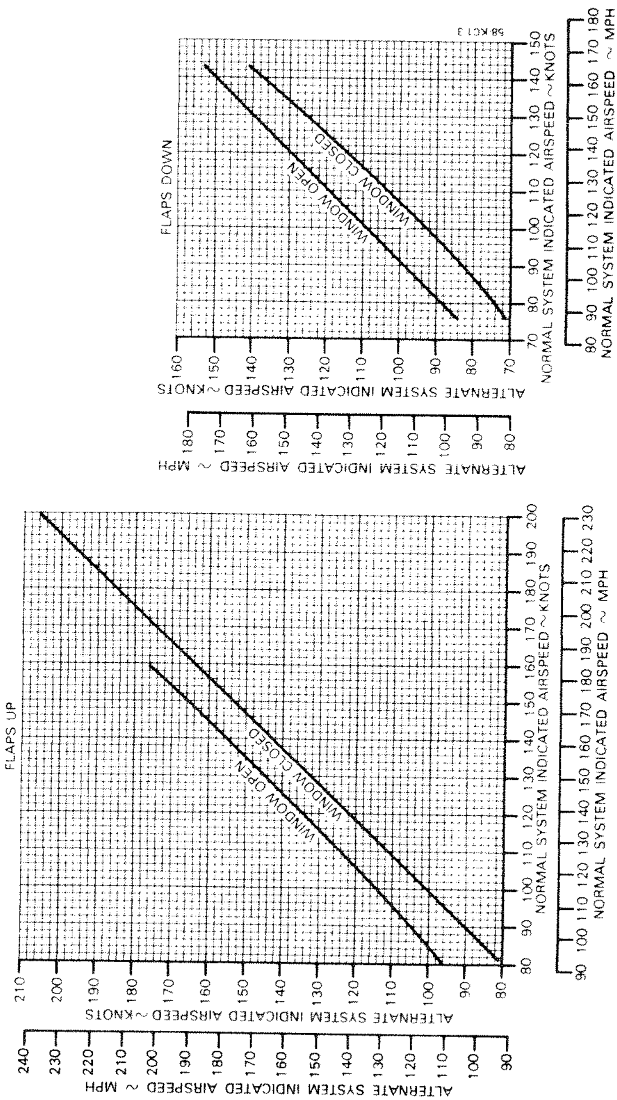
IAS	91 KTS (105 MPH)
FLAPS	DOWN
INDICATED PRESSURE ALTITUDE	3965 FT
ALTIMETER CORRECTION	-21 FT
ACTUAL PRESSURE ALTITUDE	(3965-21) = 3944 FT



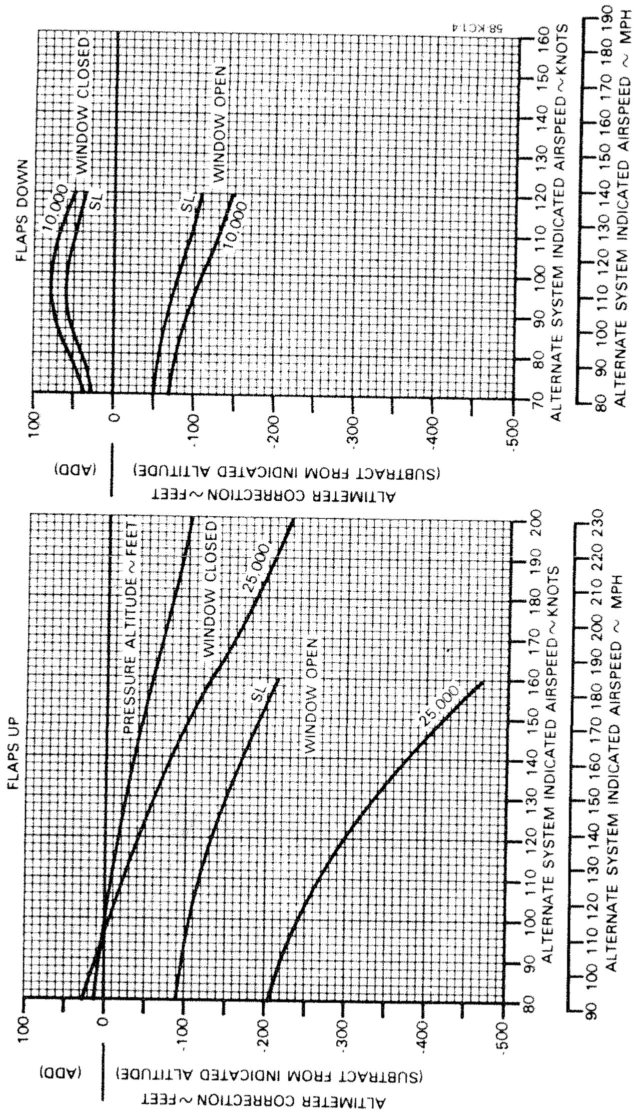


NOTE:
INDICATED ALTITUDE AND INDICATED AIRSPEED ASSUME ZERO INSTRUMENT ERROR

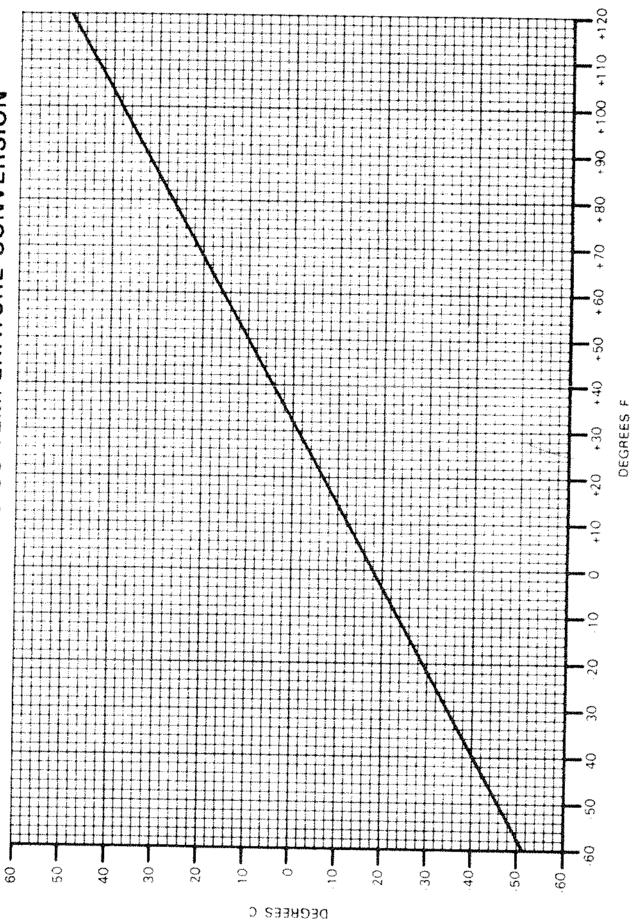
AIRSPEED CALIBRATION - ALTERNATE SYSTEM

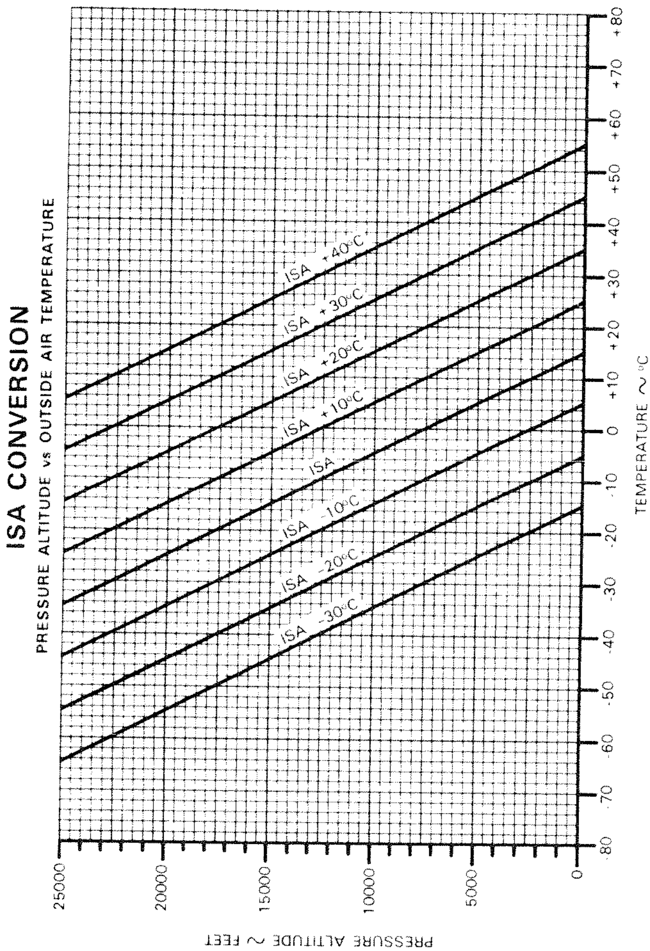


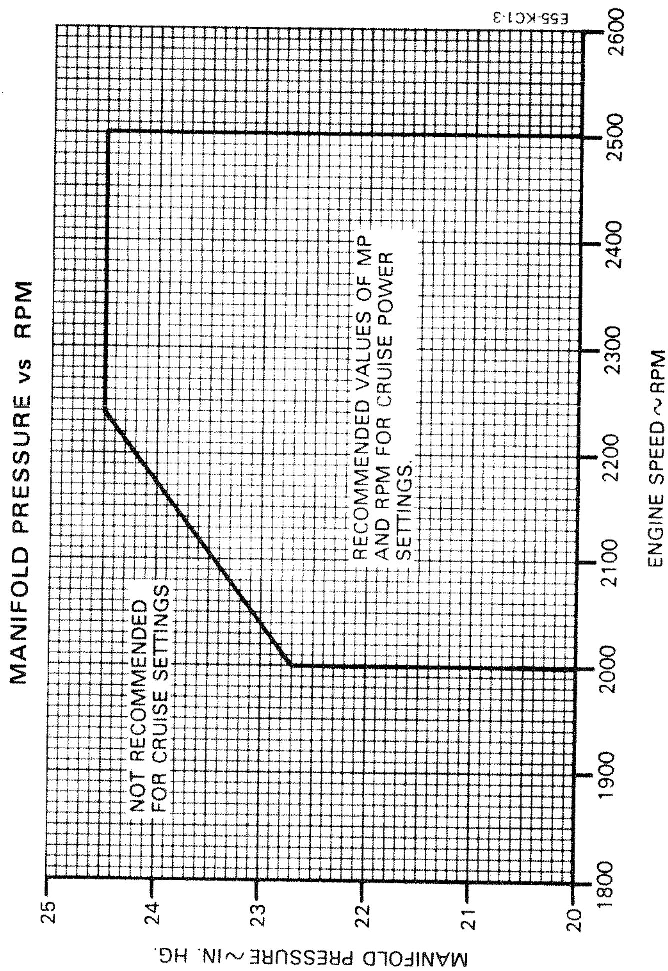
ALTIMETER CORRECTION - ALTERNATE SYSTEM



FAHRENHEIT TO CELSIUS TEMPERATURE CONVERSION




ISA CONVERSION
PRESSURE ALTITUDE vs OUTSIDE AIR TEMPERATURE
ISA +40°C
ISA +30°C
ISA +20°C
ISA +10°C
ISA
ISA -10°C
ISA -20°C
ISA -30°C
TEMPERATURE ~ °C
+80
+70
+60
+50
+40
+30
+20
+10
0
-10
-20
-30
-40
-50
-60
-70
-80
PRESSURE ALTITUDE ~ FEET
25000
20000
15000
10000
5000
0

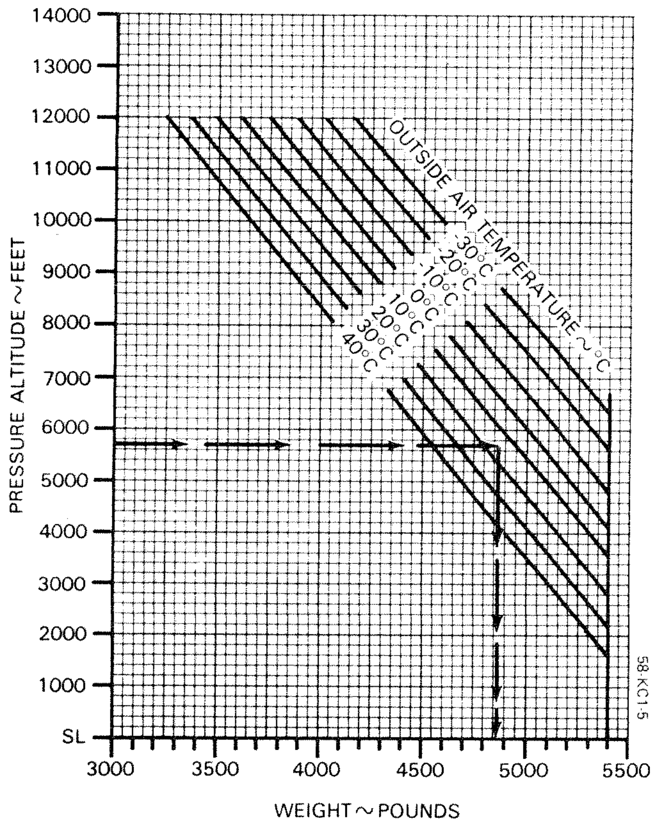

MANIFOLD PRESSURE vs RPM
NOT RECOMMENDED
FOR CRUISE SETTINGS
RECOMMENDED VALUES OF MP
AND RPM FOR CRUISE POWER
SETTINGS.
ENGINE SPEED ~ RPM
1800
1900
2000
2100
2200
2300
2400
2500
2600
MANIFOLD PRESSURE ~ IN. HG.
25
24
23
22
21
20
E55-KC1-3

TAKE-OFF WEIGHT

TO ACHIEVE POSITIVE SINGLE ENGINE
RATE-OF-CLIMB AT LIFT-OFF

ASSOCIATED CONDITIONS	
AIRPLANE	AIRBORNE
POWER	TAKE-OFF
FLAPS	UP
LANDING GEAR	DOWN
INOPERATIVE PROPELLER	FEATHERED

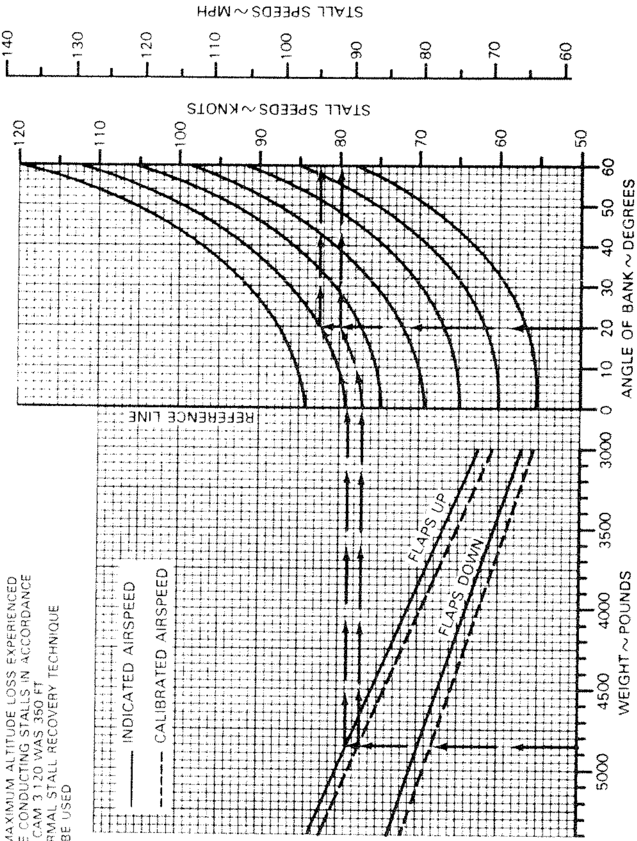
EXAMPLE:	
PRESSURE ALTITUDE	5650 FEET
OAT	15°C (59°F)
TAKE-OFF WEIGHT	4850



STALL SPEEDS - POWER IDLE

EXAMPLE:

WEIGHT	4850 LBS
FLAPS	UP
ANGLE OF BANK	20°
STALL SPEED	
(IAS)	82 KTS (94 MPH)
(CAS)	80 KTS (92 MPH)



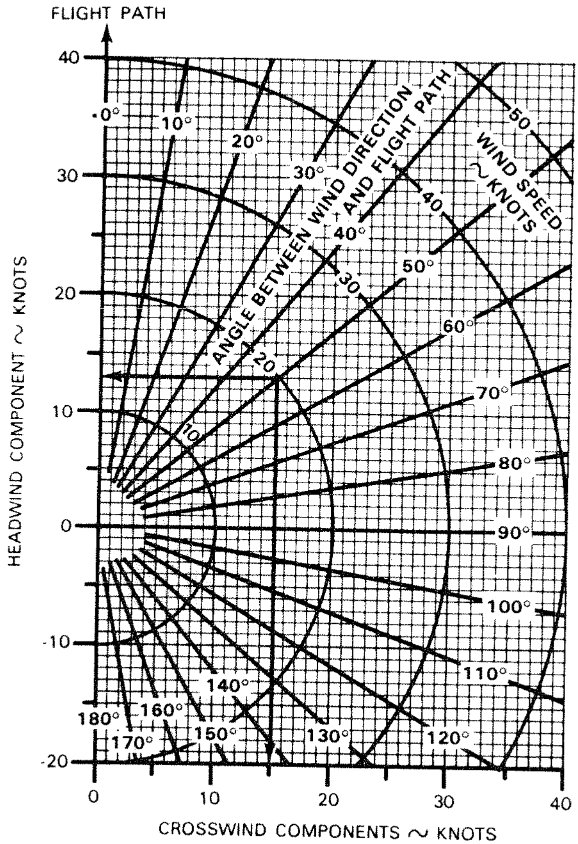
NOTES:
1. THE MAXIMUM ALTITUDE LOSS EXPERIENCED WHILE CONDUCTING STALLS IN ACCORDANCE WITH CAM 3.120 WAS 350 FT
2. A NORMAL STALL RECOVERY TECHNIQUE MAY BE USED

WIND COMPONENTS

Demonstrated Crosswind Component is 22 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

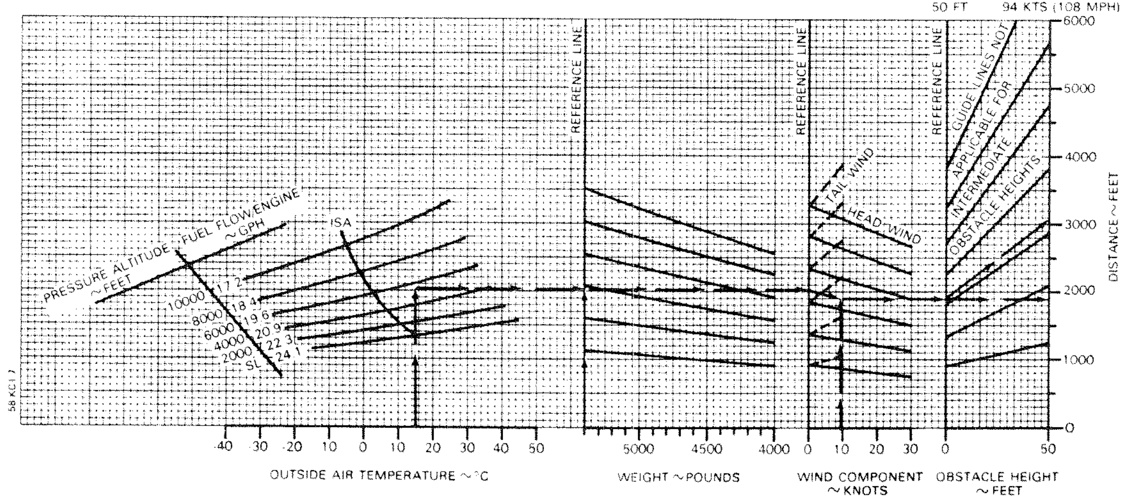
ASSOCIATED CONDITION

POWER	TAKE-OFF POWER
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW
FLAPS	UP
LANDING GEAR	RETRACT AFTER POSITIVE CLIMB ESTABLISHED
COWL FLAPS	OPEN
RUNWAY	PAVED, LEVEL, DRY SURFACE

TAKE-OFF SPEEDS (ALL WEIGHTS)
LIFT OFF 86 KTS (99 MPH)
50 FEET 94 KTS (108 MPH)

EXAMPLE:

OAT	15°C (59°F)
PRESSURE ALTITUDE	5650 FEET
TAKE-OFF WEIGHT	5400 LBS
HEAD WIND COMPONENT	9.5 KTS
GROUND ROLL	1900 FEET
TOTAL DISTANCE OVER 50 FT OBSTACLE	3090 FEET
TAKE-OFF SPEED AT LIFT OFF	86 KTS (99 MPH)
50 FT	94 KTS (108 MPH)



ACCELERATE - STOP DISTANCE

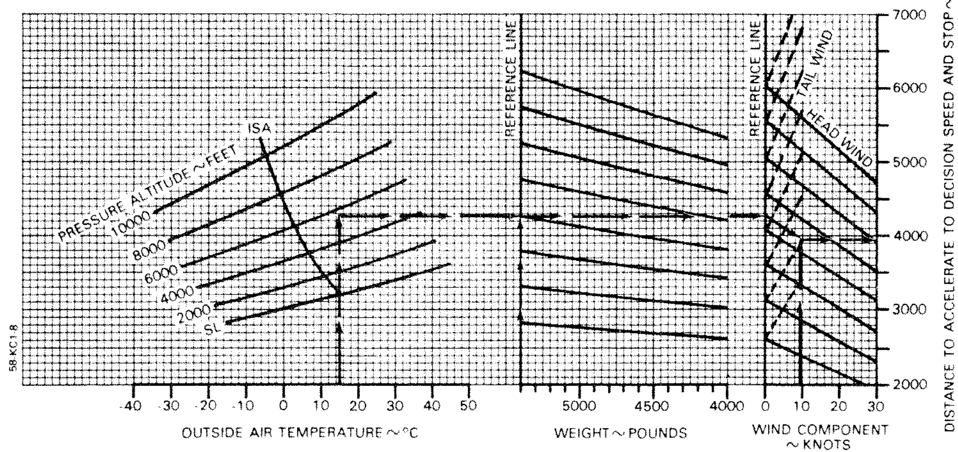
ASSOCIATED CONDITIONS

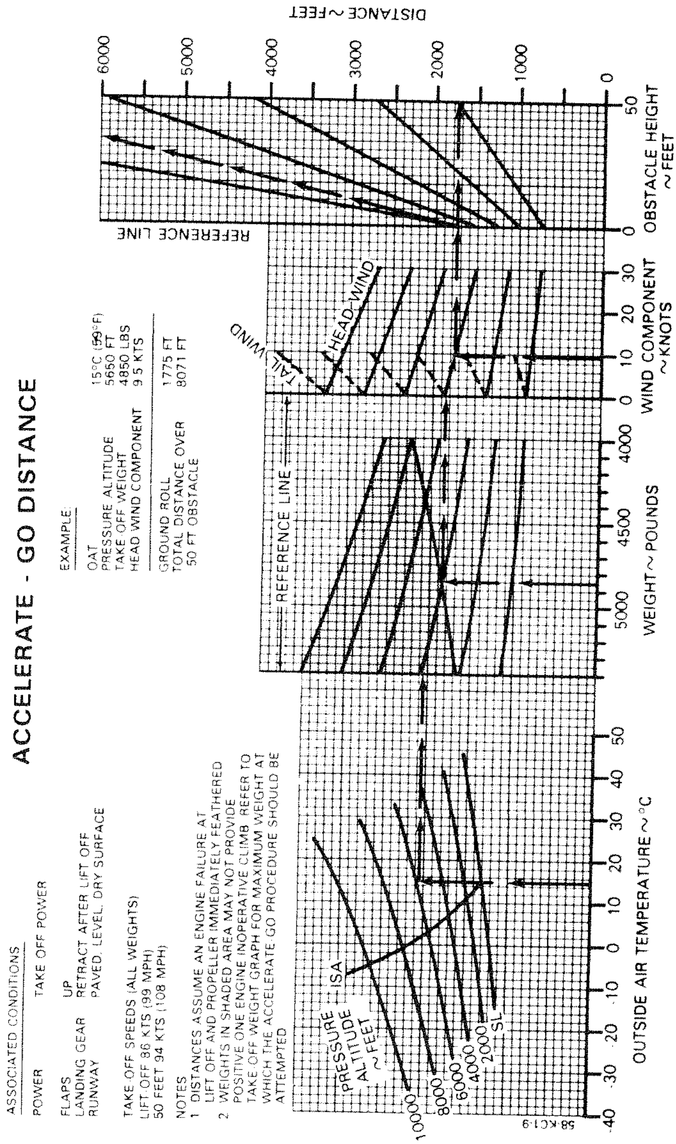
POWER	1 TAKE-OFF POWER 2 ENGINE IDLE AT DECISION SPEED
FLAPS	UP
COWL FLAPS	OPEN
RUNWAY	PAVED, LEVEL, DRY SURFACE

DECISION SPEED (ALL WEIGHTS)
86 KTS
(99 MPH)

EXAMPLE

OAT	15°C (59°F)
PRESSURE ALTITUDE	5650 FT
TAKE-OFF WEIGHT	5400 LBS
HEAD WIND	9.5 KTS
ACCELERATE - STOP DISTANCE	3960 FT
DECISION SPEED (IAS)	86 KNOTS (99 MPH)



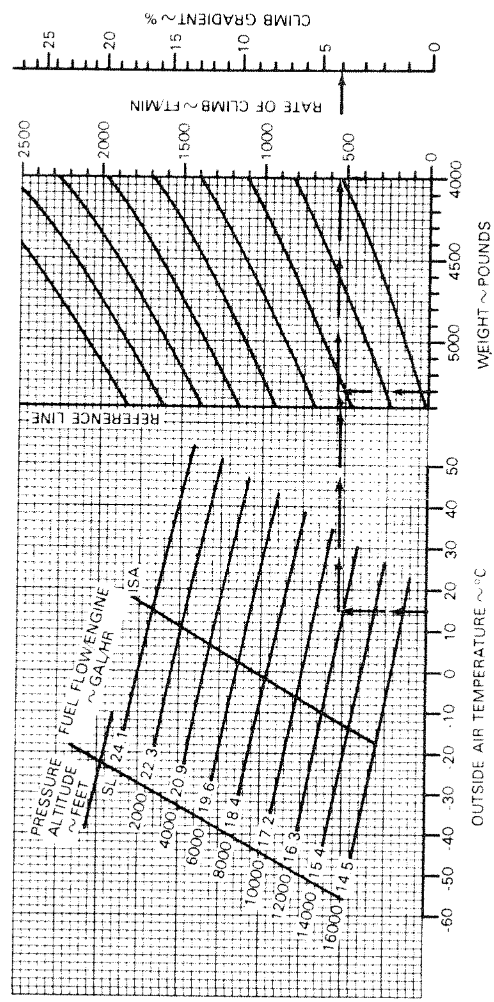

ACCELERATE - GO DISTANCE
ASSOCIATED CONDITIONS
POWER TAKE OFF POWER
FLAPS UP
LANDING GEAR RETRACT AFTER LIFT OFF
RUNWAY PAVED, LEVEL, DRY SURFACE
TAKE OFF SPEEDS (ALL WEIGHTS)
LIFT OFF 86 KTS (99 MPH)
50 FEET 94 KTS (108 MPH)
NOTES
1 DISTANCES ASSUME AN ENGINE FAILURE AT LIFT OFF AND PROPELLER IMMEDIATELY FEATHERED
2 WEIGHTS IN SHADED AREA MAY NOT PROVIDE POSITIVE ONE ENGINE INOPERATIVE CLIMB. REFER TO TAKE OFF WEIGHT GRAPH FOR MAXIMUM WEIGHT AT WHICH THE ACCELERATE-GO PROCEDURE SHOULD BE ATTEMPTED
EXAMPLE:
OAT 15°C (59°F)
PRESSURE ALTITUDE 5650 FT
TAKE OFF WEIGHT 4850 LBS
HEAD WIND COMPONENT 9.5 KTS
GROUND ROLL 1775 FT
TOTAL DISTANCE OVER 50 FT OBSTACLE 8071 FT
DISTANCE ~ FEET
6000
5000
4000
3000
2000
1000
0
REFERENCE LINE
HEAD WIND
TAIL WIND
REFERENCE LINE
PRESSURE ALTITUDE ~ FEET
ISA
10000
8000
6000
4000
2000
SL
-40
-30
-20
-10
0
10
20
30
40
50
OUTSIDE AIR TEMPERATURE ~ °C
4000
4500
5000
WEIGHT ~ POUNDS
0
10
20
30
WIND COMPONENT ~ KNOTS
0
50
OBSTACLE HEIGHT ~ FEET
58-KC-19

CLIMB - TWO ENGINE

CLIMB SPEED 104 KTS (ALL WEIGHTS)
(120 MPH)

ASSOCIATED CONDITIONS	
POWER	MAXIMUM CONTINUOUS
FLAPS	UP
LANDING GEAR	UP
COWL FLAPS	OPEN
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW

EXAMPLE	
OAT	15°C (59°F)
PRESSURE ALTITUDE	11500 FEET
WEIGHT	5352 LBS
RATE OF CLIMB	550 FPM
CLIMB GRADIENT	4%

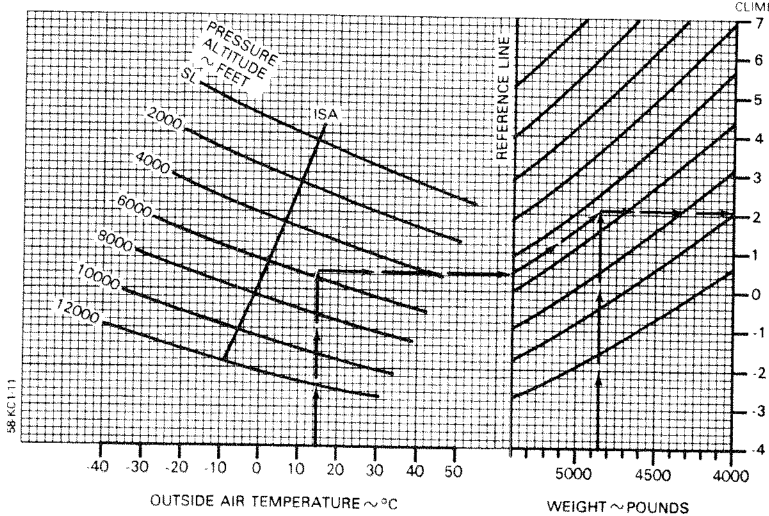


TAKE-OFF CLIMB GRADIENT - ONE ENGINE INOPERATIVE

ASSOCIATED CONDITIONS	
POWER	TAKE OFF
LANDING GEAR	UP
FLAPS	UP
INOPERATIVE PROPELLER	FEATHERED

CLIMB SPEED (ALL WEIGHTS)
94 KTS
(108 MPH)

EXAMPLE:	
OAT	15°C (59°F)
PRESSURE ALTITUDE	5650 FT
WEIGHT	4850 LBS
GRADIENT OF CLIMB	2.1%
CLIMB SPEED	94 KTS (108 MPH)



TIME, FUEL AND DISTANCE TO CLIMB

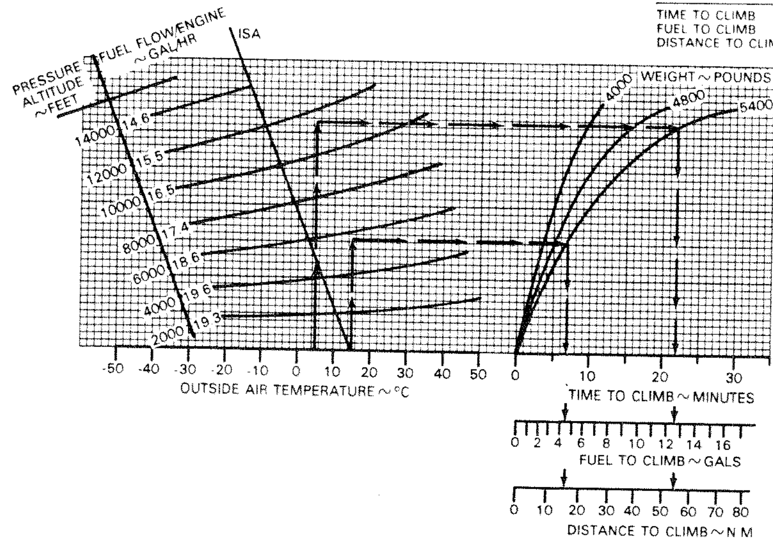
ASSOCIATED CONDITIONS

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

CLIMB SPEED 139 KTS (160 MPH)

EXAMPLE:

OAT AT TAKE-OFF	15°C (59°F)
OAT AT CRUISE	5°C (41°F)
AIRPORT PRESSURE ALTITUDE	5650 FT
CRUISE PRESSURE ALTITUDE	11500 FT
INITIAL CLIMB WEIGHT	5400 LBS
TIME TO CLIMB	(22-7) = 15 MIN
FUEL TO CLIMB	(12.7-4.7) = 8 GAL
DISTANCE TO CLIMB	(55-17) = 38 NM

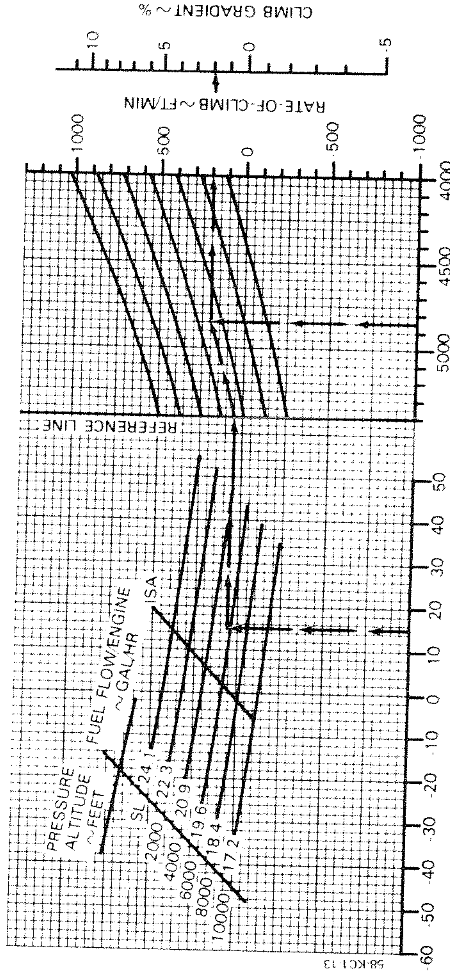


CLIMB - ONE ENGINE INOPERATIVE

CLIMB SPEED 100 KTS (ALL WEIGHTS)
(115 MPH)

ASSOCIATED CONDITIONS	
POWER	MAXIMUM CONTINUOUS
FLAPS	UP
LANDING GEAR	UP
INOPERATIVE PROPELLER	FEATHERED
COWL FLAPS	OPEN
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW

EXAMPLE	
OAT	15°C (59°F)
PRESSURE ALTITUDE	5650 FT
WEIGHT	4850 LBS
RATE OF CLIMB	200 FPM
CLIMB GRADIENT	2%



SERVICE CEILING - ONE ENGINE INOPERATIVE

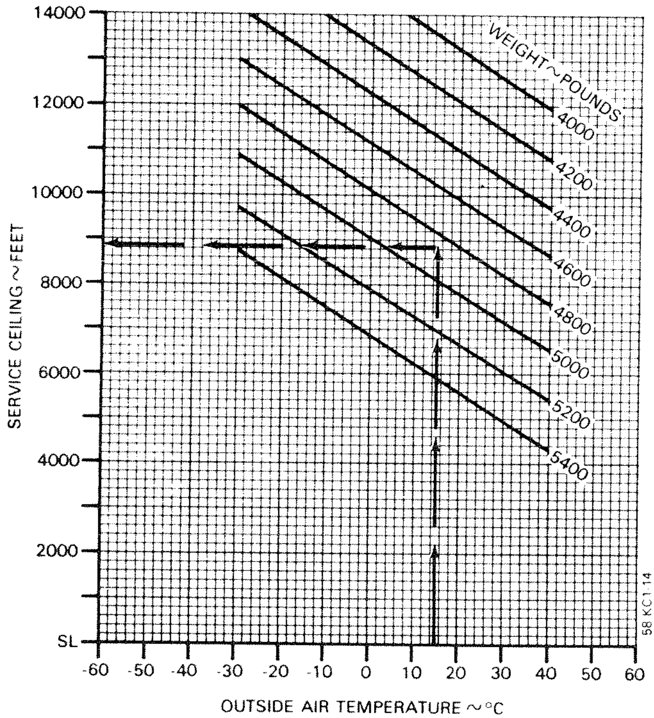
ASSOCIATED CONDITIONS

POWER	MAXIMUM CONTINUOUS
LANDING GEAR	UP
INOPERATIVE PROPELLER	FEATHERED
FLAPS	UP

EXAMPLE

OAT	15°C (59°F)
WEIGHT	4850
SERVICE CEILING	8425 FT

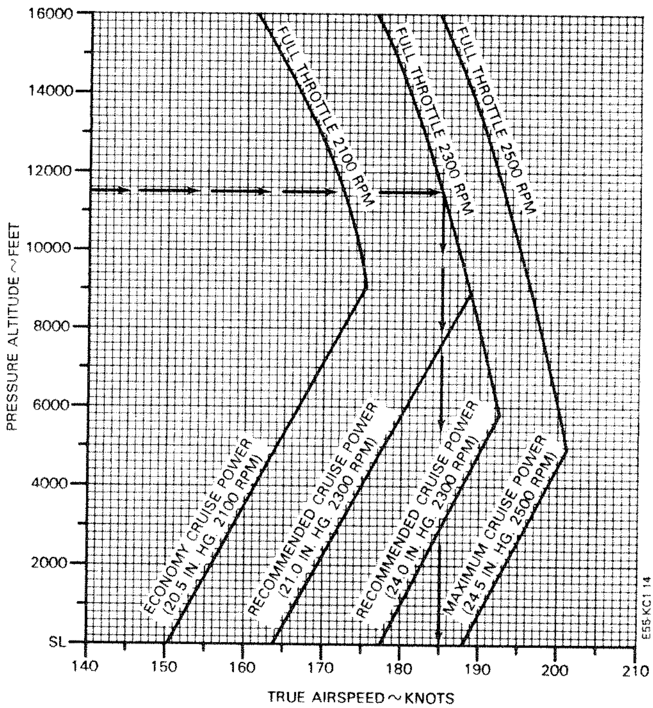
NOTE
SERVICE CEILING IS THE PRESSURE ALTITUDE WHERE AIRPLANE HAS CAPABILITY OF CLIMBING 50 FT MINUTE WITH ONE PROPELLER FEATHERED



CRUISE SPEEDS

ASSOCIATED CONDITIONS	
AVERAGE CRUISE WEIGHT	5000 LBS
TEMPERATURE	STANDARD DAY (ISA)

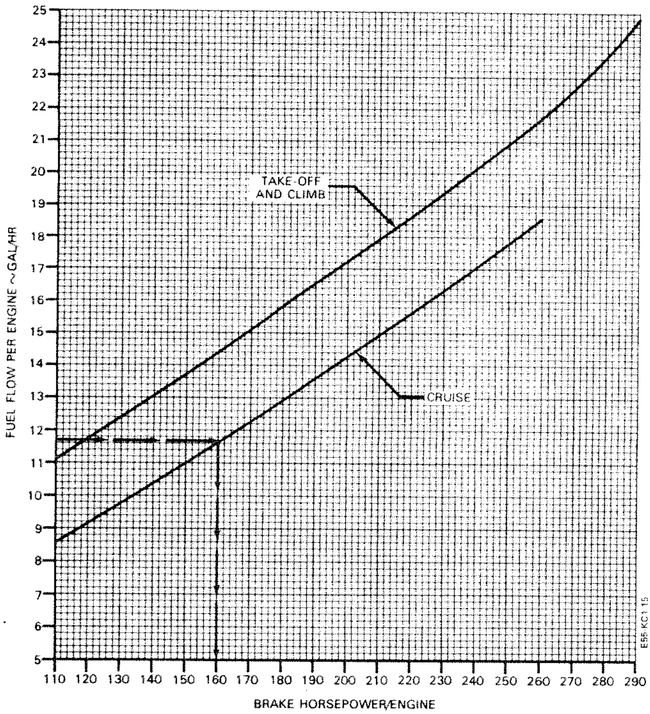
EXAMPLE	
PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
TRUE AIRSPEED	185 KTS (213 MPH)



FUEL FLOW vs BRAKE HORSEPOWER

EXAMPLE:

FUEL FLOW/ENGINE	11.7 GAL/HR
CONDITION	LEVEL FLIGHT CRUISE LEAN
BRAKE HORSEPOWER PER ENGINE	160 HP



CRUISE POWER SETTINGS
MAXIMUM CRUISE POWER
24.5 IN. HG. @ 2500 RPM (OR FULL THROTTLE) 5200 LBS.

	PRESS ALT.	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW/ ENGINE		TAS	CAS
	FEET	°F	°C	RPM	IN HG	PPH	GPH	KTS	KTS
ISA +36°F (+20°C)	SL	100	38	2500	24.5	90	14.8	189	183
	2000	95	35	2500	24.5	91	15.2	195	183
	4000	88	31	2500	24.5	93	15.5	200	182
	6000	81	27	2500	23.4	90	15.0	201	178
	8000	73	23	2500	22.0	84	14.0	199	170
	10000	66	19	2500	20.0	79	13.1	196	163
	12000	59	15	2500	18.3	73	12.2	193	155
	14000	52	11	2500	16.8	69	11.4	189	148
	16000	43	6	2500	15.5	64	10.6	185	139
STANDARD DAY (ISA)	SL	64	18	2500	24.5	93	15.4	188	188
	2000	57	14	2500	24.5	95	15.8	193	188
	4000	52	11	2500	24.5	96	16.1	199	187
	6000	45	7	2500	23.4	93	15.6	200	183
	8000	37	3	2500	22.0	87	14.5	197	176
	10000	30	−1	2500	20.0	82	13.6	195	168
	12000	23	−5	2500	18.3	76	12.7	192	161
	14000	16	−9	2500	16.8	71	11.8	189	153
	16000	7	−14	2500	15.5	66	11.0	195	145
ISA −36°F (−20°C)	SL	28	−2	2500	24.5	96	16.0	186	193
	2000	21	−6	2500	24.5	98	15.9	192	193
	4000	16	−9	2500	24.5	100	16.7	197	192
	6000	9	−13	2500	23.4	97	16.2	198	188
	8000	1	−17	2500	22.0	90	15.0	196	181
	10000	−6	−21	2500	20.0	84	14.0	194	174
	12000	−13	−25	2500	18.3	78	13.1	191	166
	14000	−20	−29	2500	16.8	73	12.2	188	158
	16000	−29	−34	2500	15.5	68	11.3	184	150

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

CRUISE POWER SETTINGS
RECOMMENDED CRUISE POWER
24.0 IN. HG. @ 2300 RPM (OR FULL THROTTLE) 5200 LBS.

	PRESS ALT.	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW/ ENGINE		TAS	CAS
	FEET	°F	°C	RPM	IN HG	PPH	GPH	KTS	KTS
ISA +36°F (+20°C)	SL	100	38	2300	24.0	78	13.0	179	173
	2000	93	34	2300	24.0	80	13.3	184	172
	4000	86	30	2300	24.0	81	13.6	189	172
	6000	81	27	2300	23.5	82	13.6	193	171
	8000	73	23	2300	21.8	76	12.7	191	164
	10000	64	18	2300	20.1	71	11.9	187	156
	12000	57	14	2300	18.5	67	11.2	185	149
	14000	50	10	2300	17.1	57	9.5	170	133
	16000	43	6	2300	15.6	54	9.1	167	126
STANDARD DAY (ISA)	SL	64	18	2300	24.0	81	13.5	178	178
	2000	57	14	2300	24.0	82	13.7	183	177
	4000	50	10	2300	24.0	84	14.1	188	177
	6000	45	7	2300	23.5	85	14.1	192	176
	8000	36	2	2300	21.8	79	13.2	190	169
	10000	28	−2	2300	20.1	74	12.3	187	161
	12000	21	−6	2300	18.5	69	11.6	184	154
	14000	14	−10	2300	17.1	59	9.9	171	139
	16000	7	−14	2300	15.6	56	9.4	169	132
ISA −36°F (−20°C)	SL	27	−3	2300	24.0	83	13.9	176	183
	2000	21	−6	2300	24.0	85	14.2	181	182
	4000	14	−10	2300	24.0	87	14.5	187	183
	6000	7	−14	2300	23.5	88	14.6	190	181
	8000	0	−18	2300	21.8	82	13.6	188	174
	10000	−8	−22	2300	20.1	76	12.7	185	166
	12000	−15	−26	2300	18.5	72	11.9	183	159
	14000	−22	−30	2300	17.1	62	10.3	171	144
	16000	−29	−34	2300	15.6	59	9.8	169	138

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

CRUISE POWER SETTINGS
RECOMMENDED CRUISE POWER
21.0 IN. HG. @ 2300 RPM (OR FULL THROTTLE) 5200 LBS.

	PRESS ALT.	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW/ ENGINE		TAS	CAS
	FEET	°F	°C	RPM	IN HG	PPH	GPH	KTS	KTS
ISA +36°F (+20°C)	SL	99	37	2300	21.0	66	10.9	164	159
	2000	93	34	2300	21.0	67	11.2	169	159
	4000	86	30	2300	21.0	70	11.6	175	160
	6000	79	26	2300	21.0	72	11.9	181	160
	8000	72	22	2300	21.0	73	12.2	187	160
	10000	64	18	2300	20.2	71	11.9	187	156
	12000	57	14	2300	18.6	67	11.2	185	149
	14000	50	10	2300	17.0	57	9.5	170	133
	16000	43	6	2300	15.7	54	9.1	167	126
STANDARD DAY (ISA)	SL	63	17	2300	21.0	68	11.3	164	164
	2000	57	14	2300	21.0	70	11.6	169	164
	4000	50	10	2300	21.0	72	12.0	175	165
	6000	93	6	2300	21.0	74	12.3	180	165
	8000	36	2	2300	21.0	76	12.7	186	165
	10000	28	−2	2300	20.2	74	12.3	187	161
	12000	21	−6	2300	18.6	69	11.6	184	154
	14000	14	−10	2300	17.0	59	9.9	171	139
	16000	7	−14	2300	15.7	56	9.4	169	132
ISA −36°F (−20°C)	SL	27	−3	2300	21.0	70	11.6	163	168
	2000	21	−6	2300	21.0	72	12.0	168	169
	4000	14	−10	2300	21.0	74	12.4	173	170
	6000	7	−14	2300	21.0	76	12.7	179	170
	8000	0	−18	2300	21.0	78	13.1	185	170
	10000	−3	−22	2300	20.2	76	12.7	185	166
	12000	−15	−26	2300	18.6	72	12.0	183	159
	14000	−22	−30	2300	17.0	62	10.3	171	144
	16000	−29	−34	2300	15.7	59	9.8	169	138

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

CRUISE POWER SETTINGS
ECONOMY CRUISE POWER
20.5 IN. HG. @ 2100 RPM (OR FULL THROTTLE) 5200 LBS.

	PRESS ALT.	OAT		ENGINE SPEED	MAN. PRESS	FUEL FLOW/ ENGINE		TAS	CAS
	FEET	°F	°C	RPM	IN HG	PPH	GPH	KTS	KTS
ISA +36°F (+20°C)	SL	99	37	2100	20.5	56	9.2	151	146
	2000	91	33	2100	20.5	57	9.5	156	146
	4000	84	29	2100	20.5	59	9.8	161	147
	6000	79	26	2100	20.5	62	10.3	167	148
	8000	72	22	2100	20.5	62	10.4	171	147
	10000	64	18	2100	20.2	62	10.4	174	144
	12000	57	14	2100	18.6	59	9.3	170	137
	14000	50	10	2100	17.0	54	9.0	165	128
	16000	43	6	2100	15.7	50	8.4	157	118
STANDARD DAY (ISA)	SL	63	17	2100	20.5	58	9.6	151	151
	2000	55	13	2100	20.5	59	9.9	156	152
	4000	48	9	2100	20.5	61	10.2	161	152
	6000	43	6	2100	20.5	64	10.6	167	153
	8000	36	2	2100	20.5	64	10.7	171	152
	10000	28	−2	2100	20.2	64	10.7	174	150
	12000	21	−6	2100	18.6	61	10.1	171	143
	14000	14	−10	2100	17.0	56	9.4	167	135
	16000	7	−14	2100	15.7	52	8.7	160	125
ISA −36°F (−20°C)	SL	27	−3	2100	20.5	60	10.0	151	156
	2000	19	−7	2100	20.5	62	10.3	156	157
	4000	12	−11	2100	20.5	63	10.6	160	157
	6000	7	−14	2100	20.5	66	10.9	166	158
	8000	0	−18	2100	20.5	66	11.1	170	157
	10000	−8	−22	2100	20.2	66	11.1	174	155
	12000	−15	−26	2100	18.6	63	10.5	171	149
	14000	−22	−30	2100	17.0	58	9.7	167	140
	16000	−29	−34	2100	15.7	54	9.0	162	132

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

RANGE PROFILE - 136 GALLONS

STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

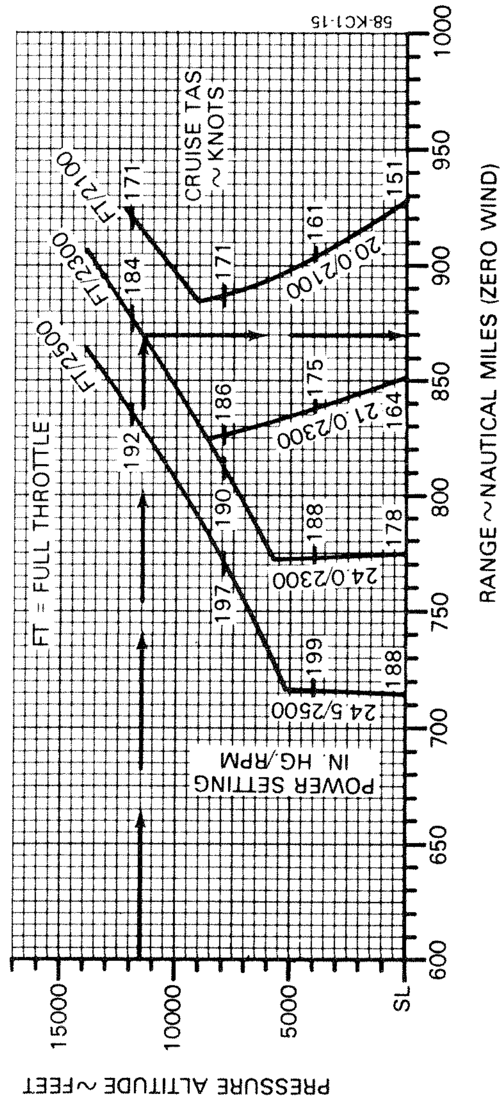
WEIGHT	5000 LBS
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	136 U.S. GALS (816 LBS)

NOTE

RANGE INCLUDES START, TAXI, CLIMB, AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE

EXAMPLE:

PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
RANGE	870 NM



ENDURANCE PROFILE - 136 GALLONS

STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

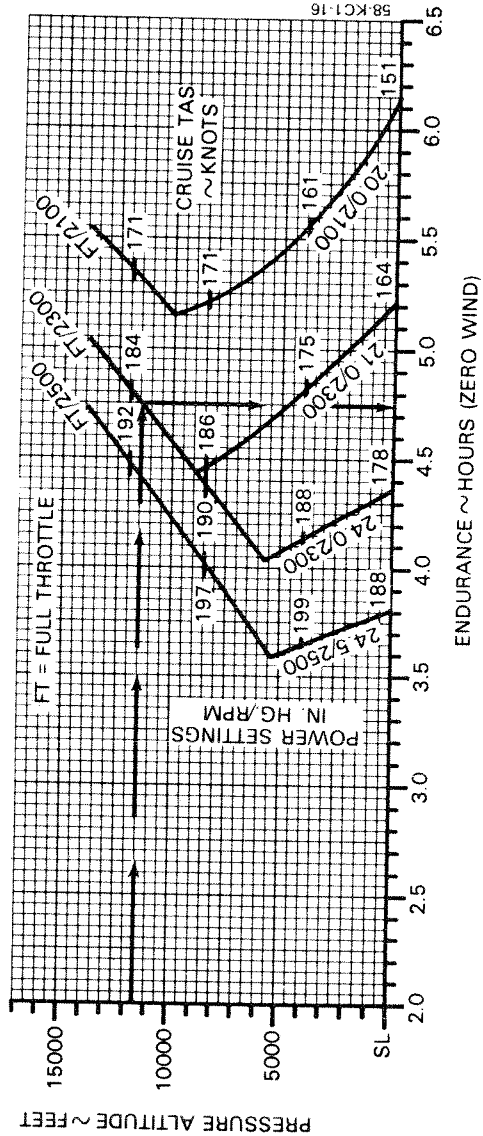
WEIGHT	5000 LBS
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	136 U.S. GALS (816 LBS)

NOTE

ENDURANCE INCLUDES START, TAXI, CLIMB AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE

EXAMPLE:

PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
ENDURANCE	4.75 HRS (4 HRS. 45 MIN)



RANGE PROFILE - 166 GALLONS

STANDARD DAY (ISA)

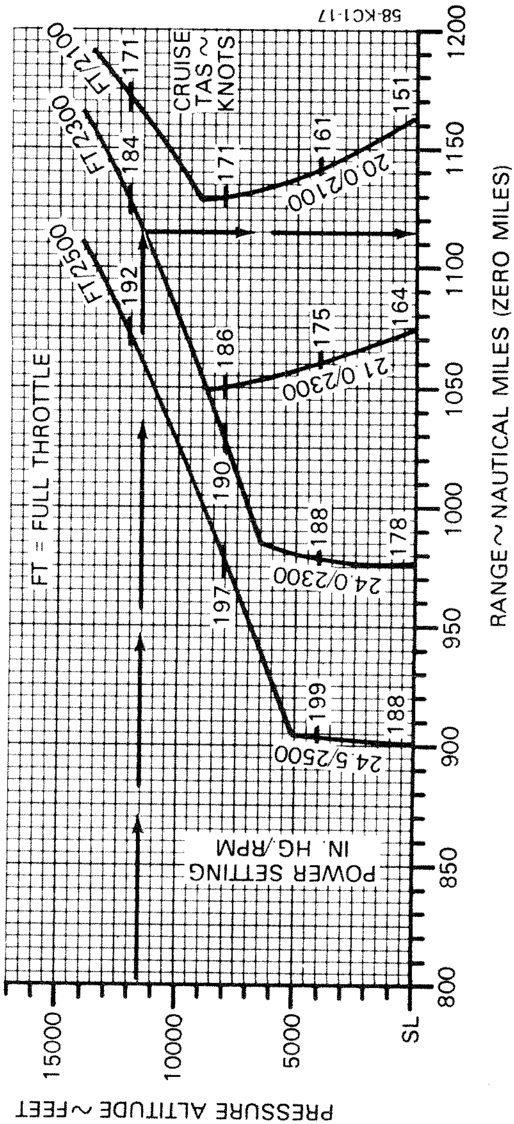
ASSOCIATED CONDITIONS:

WEIGHT	5000 LBS
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	166 U.S. GAL (996 LBS)

NOTE:
RANGE INCLUDES START, TAXI, CLIMB AND DESCENT
WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE

EXAMPLE:

PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
RANGE	1115 NM



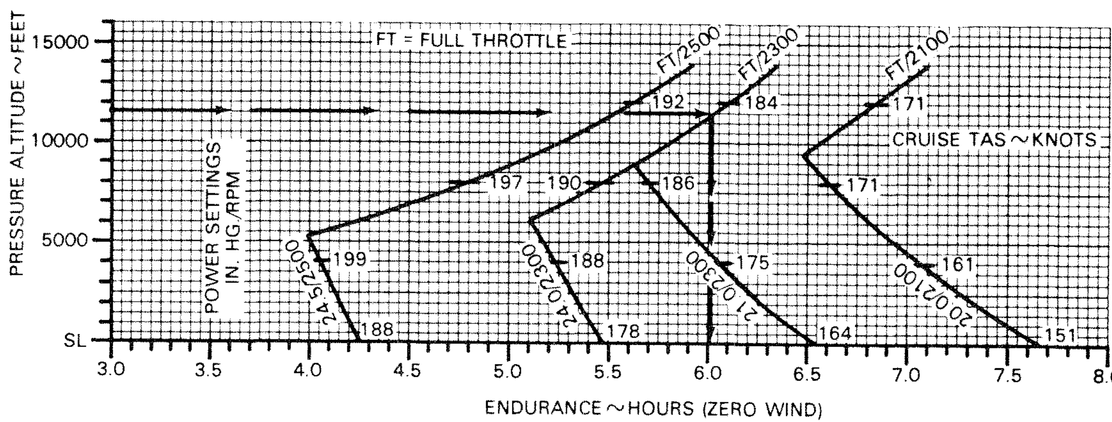
ENDURANCE PROFILE - 166 GALLONS

ASSOCIATED CONDITIONS	
WEIGHT	5000 LBS
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	166 U.S. GALS (996 LBS)

STANDARD DAY (ISA)

NOTE
ENDURANCE INCLUDES START, TAXI, CLIMB AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE

EXAMPLE:	
PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
ENDURANCE	6.0 HRS



RANGE PROFILE - 194 GALLONS

STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

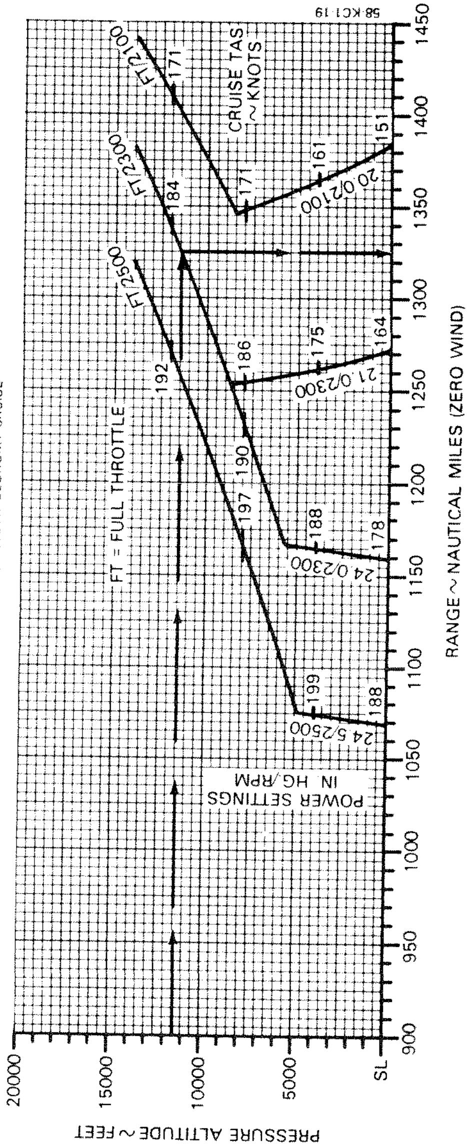
WEIGHT	5000 LBS
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	194 U.S. GAL (1164 LBS)

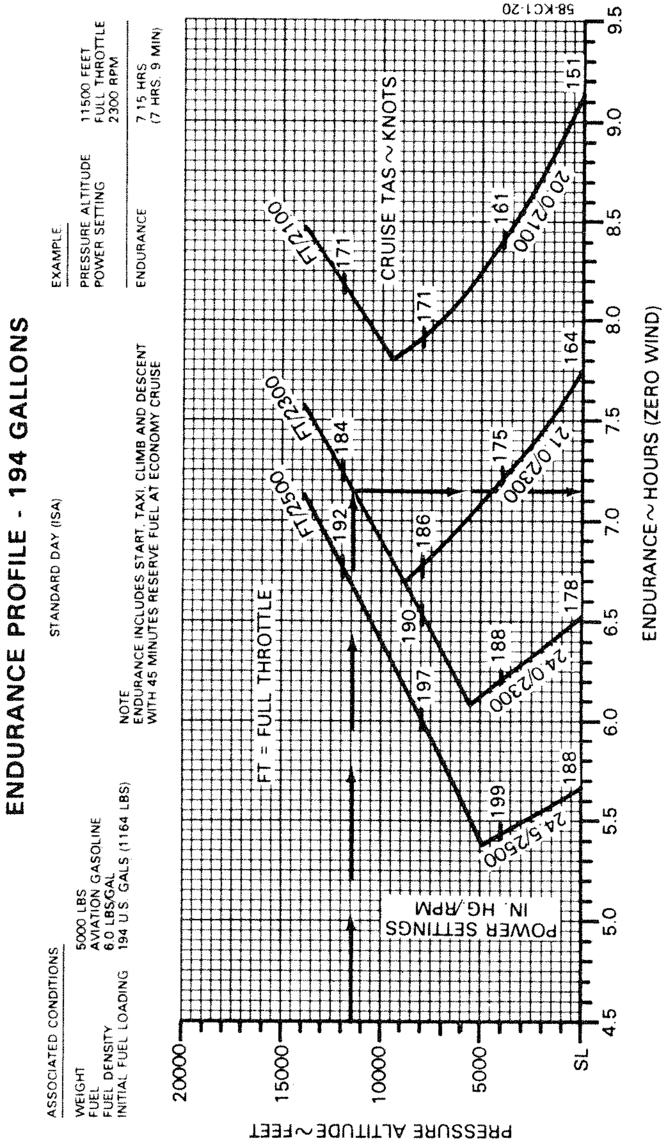
EXAMPLE:

PRESSURE ALTITUDE	11500 FEET
POWER SETTING	FULL THROTTLE 2300 RPM
RANGE	1325 NM

NOTE:

RANGE INCLUDES START, TAXI, CLIMB AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE




ENDURANCE PROFILE - 194 GALLONS
STANDARD DAY (ISA)
ASSOCIATED CONDITIONS
WEIGHT 5000 LBS
FUEL AVIATION GASOLINE
FUEL DENSITY 6.0 LBS/GAL
INITIAL FUEL LOADING 194 U.S. GALS (1164 LBS)
NOTE
ENDURANCE INCLUDES START, TAXI, CLIMB AND DESCENT WITH 45 MINUTES RESERVE FUEL AT ECONOMY CRUISE
EXAMPLE:
PRESSURE ALTITUDE 11500 FEET
POWER SETTING FULL THROTTLE 2300 RPM
ENDURANCE 7.15 HRS (7 HRS. 9 MIN)
58-KC1-20
FT = FULL THROTTLE
CRUISE TAS ~ KNOTS
POWER SETTINGS IN. HG/RPM
FT/2100
FT/2300
FT/2500
20.0/2100
21.0/2300
24.0/2300
24.5/2500
171
171
161
151
184
192
186
175
164
190
197
188
178
199
188
PRESSURE ALTITUDE ~ FEET
20000
15000
10000
5000
SL
ENDURANCE ~ HOURS (ZERO WIND)
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5

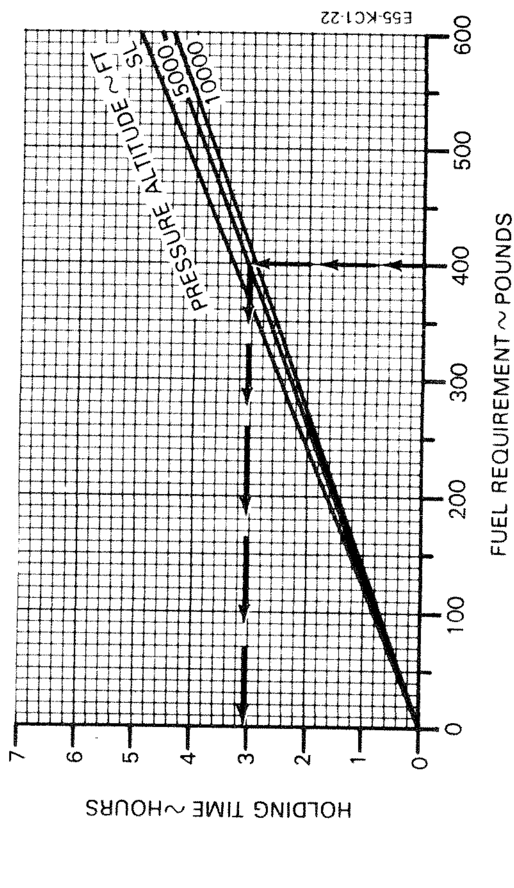
HOLDING TIME

ASSOCIATED CONDITIONS

POWER SETTING 20.5 IN. HG. OR FULL THROTTLE 2100 RPM

EXAMPLE

FUEL AVAILABLE FOR HOLDING	400 LBS
PRESSURE ALTITUDE	5000 FT
HOLDING TIME	3.1 HR



TIME, FUEL AND DISTANCE TO DESCEND

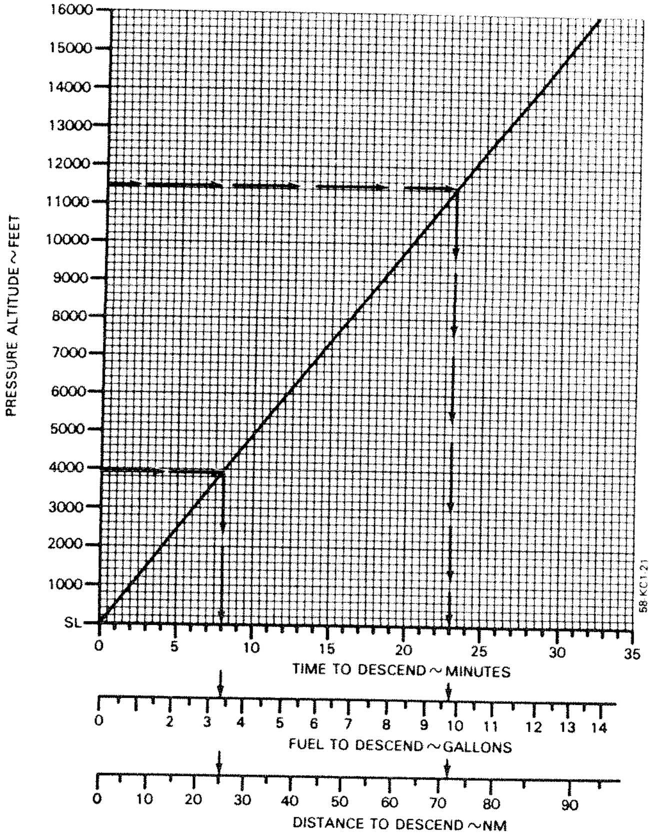
ASSOCIATED CONDITIONS:

POWER	AS REQUIRED TO MAINTAIN 500 FT/MIN RATE-OF-DESCENT
LANDING GEAR	UP
FLAPS	UP

EXAMPLE:

INITIAL ALTITUDE	11500 FT
FINAL ALTITUDE	3965 FT
TIME TO DESCEND	(23-8) = 15 MIN
FUEL TO DESCEND	(9.7-3.3) = 6.4 GAL
DISTANCE TO DESCEND	(72-25) = 47 NM

DESCENT SPEED
175 KTS
(201 MPH)



CLIMB-BALKED LANDING

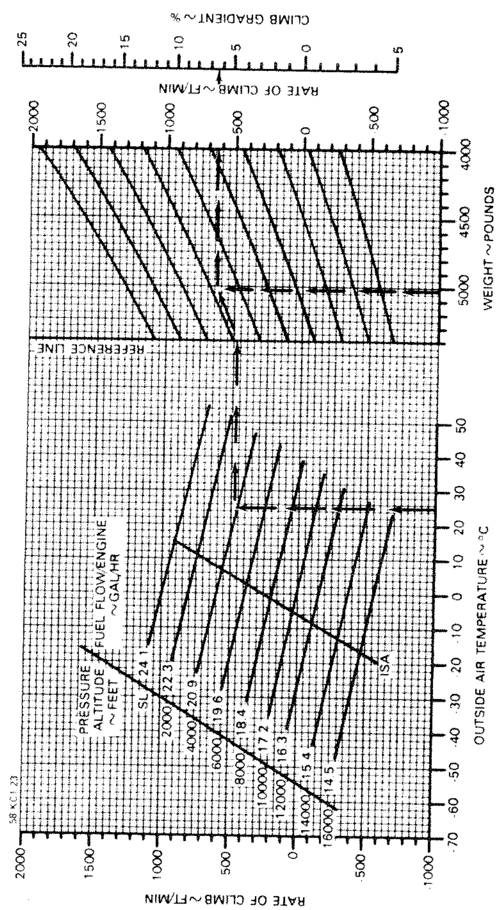
CLIMB SPEED 96 KTS (ALL WEIGHTS)
(110 MPH)

ASSOCIATED CONDITIONS:

POWER	TAKE-OFF
FLAPS	DOWN
LANDING GEAR	DOWN
MIXTURE	LEAN TO APPROPRIATE FUEL FLOW

EXAMPLE:

OAT	25°C (77°F)
PRESSURE ALTITUDE	3965 FT
WEIGHT	5039
RATE OF CLIMB	640 FT/MIN
CLIMB GRADIENT	6.5%



LANDING DISTANCE

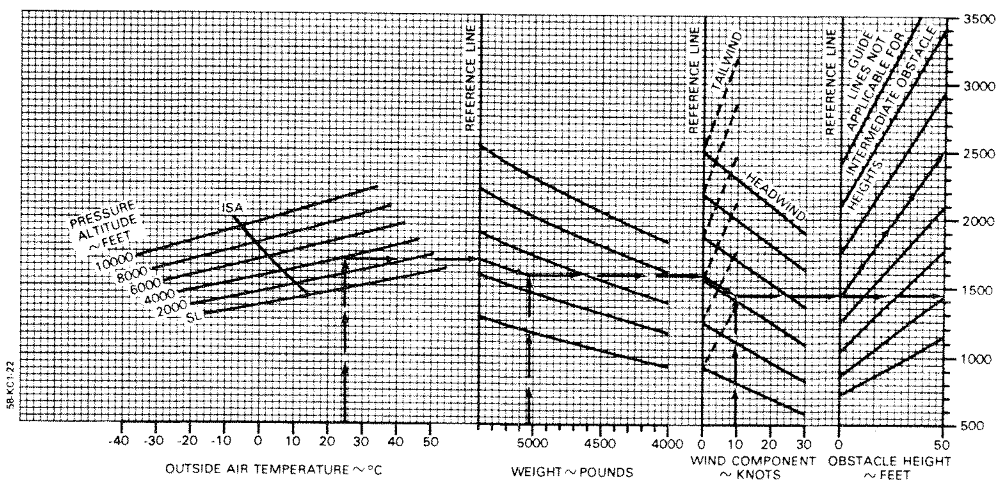
ASSOCIATED CONDITIONS

POWER	RETARDED TO MAINTAIN 800 FT/MIN ON FINAL APPROACH
FLAPS	DOWN
LANDING GEAR	DOWN
APPROACH SPEED	IAS AS TABULATED
BRAKING	MAXIMUM
RUNWAY	PAVED, LEVEL, DRY SURFACE

WEIGHT ~ POUNDS	SPEED AT 50 FT	
	KTS	MPH
5400	96	110
5000	91	105
4600	87	100
4000	81	93

EXAMPLE:

OAT	25°C (77°F)
PRESSURE ALTITUDE	3965 FT
WEIGHT	5039 LBS
WIND COMPONENT	9.5 KTS
GROUND ROLL	1450 FT
TOTAL OVER 50 FT OBSTACLE	2500 FT
APPROACH SPEED	91 KTS (105 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, 5.7 pounds of undrainable fuel remain in the airplane at Fuselage Station 81.6. The remainder of the unusable fuel to be added to a drained system is 30.3 pounds at Fuselage Station 78.5

3. Engine oil must be at the full level or completely drained. Total engine oil when full is 45 pounds at Fuselage Station 43.

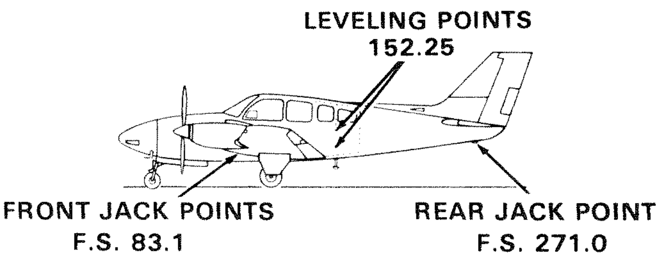
4. To determine airplane configuration at time of weighing, installed equipment is checked against the airplane equipment list or superseding forms. All installed equipment must be in its proper place during weighing.

5. The airplane must be longitudinally and laterally level with the landing gear fully extended at the time of weighing. Leveling screws are located on the left side of the fuselage at Fuselage Station 152.25 (approximately). Longitudinally level attitude is determined with a plumb bob. Laterally level attitude is accomplished by having the vertical distance, from the left and right wingtips to the floor, equal.

6. Measurement of the reaction arms for a wheel weighing is made using a steel measuring tape. Measurements are taken, with the airplane level on the scales, from the reference (a plumb bob dropped from the center of either main jack point) to the axle center line of the main gear and then to the nose wheel axle center line. The main wheel axle center line is best located by stretching a string across from one main wheel to the other. All measurements are to be taken with the tape level with the hangar floor and parallel to the fuselage center line. The locations of the wheel reactions will be approximately at Fuselage Station 96.7 for main wheels and Fuselage Station -10.3 for the nose wheel.

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

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



BASIC EMPTY WEIGHT AND BALANCE

BARON 58 ____ SER. NO. ____________ REG. NO. ____________ DATE ____________

STRUT POSITION -	**NOSE**	**MAIN**	**JACK POINT LOCATION**		**PREPARED BY**
EXTENDED	-11.6	96	FORWARD	83.1	Company ____________
COMPRESSED	-9.8	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			45	-	1935
UNUSABLE FUEL			36	79	2844
BASIC EMPTY WEIGHT					

SAMPLE

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.

WEIGHT AND BALANCE RECORD

SERIAL NO. ______ REGISTRATION NO. ______ PAGE NO. 1

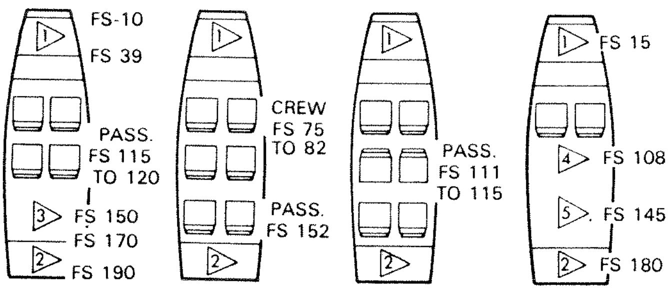
DATE	ITEM NO.		DESCRIPTION OF ARTICLE OR CHANGE	WEIGHT CHANGE ADDED (+) OR REMOVED (-)			RUNNING BASIC EMPTY WEIGHT	
	IN	OUT		WT (LBS)	ARM (IN.)	MOM/100	WT (LBS)	MOM/100

WEIGHT AND BALANCE RECORD

SERIAL NO. ______ REGISTRATION NO. ______ PAGE NO. 2

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

SEATING, BAGGAGE AND EQUIPMENT ARRANGEMENTS



NOTE

The floor structure load limit is 100 pounds per square foot, except for the area between the front and rear spars, where the floor structure load limit is 50 pounds per square foot.

1. MAXIMUM WEIGHT 300 POUNDS INCLUDING EQUIPMENT AND BAGGAGE.
2. MAXIMUM WEIGHT 120 POUNDS INCLUDING EQUIPMENT AND BAGGAGE.
3. MAXIMUM WEIGHT 400 POUNDS INCLUDING EQUIPMENT AND BAGGAGE.
4. MAXIMUM WEIGHT 200 POUNDS FORWARD OF REAR SPAR INCLUDING EQUIPMENT AND CARGO WITH 3rd and 4th SEATS REMOVED.
5. MAXIMUM WEIGHT 400 POUNDS AFT OF REAR SPAR INCLUDING EQUIPMENT AND CARGO WITH 3rd, 4th, 5th and 6th SEATS REMOVED.

ALL CARGO MUST BE SECURED WITH APPROVED CARGO RETENTION SYSTEMS.

LOADING INSTRUCTIONS

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

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

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
5400 lb. (58 max. take-off or landing)	78.0	86.0
4990 lb. (58A max. take-off or landing)	76.6	86.0
4200 lb. or less	74.0	86.0

MOMENT LIMITS vs WEIGHT (Continued)

Weight	Minimum Moment / 100	Maximum Moment / 100
3400	2516	2924
3425	2535	2946
3450	2553	2967
3475	2572	2989
3500	2590	3010
3525	2609	3032
3550	2627	3053
3575	2646	3075
3600	2664	3096
3625	2683	3118
3650	2701	3139
3675	2720	3161
3700	2738	3182
3725	2757	3204
3750	2775	3225
3775	2794	3247
3800	2812	3268
3825	2831	3290
3850	2849	3311
3875	2868	3333
3900	2886	3354
3925	2905	3376
3950	2923	3397
3975	2942	3419
4000	2960	3440
4025	2979	3462
4050	2997	3483
4075	3016	3505

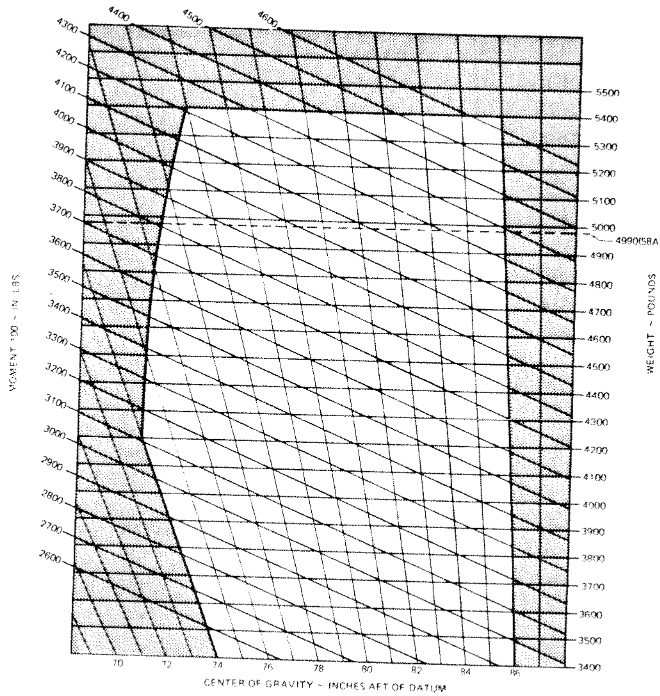
MOMENT LIMITS vs WEIGHT (Continued)

Weight	Minimum Moment / 100	Maximum Moment / 100
4100	3034	3526
4125	3053	3548
4150	3071	3569
4175	3090	3591
4200	3108	3612
4225	3130	3634
4250	3152	3655
4275	3174	3677
4300	3196	3698
4325	3218	3720
4350	3240	3741
4375	3263	3763
4400	3285	3784
4425	3308	3806
4450	3330	3827
4475	3352	3849
4500	3374	3870
4525	3398	3892
4550	3420	3913
4575	3442	3935
4600	3465	3956
4625	3488	3978
4650	3510	3999
4675	3534	4021
4700	3556	4042
4725	3579	4064
4750	3602	4085
4775	3625	4107

MOMENT LIMITS vs WEIGHT (Continued)

Weight	Minimum Moment / 100	Maximum Moment / 100
4800	3648	4128
4825	3671	4150
4850	3694	4171
4875	3717	4193
4900	3740	4214
4925	3764	4236
4950	3786	4257
4975	3810	4279
4990	3824	4291
5000	3833	4300
5025	3856	4322
5050	3880	4343
5075	3904	4365
5100	3926	4386
5125	3950	4408
5150	3974	4429
5175	3998	4451
5200	4021	4472
5225	4045	4494
5250	4068	4515
5275	4092	4537
5300	4116	4558
5325	4140	4580
5350	4164	4601
5375	4188	4622
5400	4212	4644

MOMENT LIMITS vs WEIGHT



ENVELOPE BASED ON THE FOLLOWING WEIGHT AND CENTER OF GRAVITY LIMIT DATA (LANDING GEAR DOWN)

BARON 58

WEIGHT CONDITION	FORWARD C.G. LIMIT	AFT C.G. LIMIT
5400 LBS (MAXIMUM TAKE OFF OR LANDING)	78.0	86.0
4200 LBS	74.0	86.0

BARON 58A

WEIGHT CONDITION	FORWARD C.G. LIMIT	AFT C.G. LIMIT
4990 LBS (MAXIMUM TAKE OFF OR LANDING)	76.6	86.0
4200 LBS	74.0	86.0

58 601 15

COMPUTING PROCEDURE

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

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

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

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

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

6. Subtract the weight and moment of the fuel to be used from the take-off weight and moment. (Determine the weight and moment of this fuel by subtracting the amount on board on landing from the amount on board on take-off.) The Zero Fuel Condition, the Take-Off Condition, and the Landing Condition moment must be within the minimum and maximum moments shown on the Moment Limit vs Weight table for that weight. If the total moment is less than the minimum moment allowed, useful load items must be shifted aft or forward load items reduced. If the total moment is greater than the maximum moment allowed, useful load items must be shifted forward or aft load items reduced. If the quantity or location of load items is changed, the calculations must be revised and the moments rechecked.

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

WEIGHT AND BALANCE LOADING FORM

BARON 58 DATE ____________

SERIAL NO. TH-XXXX REG NO. NXXX

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION	3517	2763
2. FRONT SEAT OCCUPANTS	340	256
3. 3rd and 4th SEAT OCCUPANTS FWD FACING	-	-
4. 3rd and 4th SEAT OCCUPANTS AFT FACING	340	378
5. 5th and 6th SEAT OCCUPANTS	170	258
6. NOSE BAGGAGE	61	9
7. AFT BAGGAGE	-	-
8. CARGO	-	-
9. SUB TOTAL ZERO FUEL CONDITION	4428	3664
10. FUEL LOADING (166 GAL)	996	824
11. SUB TOTAL RAMP CONDITION	5424	4488
12. *LESS FUEL FOR START, TAXI, AND TAKE-OFF	-24	-20
13. SUB TOTAL TAKE-OFF CONDITION	5400	4468
14. LESS FUEL TO DESTINATION (142 GAL)	-852	-712
15. LANDING CONDITION	4548	3756

SAMPLE

*Fuel for start, taxi and take-off is normally 24 lbs at an average mom/100 of 20.

WEIGHT AND BALANCE LOADING FORM

BARON ____________________ DATE ____________________

SERIAL NO. ____________________ REG NO. ____________________

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION		
2. FRONT SEAT OCCUPANTS		
3. 3rd and 4th SEAT OCCUPANTS FWD FACING		
4. 3rd and 4th SEAT OCCUPANTS AFT FACING		
5. 5th and 6th SEAT OCCUPANTS		
6. NOSE BAGGAGE		
7. AFT BAGGAGE		
8. CARGO		
9. SUB TOTAL ZERO FUEL CONDITION		
10. FUEL LOADING		
11. SUB TOTAL RAMP CONDITION		
12. *LESS FUEL FOR START, TAXI, AND TAKE-OFF		
13. SUB TOTAL TAKE-OFF CONDITION		
14. LESS FUEL TO DESTINATION		
15. LANDING CONDITION		

*Fuel for start, taxi and take-off is normally 24 lbs at an average mom/100 of 20.

USEFUL LOAD WEIGHTS AND MOMENTS
OCCUPANTS

	Front Seats		Standard Seating 3rd and 4th Fwd Facing		Club Seating 3rd and 4th Aft Facing		5th and 6th Seats
	Fwd Position	Aft Position	Fwd Position	Aft Position	Fwd Position	Aft Position	Standard or Club Seating
WEIGHT	ARM 75	ARM 82	ARM 115	ARM 120	ARM 111	ARM 115	ARM 152
	MOM/100						
100	75	82	115	120	111	115	152
110	82	90	126	132	122	126	167
120	90	98	138	144	133	138	182
130	98	106	150	156	144	150	198
140	105	114	161	168	155	161	212
150	112	123	172	180	166	172	228
160	120	131	184	192	178	184	243
170	128	139	196	204	188	196	258
180	135	148	207	216	200	207	274
190	142	156	218	228	210	218	288
200	150	164	230	240	222	230	304

NOTE: OCCUPANT POSITIONS SHOWN ARE FOR THE SEATS ADJUSTED THE MAXIMUM RANGE. INTERMEDIATE POSITIONS WILL REQUIRE INTERPOLATION OF THE MOM/100 VALUES.

BAGGAGE

Weight	NOSE COMPT ARM 15	REAR FS 131 TO 170 ARM 150	AFT FS 170 TO 190 ARM 180
	Mom/100	Mom/100	Mom/100
10	2	15	18
20	3	30	36
30	5	45	54
40	6	60	72
50	8	75	90
60	9	90	108
70	11	105	126
80	12	120	144
90	14	135	162
100	15	150	180
110	17	165	198
120	18	180	216
130	20	195	
140	21	210	
150	23	225	
160	24	240	
170	26	255	
180	27	270	
190	29	285	
200	30	300	
220	33	330	
240	37	360	
260	39	390	
280	42	420	
300	45	450	
320		480	
340		510	
360		540	
380		570	
400		600	

CARGO
FWD OF SPAR
(CENTER SEATS REMOVED)
ARM 108

Weight	Moment / 100	Weight	Moment / 100
10	11	110	119
20	22	120	130
30	32	130	140
40	43	140	151
50	54	150	162
60	65	160	173
70	76	170	184
80	86	180	194
90	97	190	205
100	108	200	216

CARGO
AFT OF SPAR
(CENTER & AFT SEATS REMOVED)
ARM 145

Weight	Moment / 100	Weight	Moment / 100
10	15	150	218
20	29	160	232
30	44	170	247
40	58	180	261
50	73	190	276
60	87	200	290
70	102	210	305
80	116	220	319
90	131	230	334
100	145	240	348
110	160	250	363
120	174	260	377
130	189	270	392
140	203	280	406

Weight	Moment/100	Weight	Moment/100
290	421	350	508
300	435	360	522
310	450	370	537
320	464	380	551
330	479	390	566
340	493	400	580

USABLE FUEL

		136 GAL	166 GAL	194 GAL
Gallons	Weight	Mom/100		
10	60	46	46	46
20	120	92	92	92
30	180	140	140	140
40	240	189	189	189
50	300	238	238	238
60	360	288	288	288
70	420	338	338	338
80	480	388	388	388
90	540	439	439	439
100	600	489	489	489
110	660	539	539	539
120	720	590	590	590
130	780	641	641	641
136	816	671		
140	840		692	692
150	900		743	743
160	960		793	793
166	996		824	
170	1020			845
180	1080			899
190	1140			953
194	1164			974

***OIL**
ARM 43

Quarts	Weight	$\frac{\text{Moment}}{100}$
24	45	19

*Included in Basic Empty Weight

SECTION VII

SYSTEMS DESCRIPTION

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SUBJECT *PAGE*

TABLE OF CONTENTS (Continued)

SUBJECT *PAGE*

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AIRFRAME

The BEECHCRAFT BARON 58 is a four to six place all-metal, low-wing, twin-engine airplane with retractable tricycle landing gear, and a conventional horizontal and vertical stabilizer.

FLIGHT CONTROLS

CONTROL SURFACES

Control surfaces are bearing supported and 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. Check for full freedom of movement after repositioning the control.

NOTE

(TH-312 thru TH-772)

> If a reduced power throttle position exists when throwing over the control column, it will be necessary to momentarily move the throttle levers forward for passage of the control column.

The optional dual control column is required for flight instruction.

RUDDER PEDALS

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

TRIM CONTROLS

Trim tabs on the rudder, left aileron, and elevator are adjustable with the controls mounted on the center console through closed cable systems. Mechanical position indicators for each of the trim tabs are integrated with their respective controls. The left aileron tab incorporates servo action in addition to its trimming purpose. Elevator trim is accomplished through either the electric or the manual pitch trim system.

ELECTRIC ELEVATOR TRIM

The electric elevator trim system is controlled by the ON-OFF switch located on the instrument panel, a thumb switch on the control wheel and a circuit breaker on the left sidewall. The ON-OFF switch must be in the ON position to operate the system. The thumb switch is moved forward for nose down, aft for nose up and when released returns to the center OFF position. When the system is not being electrically actuated, the manual trim control wheel may be used.

Incorporated in the system is an emergency release button located on the left handle grip of the pilot's control wheel. This button can be depressed to deactivate the system quickly in case of a malfunction in the system. The system will remain deactivated only while the release button is being held in the depressed position.

INSTRUMENT PANEL

FLIGHT INSTRUMENTS

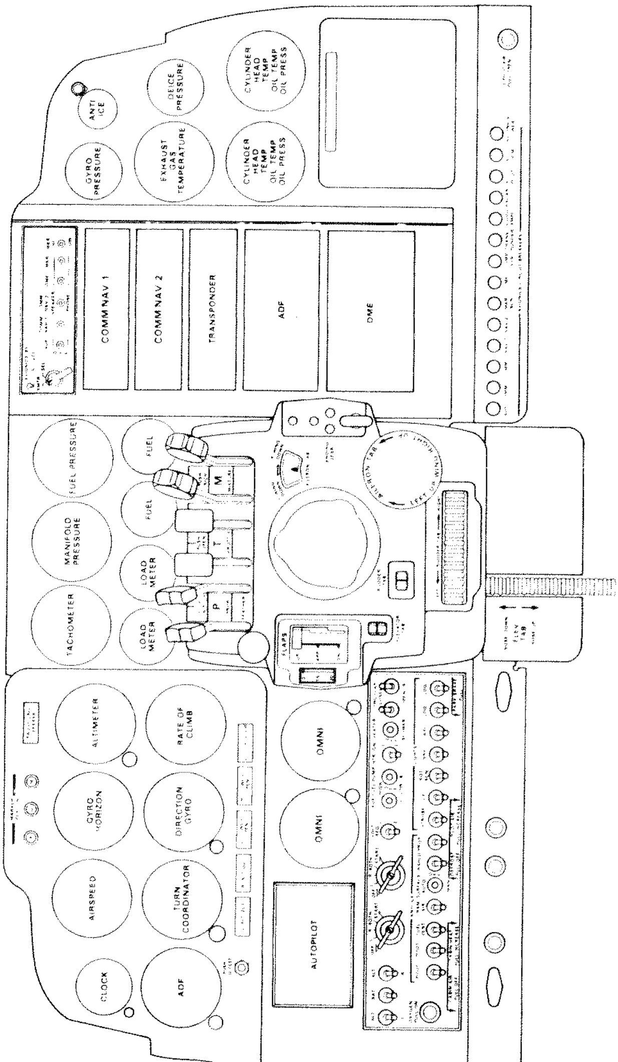
The flight instruments are located on a floating panel directly in front of the pilot's seat. Standard flight instrumentation includes attitude and directional gyros, airspeed, altimeter, vertical speed, turn coordinator, and a clock. A magnetic compass is mounted above the instrument panel and an outside air temperature indicator is located on the left side panel. Located on the right side of the instrument panel is the standard pressure gage for the instrument air system.

POWER PLANT INSTRUMENTS

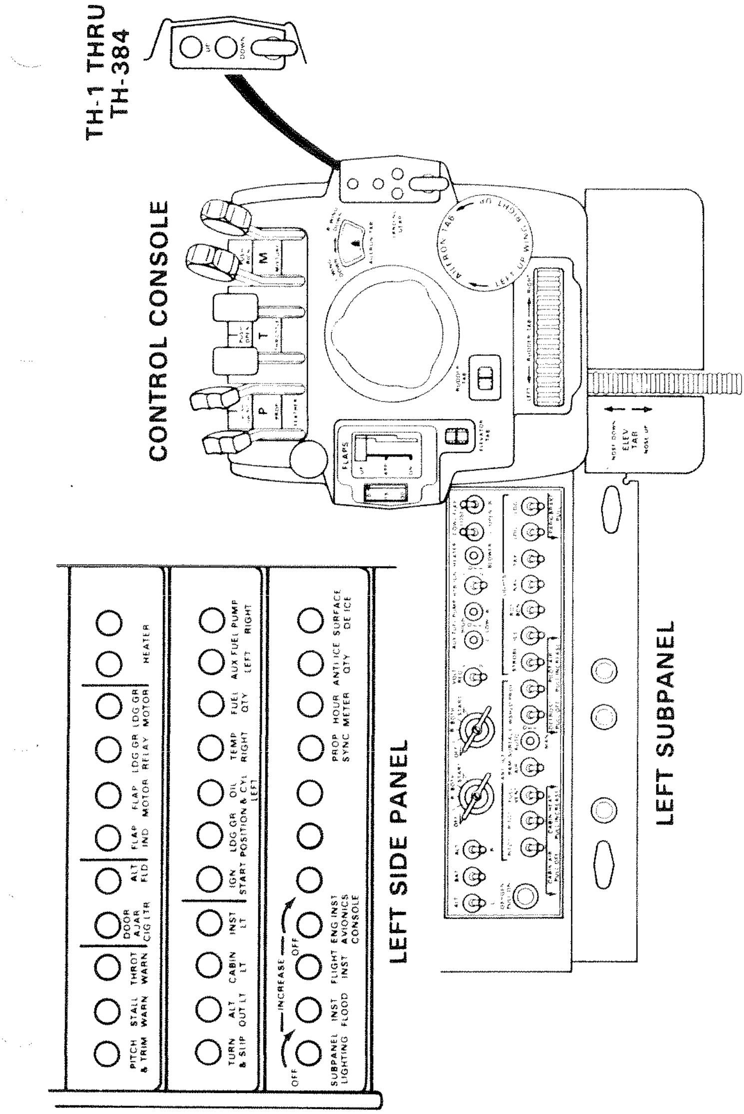
Most of the engine instruments are located in the upper center of the instrument panel. The standard indicators for each engine are as follows: tachometers, manifold pressure, fuel flow, fuel quantity, and loadmeters. Other indicators such as the exhaust gas temperature system, the propeller deice ammeter (or propeller alcohol quantity and deice pressure) are usually installed on the right side of the instrument panel. Two multi-purpose instruments, one for each engine, indicate cylinder head temperature, oil pressure, and oil temperature.

GROUND CONTROL

Spring-loaded linkage from the nose gear to the adjustable rudder pedals allows for nose wheel steering. Smooth turning is accomplished by allowing the airplane to roll while depressing the appropriate rudder pedal. The minimum wing tip turning radius, using partial braking action and differential power, is 31 feet 6 inches.



TYPICAL INSTRUMENT PANEL


TH-1 THRU
TH-384
CONTROL CONSOLE
LEFT SIDE PANEL
LEFT SUBPANEL
PITCH & TRIM
STALL WARN
THROT WARN
DOOR AJAR CIG LTR
ALT FLD
FLAP IND
FLAP MOTOR
LDG GR RELAY
LDG GR MOTOR
HEATER
TURN & SLIP
ALT OUT LT
CABIN LT
INST LT
IGN START
LDG GR POSITION & CYL
OIL LEFT
TEMP RIGHT
FUEL QTY
AUX FUEL PUMP LEFT RIGHT
OFF
INCREASE
OFF
SUBPANEL LIGHTING
INST FLOOD
FLIGHT INST
ENG INST AVIONICS CONSOLE
PROP SYNC
HOUR METER
ANTI ICE QTY
SURFACE DE ICE

WING FLAPS

The wing flaps have three positions; UP, APP (15°), and DOWN (30°), with no intermediate positions. A flap position indicator and a control switch are located on the left side of the control console. The switch must be pulled out of a detent to change the flap position. The flaps will move to either position selected from any previously selected position.

LANDING GEAR SYSTEM

CAUTION

Never taxi with a flat strut.

The landing gear is 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 gear may be electrically retracted and extended, and may be extended manually.

CONTROL SWITCH

The landing gear is controlled by a two-position switch on the right side of the control console. The switch handle must be pulled out of the safety detent before it can be moved to the opposite position. Never operate the landing gear electrically with the handcrank engaged.

CAUTION

Do not change the position of the control switch to reverse the direction of the landing gear while the gear is in transit, as this could cause damage to the retract mechanism.

POSITION INDICATORS *(TH-1 thru TH-384)*

Landing gear position lights are located above the control switch. The lights, red for gear up and green for gear down, illuminate only when the gear has reached the fully retracted or extended position. In addition, a mechanical pointer at the base of the console shows the position of the nose gear during transit and in the full up or full down position.

POSITION INDICATORS *(TH-385 thru TH-772)*

The landing gear position indicator lights are located above the landing gear switch handle. Three green lights, one for each gear, are illuminated whenever the landing gear are down and locked. The red light illuminates anytime one or all of the landing gear are in transit or in any intermediate position. All of the lights will be extinguished when the landing gear are up and locked. Pressing the warning light test button on the instrument panel will verify the landing gear lamp bulbs are illuminating. The intensity of the lamps are automatically lowered for night flights when the navigation lights are turned on.

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

If either or both throttles are retarded below an engine setting sufficient to sustain two engine flight with the landing gear retracted, a warning horn will sound intermittently. During one engine operation, the horn can be silenced by advancing the throttle of the inoperative engine until the throttle warning horn switch opens the circuit.

MANUAL EXTENSION

The landing gear can be manually extended, but not retracted, by operating the handcrank at the rear of the pilot's seat. Make certain that the landing gear handle is in the down position and pull the landing gear MOTOR circuit breaker before manually extending the gear. When the electrical system is operative, the landing gear may be checked for full down with the gear position lights, provided the landing gear RELAY circuit breaker is engaged. After the landing gear is down, disengage the handcrank. For electrical retraction of the landing gear after a practice manual extension use procedures outlined in the EMERGENCY PROCEDURES Section.

If the landing gear was extended for emergency reasons, do not move any landing gear controls or reset any switches or circuit breakers until the airplane is on the ground and the malfunction has been determined and corrected, to prevent a gear retraction on the ground. These procedures are outlined in the EMERGENCY PROCEDURES section.

BRAKES

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

CAUTION

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

The parking brake T-handle control is located just left of the elevator tab wheel on the pilot's subpanel. To set the parking brakes, pull the control out and depress the pilot's toe pedals until firm. Push the control in to release the brakes.

CAUTION

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

NOTE

Only the pilot's brake pedals can be used in conjunction with the parking brake system to set the parking brake.

The brakes hydraulic fluid reservoir is accessible through the nose baggage door. Fluid level is checked with the dipstick attached to the reservoir cap. The brakes require no adjustments, since the pistons move outward to compensate for lining wear.

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BAGGAGE/CARGO COMPARTMENTS

AFT BAGGAGE/CARGO COMPARTMENT

The aft baggage/cargo compartment is accessible through the utility door on the right side of the fuselage. This area extends aft of the pilot's seats to the rear bulkhead. Because of structural limitations, this area is divided into three sub-compartments, each having a different weight limitation. Loading within the baggage/cargo compartment must be in accordance with the data in the WEIGHT AND BALANCE Section. All baggage/cargo must be secured with the approved cargo retention systems.

WARNING

Do not carry hazardous material anywhere in the airplane.

Do not carry passengers in the baggage or cargo area unless secured in a seat.

NOSE BAGGAGE/CARGO COMPARTMENT

The forward baggage/cargo compartment is easily accessible through a large door on the right side of the nose. The door, hinged at the top, swings upward, clear of the loading area. Loading within this area must be within the limitations according to the WEIGHT AND BALANCE section. The nose baggage/cargo compartment incorporates the full width of the fuselage as usable space. This compartment also affords accessibility to the oxygen cylinder and to some of the airplane's avionics. Straps are provided and should be used to secure any baggage or cargo loaded into the nose baggage/cargo compartment.

SEATING

To adjust any of the four standard seats forward or aft, pull up on the release bar below the seat and slide the seat to the desired position. The seat backs of all standard seats can be placed in any of four positions by operating a release lever on the inboard side of each seat. An option is available that provides for the seat backs on all seats (except the pilot's) to be placed in any position from vertical to fully reclined. Outboard armrests for all standard seats are built into the cabin sidewalls. Center armrests can be elevated or positioned flush with the seat cushions. On airplanes TH-733 and after, the 3rd and 4th place chairs are equipped with a locking back to accomodate the shoulder harness, and the seat back can be folded over for access by rotating the red handle located on the lower inboard side of the seat back. The optional fifth and sixth seats can be folded up to provide additional floor space, or folded down to provide access to the optional extended baggage/cargo compartment.

Club seating is available. When occupied, aft facing chairs in the club seating arrangement must have the headrests in the fully raised position during takeoff and landing. When aft facing seats are reversed to the forward facing configuration, maintenance personnel must refer to the shop manual before making the conversion in order to assure proper installation.

SEAT BELTS AND SHOULDER HARNESSES

PRIOR TO TH-733

The optional shoulder harness installation is available for the pilot seats only. The belt is in the "Y" configuration with the single strap being contained in an inertia reel attached to the overhead canopy structure of the cockpit. The two straps are worn with one strap over each shoulder and fastened by metal loops into the seat belt buckle. The harness should be used with the seats in the upright position. The spring loading at the inertia reel keeps the harness snug but will allow normal movement required during flight operations. The inertia reel is designed with a locking device that will secure the harness in the event of sudden forward movement or an impact action.

TH-733 AND AFTER

The shoulder harness is a standard installation for all seats and must be used with the seats in the upright position. The spring loading at the inertia reel keeps the harness snug but will allow normal movement during flight operations. The inertia reel is designed with a locking device that will secure the harness in the event of sudden forward movement or an impact action.

The strap is worn over the shoulder and down across the body, where it is fastened by a metal loop into the seat belt buckle. For the pilot seats, the harness strap is contained in an inertia reel attached to the side canopy structure of the cockpit. The inertia reel is covered with an escutcheon and the strap runs up from the reel location to a looped fitting attached to the window frame just aft of the pilot seats. For the third and fourth passenger seats, the inertia reel is attached into the seat back structure and is covered with the seat back upholstery. The strap runs up the seat back and over the outboard corner of the seat back. For the fifth and sixth passenger seats, the strap is contained in an inertia reel attached to the upper fuselage side structure, just aft of the seat back and is covered with an escutcheon.

NOTE

The seat belt is independent of the shoulder harness, but the outboard seat belt and the shoulder harness must be connected for stowage when the seat is not occupied.

DOORS, WINDOWS AND EXITS

FORWARD CABIN DOOR

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

To close the cabin door from the inside, observe that the door handle is in the 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.

UTILITY DOOR

A utility door aft of the cabin door is provided for loading bulky cargo or to accommodate passengers. The utility door is a double door with each half hinged at the forward and aft edge of the door opening. The rear half of the door must be closed first. A latch on the forward edge of the door moves downward to a locked position to secure the hooks at the top and bottom of the door to the door frame. The front half of the door cannot be fully closed until the latch of the aft door is latched and flush with the edge of the door. After the forward half of the door is closed, it can be latched from the outside by rotating the half-moon shaped handle to the CLOSED position. A conventional handle on the inside of this door provides for opening or closing from the inside.

A BEECH approved kit is available to provide for operation with the cargo doors removed. A baffle is to be installed on the forward edge of the door and placards installed in the airplane. With the doors removed, assure that all registration numbers are visible on the side of the airplane. With doors removed, all occupants not wearing parachutes must wear restraining belts.

The utility door ajar warning light is tested by a PRESS-TO-TEST switch. When the switch is held in, the light is energized in order to verify that it illuminates.

OPENABLE CABIN WINDOWS

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

Close window by pulling 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

> Windows are to be closed before takeoff 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 middle 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 middle windows after compliance with BEECHCRAFT Service Instructions 1241.

CONTROL LOCKS

CONTROL COLUMN TYPE

1. Insert the spring end of the rudder control locking pin into the hole at the top of the pilot's left rudder pedal.
2. Neutralize the pedals and insert the opposite end of the locking pin into the right pedal by compressing the spring.
3. Place the elevator and aileron controls in an approximately neutral position.
4. Insert the elevator-aileron control locking pin into the hole in the control column hanger and the hole in the underside of the control column tube.
5. Close the throttles and place the throttle lock over the throttle control knobs.

To lessen the possibility of taxi or takeoff with the control lock installed, remove the locking components in the following order: rudder, throttle and elevator-aileron.

OR

THROTTLE TYPE

The control column pin assembly is placarded with the installation instructions. Install the assembly with the instructions facing the instrument panel. Placard reading CONTROLS LOCKED, REMOVE BEFORE FLIGHT will be facing pilot if properly installed.

1. Close throttles, install pin between levers, through collar lock and control column. (Rotate control wheel approximately 12° to the right.)
2. Route cable and rudder lock around right side of control column, position pedals in aft position and install lock in rudder pedals.

POWER PLANTS

The BEECHCRAFT BARON 58 is powered by two Continental IO-520-C six-cylinder, horizontally opposed, fuel injected engines rated at 285 hp at 2700 rpm.

POWER PLANT CONTROLS

PROPELLER, THROTTLE, AND MIXTURE

The control levers are grouped along the upper face of the control console. Their knobs are shaped so they can be identified by touch. A single controllable friction knob below and to the left of the control levers prevents creeping.

INDUCTION AIR

(TH-1 thru TH-384)

The induction air controls are located near the bottom of the control console. Individual control levers for each engine provide three sources of induction air: unfiltered ram, alternate, and filtered ram. The UNFILTERED RAM position is at the lower limit of lever travel and provides unfiltered ram air. Detents placarded ALTERNATE and FILTERED are located above the UNFILTERED RAM position. Moving the control to the ALTERNATE position blocks the induction system from operating on filtered or unfiltered air. This causes a spring-loaded door on the alternate air box to be sucked open and the engine draws air from the engine compartment. If the filtered ram air is blocked due to ice or foreign material against the filter, or the entire induction system is blocked at the air scoop, the spring-loaded door will suck open regardless of the position selected, providing the engine with alternate air.

Unfiltered ram air provides slightly better engine performance. However, where dusty conditions prevail, filtered air should be selected.

(TH-385 thru TH-772)

Induction air is available from filtered ram air or unfiltered alternate air. Filtered ram air enters from the intake air scoop on top of the cowling. Should the filter become obstructed, a spring-loaded door on the alternate air intake will open automatically and the induction system will operate on alternate air taken from the engine accessory section.

ENGINE ICE PROTECTION

Engine ice protection consists of electrothermal fuel vent heaters controlled by a switch on the left panel, and an automatic alternate air induction system.

The only significant ice accumulation is impact ice on the inlet scoop and filter. Should the induction air scoop or filter become clogged with ice, a spring-loaded door on the firewall will open automatically, and the induction system will operate on alternate air.

LUBRICATION SYSTEM

The engine oil system for each engine is the full pressure, wet sump type, with a full flow, integrally mounted oil filter and has a 12-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.

The oil system may be checked through access doors in the engine cowling. A calibrated dip stick attached to the filler cap indicates the oil level. Due to the canted position of the engines, the dip sticks are calibrated for either right or left engines and are not interchangeable.

The oil grades listed in the Approved Engine Oils in the SERVICING section are general recommendations only, and will vary with individual circumstances. The determining factor for choosing the correct grade of oil is the average ambient temperature.

COWL FLAPS

(TH-1 thru TH-384)

The cowl flap for each engine is controlled by a separate switch located on the pilot's subpanel to the left of the control console. The cowl flap is closed when the switch is in the up position and open when the switch is down. An amber annunciator light on the floating instrument panel illuminates when its respective cowl flap is between one third and full open.

(TH-385 thru TH-772)

The cowl flap for each engine is controlled by a manual control lever located on the lower center console. The cowl flap is closed when the lever is in the up position and open when the lever is down.

PROPELLERS

The engines are equipped with either two or three blade, full feathering, constant speed, propellers. Springs aided by counterweights move the blades to high pitch. Engine oil under governor-boosted pressure moves the blades to low pitch.

The propellers should be cycled occasionally during cold weather operation. This will help maintain warm oil in the propeller hubs so that the oil will not congeal.

HARTZELL AIR-CHARGED PROPELLER DOMES

If propeller air dome pressure is lost during flight, the following symptoms may be noticed: sluggish propeller rpm reduction; overspeed and poor synchronization during higher rpm operation; and propeller overspeed upon the instant opening of the throttle, followed by poor rpm recovery.

NOTE

In the event of pressure loss, feathering capability is lost, but flight can be continued by reducing air speed to regain rpm control. The malfunction should be corrected by an authorized service center before further flight.

PROPELLER SYNCHRONIZER

(TH-467 thru TH-772 except TH-473 and TH-474)

The propeller synchronizer automatically matches the rpm of both propellers. The system's range of authority is limited to approximately 25 rpm. Normal governor operation is unchanged but the synchronizer will continuously monitor propeller rpm and adjust one governor as required.

A magnetic pickup mounted in each propeller governor transmits electric pulses to a transistorized control box installed behind the pedestal. The control box converts any pulse rate differences into correction commands, which are transmitted to the appropriate governor.

A toggle switch installed on the pedestal turns the system on. To operate the system, synchronize the propellers in the normal manner and turn the synchronizer on. To change rpm, adjust both propeller controls at the same time. This will keep the setting within the limiting range of the system. If the synchronzer is on but unable to adjust the propeller rpm, the system has reached its range limit. Turn the synchronizer switch off, synchronize the propellers manually, and turn the synchronizer switch on.

PROPELLER SYNCHROSCOPE

A propeller synchroscope, located in the tachometer case, operates to give an indication of synchronization of propellers. If the right propeller is operating at a higher rpm than the left, the face of the synchroscope, a black and white cross pattern, spins in a clockwise rotation. Counterclockwise rotation indicates a higher rpm of the left propeller. This instrument aids the pilot in accomplishing manual synchronization of the propellers.

FUEL SYSTEM

The fuel system is an OFF-ON-CROSSFEED arrangement. The fuel selector panel, located on the floor forward of the front seats, contains the fuel selector for each engine and a schematic diagram of fuel flow.

The standard wing fuel system has a total capacity of 142 gallons. Two optional systems are available. The first has a total capacity of 172 gallons; the second, comprising the 172 gallon system plus wet wing tip tanks, provides a total capacity of 200 gallons. The fuel value placarded adjacent to each filler cap indicates fuel capacity and usable fuel when that wing fuel system is full. Refer to the LIMITATIONS section for usable fuel in each system.

A vapor return line returns excess fuel from the engine to its respective wing system. All of the fuel cells, standard or optional, in each wing are interconnected in order to make all the usable fuel in each wing available to its engine when the fuel selector valve is turned to ON. The standard 142 gallon and optional 172 gallon fuel systems are filled through a single filler located in each wing. When the wet wing tip option is installed (200 gallons total), there are two additional filler caps, one per wing. Refer to the SERVICING section for additional information.

CAUTION

> When the wet wing tip tanks are filled with fuel, DO NOT open the outboard wing leading edge filler caps, as fuel will exit from those opening.

The standard 142 gallon fuel system and the optional 172 gallon fuel system have six drain locations. There are two additional drain locations when the wet wing tip tanks are installed.

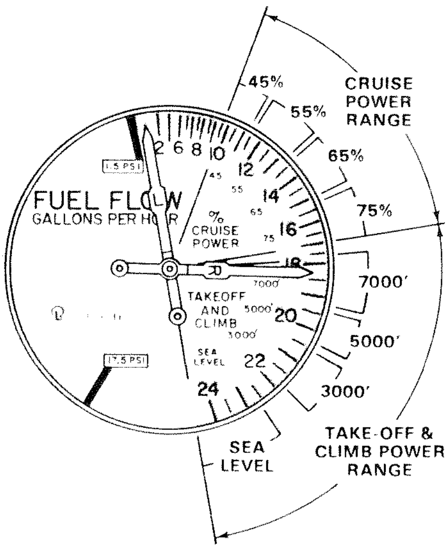
Fuel quantity is measured by float type transmitter units which transmit the common level indication to a single indicator for each respective wing system.

When the wet wing tip fuel system is installed, the fuel quantity indicators will read FULL until the fuel quantity remaining is less than 75 gallons. When this occurs, the quantity indicated is coordinated to the total usable fuel supply.

FUEL FLOW INDICATOR

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

In the cruise power range the green sectors cover the fuel flow from 45% to 75% power. The lower edge of each sector is the cruise-lean setting and the upper edge is the best power setting for that particular power range. When cruise RPM is set in accordance with cruise power setting tables in the PERFORMANCE section, these sectors provide approximate percent power information.



The takeoff and climb range is covered by green radials for climb at various altitudes. These markings represent the mixtures which should be set for the altitudes shown and correspond to fuel flow settings in the performance section.

FUEL CROSSFEED (One Engine Inoperative Only)

The fuel lines for the engines are interconnected by crossfeed lines. During normal operation each engine uses its own fuel pumps to draw fuel from its respective wing fuel system. However, on emergency crossfeed operations either engine can consume the available fuel from the opposite side.

The fuel crossfeed system is provided for use during emergency conditions. The system cannot be used to transfer fuel from one wing system to the other. The procedure for using the crossfeed system is described in the EMERGENCY PROCEDURES section.

AUXILIARY FUEL PUMPS

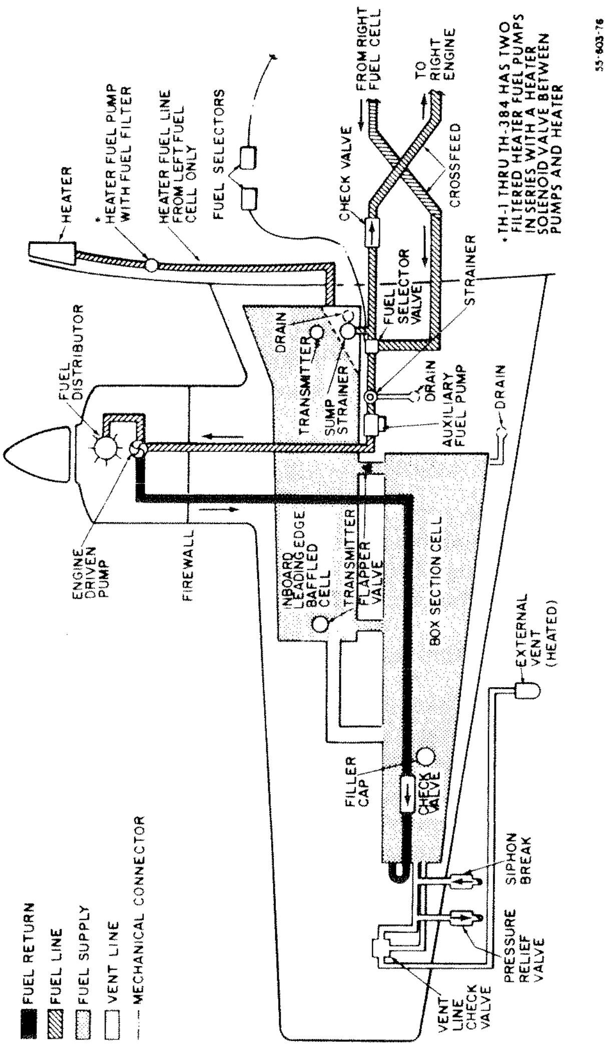
An individual two-speed electric auxiliary fuel pump is provided for each engine. HIGH pressure, OFF or LOW pressure is selected with each auxiliary fuel pump switch on the pilot's subpanel. High pressure is used for providing fuel pressure before starting, and provides near maximum engine performance, should the engine-driven pump fail. Low pressure may be used in any operating mode to eliminate pressure fluctuations resulting from high ambient temperatures and/or high altitudes. The high pressure position should not be selected while the engine is operating except in the event of engine-driven pump failure since the high pressure mode supplies a greater pressure than can be accepted by the injection system during normal operation.

PARTIAL FUEL LOADING *(TH-385 thru TH-772)*

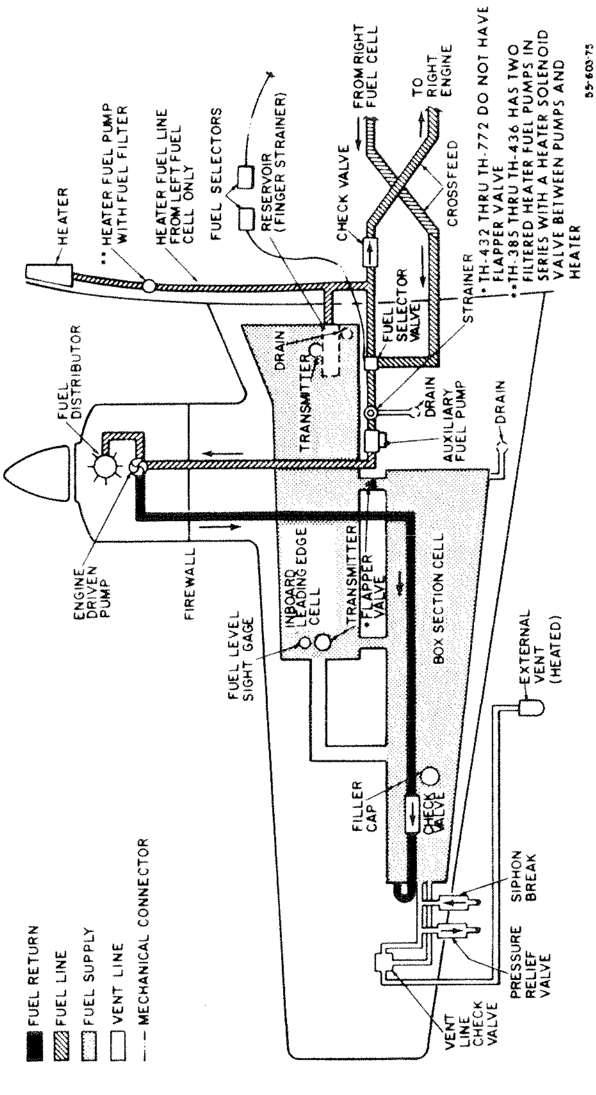
A visual fuel level sight gage in each wing leading edge, outboard of the engine nacelle, can be used for partial filling or off-loading of fuel. This gage is to be used only when it reads within the calibrated areas.

FUEL REQUIRED FOR FLIGHT

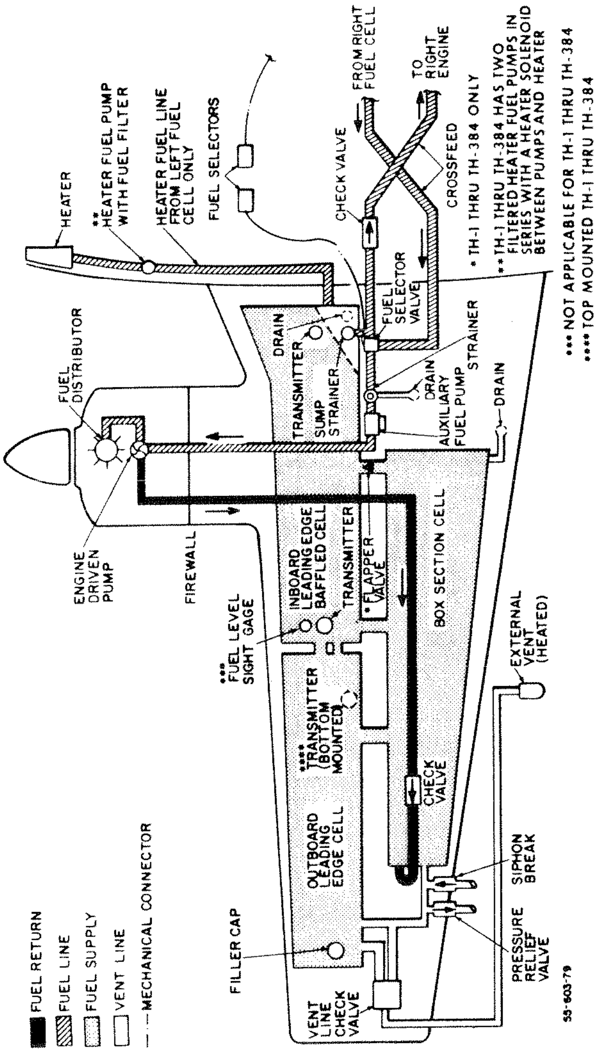
Flight planning and fuel loading is facilitated by the use of fuel quantity indicators that have been coordinated with the usable fuel supply. It is the pilot's responsibility to ascertain that the fuel quantity indicators are functioning and maintaining a reasonable degree of accuracy, and be certain of ample fuel for a flight. A minimum of 13 gallons of fuel is required in each wing system before takeoff. An inaccurate indicator could give an erroneous indication of fuel quantity. If the pilot is not sure that at least 13 gallons are in each wing system, add necessary fuel so that the amount of fuel will not be less than 13 gallons per wing system at takeoff. Plan for an ample margin of fuel for any flight.



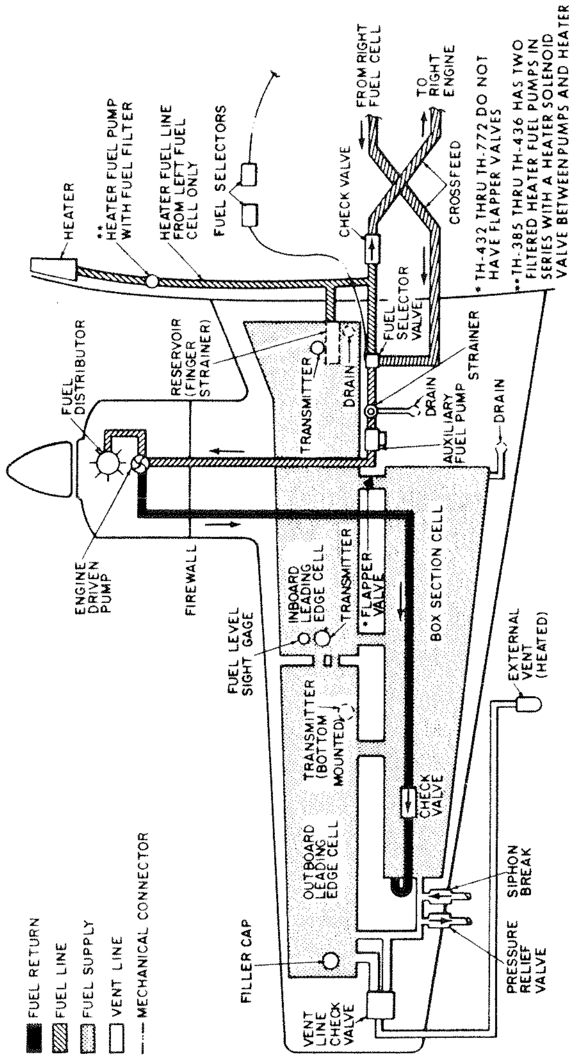
FUEL SYSTEM, 142 Gallon Capacity
(136 Gallons Usable, TH-1 thru TH-384)



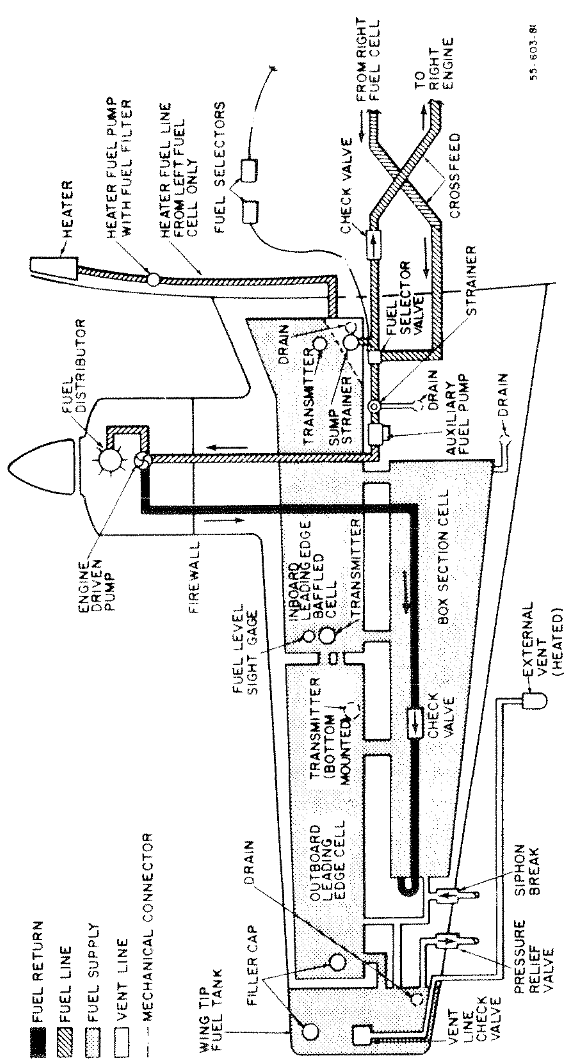
FUEL SYSTEM, 142 Gallon Capacity
(136 Gallons Usable, TH-385 thru TH-772)



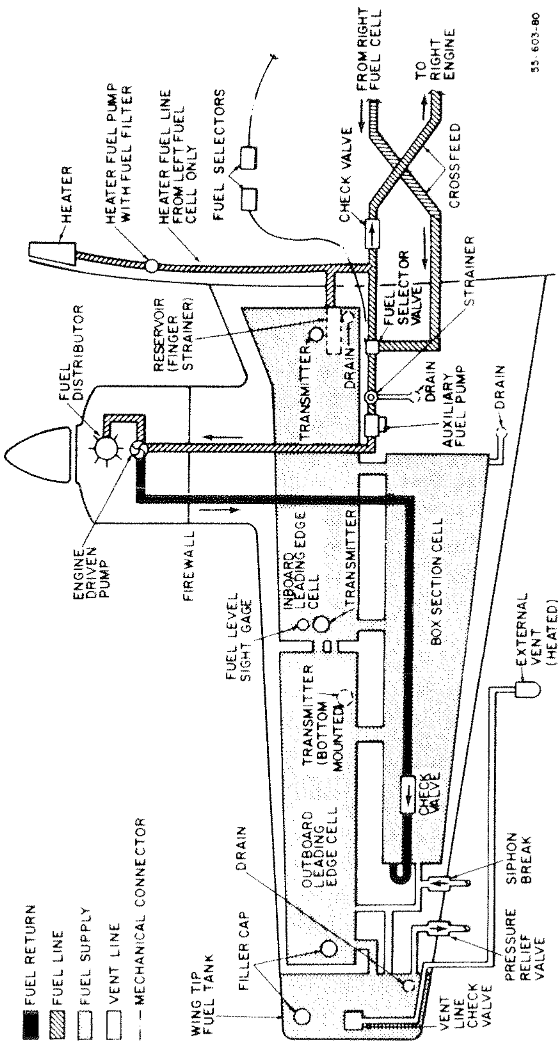
FUEL SYSTEM, 172 Gallon Capacity
(166 Gallons Usable, TH-1 thru TH-384, TH-766)



FUEL SYSTEM, 172 Gallon Capacity
(166 Gallons Usable, TH-385 thru TH-772 except TH-766)



FUEL SYSTEM, 200 Gallon Capacity
(194 Gallons Usable, TH-1 thru TH-384 and TH-766)



FUEL SYSTEM, 200 Gallon Capacity
(194 Gallons Usable, TH-385 thru TH-772 except TH-766)

ELECTRICAL SYSTEM

In general, the airplane's circuitry is the single-wire, ground return type. The battery, magneto/start, and alternator switches are located on the left subpanel. This panel contains most of the electrical system switches and switch type circuit breakers. Each is placarded as to its function. The remainder of the electrical equipment circuit breakers are located on the pilot's side panel. Avionics circuit breakers are located on the right subpanel.

BATTERY

One 17 ampere-hour, 24-volt lead acid battery is standard. Two 25 ampere-hour, 12-volt lead acid batteries, connected in series, are offered as options. The battery installation is located beneath the floor of the nose baggage compartment. Battery servicing procedures are described in the SERVICING section. The battery switch can be turned off in flight and the alternator will remain on the line.

ALTERNATORS

Two 50-ampere, 24-volt, gear-driven alternators are controlled by two transistorized voltage regulators. Only one regulator is operable in the system at any one time. The remaining regulator is used as an alternate or standby unit. When switched into the circuit, either regulator will adjust alternator output to the required electrical load, including battery recharging. Selection of the regulators is provided by a two-position selector switch on the pilot's subpanel. The alternators are protected by current limiters.

Individual alternator output is indicated by two loadmeters on the instrument panel. The loadmeters give a percentage reading of the load on the system.

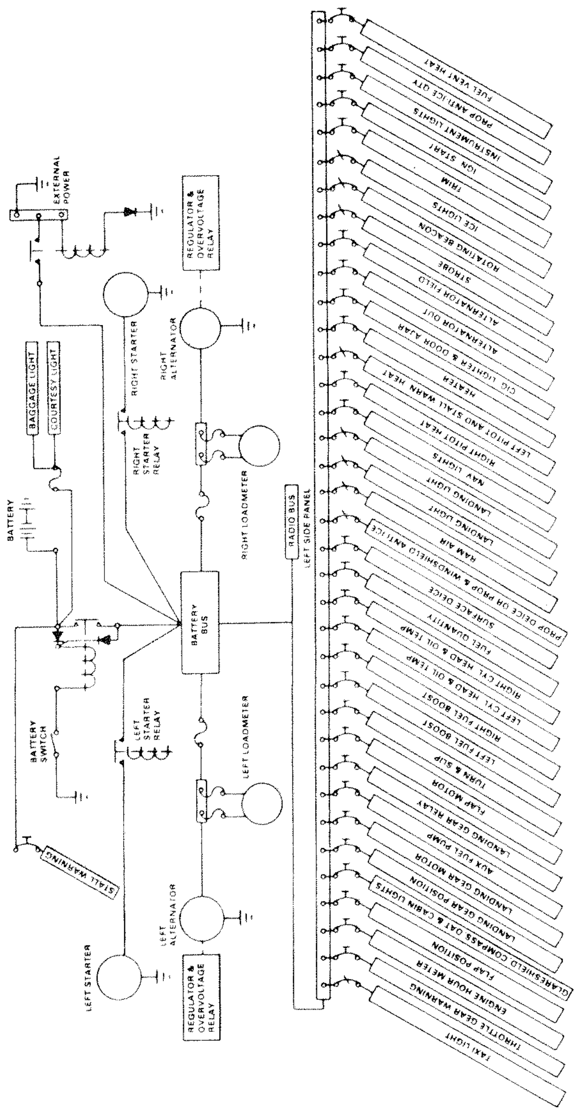
Two warning lights, placarded ALTERNATOR-L-R, located in the floating instrument panel, will illuminate whenever the respective alternator is disconnected from the bus by low voltage or an over-voltage condition or with the switch in the OFF position. Any time a failure is detected. the appropriate alternator should be turned off. These lights can be tested by the PRESS-TO-TEST - WARN LIGHT switch, located on the floating instrument panel.

STARTERS

The starters are relay-controlled and are actuated by rotary type, momentary-on switches incorporated in the magneto/start switches located on the pilot's subpanel. To energize the starter circuit, hold the magneto/start switch in the START position. After starting, release the switch to the BOTH position.

EXTERNAL POWER

The external power receptacle is located in the outboard side of the left nacelle and accepts a standard AN type plug. The power unit should be capable of delivering at least 300 amperes for starting. Before connecting an external power unit, turn the electrical systems and avionics off to avoid damage due to electrical surges. If the unit does not have a standard AN type plug, check the polarity (negative ground) and connect the positive lead from the external power unit to the center and aft post of the airplane's receptacle. The negative lead connects to the front post. When external power is connected, the battery switch should be turned on. If polarity is reversed, a diode in the coil circuit will prevent contactor operation.



POWER DISTRIBUTION SCHEMATIC

LIGHTING SYSTEM

INTERIOR LIGHTING

A courtesy light located in the door will be illuminated any time the door is in the open position. The cabin dome light is operated by an OFF-ON switch forward of the light. Individual reading lights above the standard third and fourth or the optional fifth and sixth seats are operated by switches between the air and light outlets. Four rheostat switches are located on the lower level of the circuit breaker panel. One switch adjusts the intensity of the individual instrument lights for the instruments directly above the pilot's subpanel. The second switch regulates the lighting for the avionics panel, the fuel selector panel, and the trim tab indicators. The third switch controls the intensity of the instrument lights in th glareshield. The fourth switch controls the electroluminescent lighting in the pilot's subpanel.

On aircraft with serials TH-1 thru TH-174, the magnetic compass light and the outside air temperature indicator light are controlled by a momentary PUSH-ON switch located above the outside air temperature indicator. On aircraft TH-175 thru TH-772, the switch for these lights is located on the pilot's control wheel.

EXTERIOR LIGHTING

The switches for the navigation lights, landing light(s), rotating beacons, nose gear taxi light (if installed), and wing ice light(s) are at the top of the pilot's subpanel. The two wing leading edge landing lights are operated by separate switches. With optional wing tip fuel tanks a single nose gear landing light replaces the two leading edge landing lights and the optional nose gear taxi light. For longer battery and lamp service life, use the landing light(s) only when necessary. Avoid prolonged operation, during ground maneuvering, which could cause overheating. The optional taxi light is offered for use during ground operation. At night, reflections from rotating anti-collision lights on clouds, dense haze, or dust can produce optical illusions and vertigo. The use of these lights is not advisable under instrument or limited VFR conditions.

HEATING AND VENTILATION SYSTEM

CABIN HEATING

A combustion heater in the nose supplies heated air to the cabin. Outlets are located forward of the pilot and copilot seats, at the rear of the copilot's seat, and at the rear of the right passenger seat. The fifth outlet provides heated air for windshield defrosting.

In flight, fresh ram air enters an intake on each side of the nose cone, passes through the heater, and is distributed to the cabin outlets. For ground operation, a blower maintains airflow through the system.

If a malfunction resulting in dangerously high temperatures should occur, a thermostat will trip a circuit breaker in the heater power circuit. This circuit breaker cannot be reset in flight. MAKE CERTAIN ANY MALFUNCTION CAUSING THE OVERHEAT CIRCUIT BREAKER TO TRIP IS CORRECTED BEFORE ATTEMPTING TO OPERATE THE HEATER AGAIN.

HEATER OPERATION

1. A three-position switch, placarded BLOWER, OFF, and HEATER, is located on the pilot's subpanel. To place the heating system in operation, move the switch to the HEATER position.

2. The CABIN AIR control, which regulates the amount of intake air, is below the left side of the pilot's subpanel. Push the CABIN AIR control full forward.
3. Pull out the CABIN HEAT control to the right of the CABIN AIR control to increase the temperature of the heated air. Push the CABIN HEAT control in to decrease temperature.
4. For windshield defrosting, push in the DEFROST control located to the right of the CABIN HEAT control.
5. To direct heated air onto the pilot's feet, pull out the PILOT AIR control to the right of the DEFROST control.
6. The COPILOT AIR control, identical to the PILOT AIR control, is located below the right side of the instrument panel.

HEAT REGULATION

For maximum heat, the CABIN AIR control can be pulled partially out to reduce the volume of incoming cold air and permit the heater to raise the temperature of the admitted air. However, if the CABIN AIR control is pulled out more than halfway, the heater will not operate.

The volume of air available for the pilot outlet and the copilot outlet can be divided between the two outlets as desired by adjusting each control individually.

More heated air will be available for defrosting by reducing the flow of air from the pilot outlet, copilot outlet, or both.

The PILOT AIR and COPILOT AIR controls can be used to regulate the amount of air distributed to the two rear outlets.

HEATER BLOWER

When the three-position switch on the pilot's subpanel is placed in either the HEATER position or the BLOWER position, the blower will operate if the landing gear is in the extended position and the CABIN AIR control is more than halfway in. The blower will automatically shut off if the landing gear is retracted or the CABIN AIR control is pulled out more than halfway.

CABIN VENTILATION

In flight, to provide unheated air for the same cabin outlets used for heating, push the CABIN AIR and CABIN HEAT controls forward.

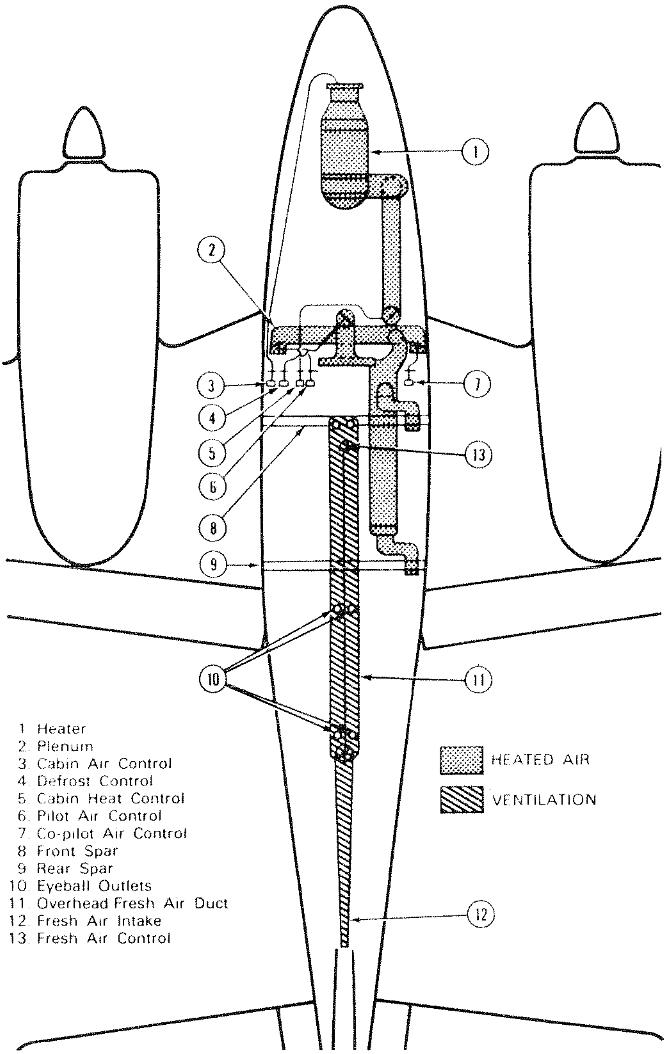
For ventilation during ground operation, push the CABIN AIR control forward and place the three position switch on the pilot's subpanel in the BLOWER position.

EXHAUST VENTS

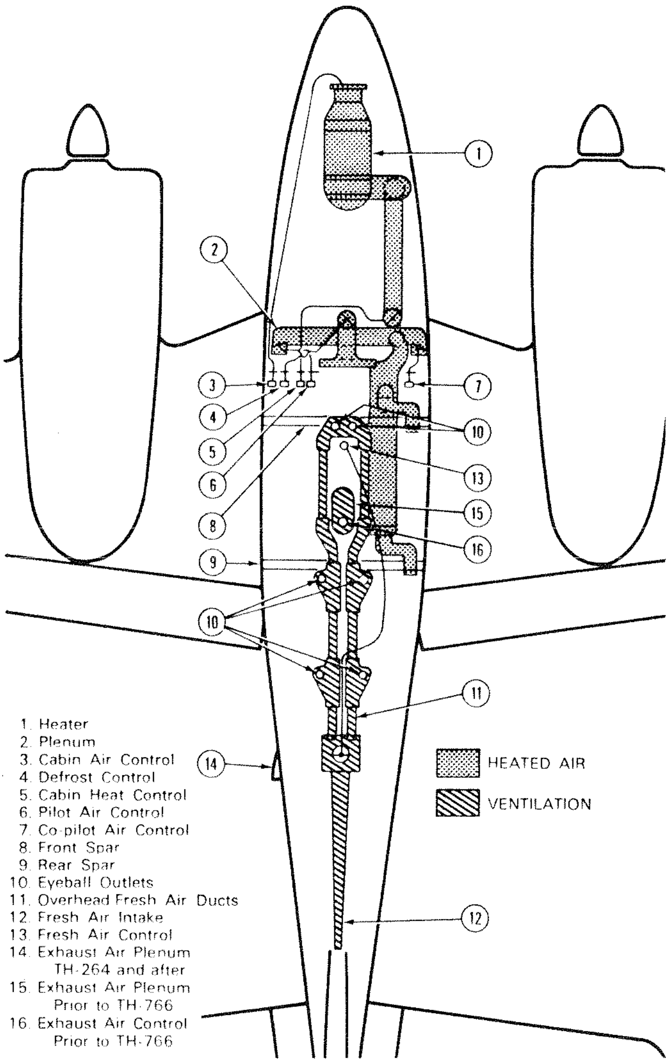
ON Serials TH-1 thru TH-765, an adjustable cabin air exhaust vent is located aft of the radio speaker in the overhead panel. The overhead vent can be closed by a control located in the overhead panel. In addition, a fixed exhaust vent is located in the aft cabin (effective TH-264 and after).

INDIVIDUAL FRESH AIR OUTLETS

Fresh ram air from the intake on the left side of the dorsal fairing is ducted to individual outlets above each seat, including the optional fifth and sixth seats. A master control in the overhead panel just aft of the front air outlets enables the pilot to adjust the amount of ram air available to all outlets. The volume of air at each outlet can be regulated by rotating the outlet. Each outlet can be positioned to direct the flow of air as desired.



ENVIRONMENTAL SCHEMATIC
(TH-1 thru TH-174)



ENVIRONMENTAL SCHEMATIC
(TH-175 thru TH-772)

OXYGEN SYSTEM

WARNING

> Proper safety measures must be employed when using oxygen, or a serious fire hazard will be created. NO SMOKING PERMITTED.

DESCRIPTION

The recommended masks are provided with the system. The masks are designed to be adjustable to fit the average person.

The oxygen cylinder is located at the aft end of the forward baggage compartment. The system is available with either four, five, or six outlets and with a 49.8 or 66 cu ft oxygen bottle.Supply of oxygen to the system is controlled by a push-pull control on the pilot's subpanel. The pressure indicator shows the supply of oxygen available (1850 psi is nominal pressure for a full supply in the cylinder).

The system regulator is altitude compensated to provide a varying flow of oxygen with altitude. Flow is varied automatically from 0.5 liters per minute at 5,000 feet to 3.5 liters per minute at 30,000 feet. The use of oxygen is recommended to be in accordance with current FAR operating rules.

PITOT AND STATIC SYSTEM

The pitot and static system provides a source of impact and static air for the operation of flight instruments.

PITOT SYSTEM

A standard pitot tube for the pilot's flight instruments is located immediately to the left of the nose gear doors. The optional pitot tube for the copilot's instrument is located to the right of the nose gear doors.

Left and right pitot heat switches, located on the pilot's left subpanel, supply heat to the left and right pitot masts respectively.

The pitot system needs no drain because of the location of the components.

STATIC SYSTEM

Static air is taken from a flush static port located on each side of the aft fuselage. The static air is routed to the rate-of-climb indicator, altimeter and airspeed indicator.

The static air line is drained at the emergency static air source by raising the lever to the emergency static air source position. Return the lever to normal position after the line is completely drained.

The alternate static air source is designed to provide a source of static pressure to the instruments from inside the fuselage should the outside static air ports become blocked. An abnormal reading of the instruments supplied with static air could indicate a restriction in the outside static air ports. A lever on the lower sidewall adjacent to the pilot, is placarded OFF NORMAL, ON EMERGENCY. When it is desired or required to use this alternate source of static air, select the ON EMERGENCY position. To recognize the need and procedures for the use of alternate static air, refer to EMERGENCY PROCEDURES. Airspeed Calibrations and Altimeter Corrections charts are in the PERFORMANCE section.

PRESSURE SYSTEM

Pressure for the flight instruments, deice boots, and autopilot (if installed) is supplied by two, engine-driven, dry, pressure pumps interconnected to form a single system. If either pump fails, check valves automatically close and the remaining pump continues to operate all gyro instruments. A pressure gage on the instrument panel indicates pressure in inches of mercury. Two red buttons on the pressure gage serve as source failure indicators, each for its respective side of the system. The pressure system incorporates two filters per engine. One is located on the rear baffle of the engine to filter intake air to the pressure pump. The other is down stream of the pump and is located aft of the firewall in the upper nacelle. This filter protects the instruments.

STALL WARNING

A stall warning horn on the cabin forward bulkhead sounds a warning signal while there is time for the pilot to correct the attitude. The horn is triggered by a sensing vane on the leading edge of the left wing and is 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.

In icing conditions, stalling airspeeds should be expected to increase due to the distortion of the wing airfoil when ice has accumulated on the airplane. For the same reason, stall warning devices tend to lose their accuracy. The sensing vane is installed on a plate that can be electrically heated, preventing ice from forming on the vane of the transducer. A switch on the pilot's subpanel, placarded PITOT HEAT, supplies power to the heated pitot mast and to the heating plate at the stall warning transducer. However, any accumulation of ice in the proximity of the stall warning vane reduces the probability of accuracy in the stall warning system whether or not the vane itself is clear of ice. For this reason, it is advisable to maintain an extra margin of airspeed above the stall speed.

ICE PROTECTION SYSTEMS

SURFACE DEICE SYSTEM

Deice boots bonded to the leading edges of the wings and the tail surfaces are operated by engine-driven pump pressure. Compressed air, after passing through the pressure regulator, goes to the distributor valve. When the deice system is not in operation, the distributor valve applies vacuum to the boots to deflate and hold the boots flat against the surface. Then, when the deice system is operated, the distributor valve changes from vacuum to pressure and the boots inflate. After the cycle is completed, the valve returns to vacuum hold down.

A three-position, spring loaded switch, with a center OFF position, a MAN (manual) down position, and an up AUTO (automatic) position, controls the system. When the switch is in the AUTO position, the deice boots inflate for a period of five to six seconds, then deflate automatically and return to the vacuum hold down position. The switch must be tripped for each complete cycle. In the MAN position the deice boots inflate as long as the switch is held in this position. When the switch is released, the boots deflate and go to the vacuum hold down condition.

Deice boots are designed to remove ice after it has accumulated, rather than prevent its formation. If the rate of ice accumulation is slow, best results are obtained by leaving the deice system off until 1/2 to 1 inch of ice accumulates. Bridging can occur if boots are actuated too early or too frequently.

The wing ice light(s), used to check for ice accumulation during night operation, illuminates the wing leading edge. The light switch is on the pilot's subpanel.

PROPELLER AND WINDSHIELD ANTI-ICE SYSTEM (FLUID FLOW)

The system is designed to prevent the formation of ice. Always place the system in operation before encountering icing conditions.

Ice is prevented from forming on the propeller blades by wetting the blade anti-ice boots with anti-icing fluid. The anti-ice pump delivers a constant flow of fluid from the supply tank to the blade boots. The pump is controlled by an ON-OFF switch located on the pilot's subpanel.

Windshield anti-ice (when installed) receives anti-ice fluid from the same source as the propeller anti-ice system. Ice is prevented from forming on the windshield by wetting the windshield surface with anti-ice fluid. This combined system is controlled by a three position switch, MOM ON-OFF-ON, located on the pilot's subpanel. The system will not function unless the propeller anti-ice pump switch is turned ON. For windshield system only, the flow is controlled by an ON-OFF switch. An indicator on the right side of the instrument panel indicates the amount of fluid in the supply tank.

With a full reservoir, system endurance is:

Windshield .... approx. 36 min.
Prop Anti-ice Only .... approx. 120 min.
Prop & Windshield .... approx. 28 min.

ELECTROTHERMAL PROPELLER DEICE (2 and 3 BLADES)

Propeller ice removal is accomplished by the electrically heated deice boots bonded to each propeller blade. The system uses the aircraft electrical power to heat portions of the deice boots in a sequence controlled by a timer. The system is controlled by an ON-OFF switch on the pilot's subpanel. When the system is turned on the ammeter will register 7 to 12 amperes on the 2 blade propeller, or 14 to 18 amperes on the 3 blade propeller. The system can be operated continuously in flight; it will function automatically until the switch is turned off. Propeller imbalance can be relieved by varying rpm. Increase rpm briefly, then return to the desired setting. Repeat if necessary.

CAUTION

> Do not operate the system with the engines inoperatve.

PITOT HEAT

Heating elements are installed in the pitot mast(s). Each heating element is controlled by an individual switch located on the pilot's subpanel. The switches are placarded PITOT HEAT - LT - RT, and should remain off during ground operations, except for testing or for short intervals of time to remove ice or snow from the mast(s).

STALL WARNING ANTI-ICE (Optional)

The mounting pad and the stall warning vane are equipped with a heating element that is activated any time the switch placarded PITOT HEAT - LT, is on.

HEATED FUEL VENTS

The fuel system vents, one located on the underside of each wing outboard of the nacelle, are provided with heating elements controlled by the FUEL VENT switch on the pilot's subpanel.

ENGINE BREAK-IN INFORMATION

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

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

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

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

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

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SECTION VIII

HANDLING, SERVICING AND MAINTENANCE

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INTRODUCTION

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

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

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

Authorized BEECHCRAFT Aero or Aviation Centers and International Distributors and 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 right side of the fuselage at the inboard end of the flap.

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
5. Wiring Diagram Manual (TH-598, TH-648 and After)

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. Continuous Care Inspection Guide.
4. See "Recommended Servicing Schedule" and Overhaul or Replacement Guide" 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.

PREVENTATIVE MAINTENANCE THAT MAY BE ACCOMPLISHED BY A CERTIFICATED PILOT

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

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

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

NOTE

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

ALTERATIONS OR REPAIRS TO AIRPLANE

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

NOTE

Alterations or repairs to the airplane must be accomplished by licensed personnel.

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 non-BEECHCRAFT approved parts.

GROUND HANDLING

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

CAUTION

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

TOWING

Attach the tow bar to the tow pin on the nose gear lower torque knee. It is recommended to have someone in the airplane to operate the brakes.

CAUTION

Do not exert force on the propellers, control surfaces, or horizontal stabilizers. When towing with a tug, limit turns to prevent damage to the nose gear. Do not attempt to tow airplane backward by the tail tiedown ring. Do not tow when the main gear is obstructed by mud or snow. Also ensure the rudder lock is removed.

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

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PARKING

The parking brake T-handle control is located just left of the elevator tab wheel on the pilot's subpanel. To set the parking brakes, pull control out and depress the pilot's toe pedals until firm. Push the control in to release the brakes.

CAUTION

Excessive pedal pressure may prevent releasing of the parking brake.

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 locks.
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

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 81-3 or later issue.

FLYABLE STORAGE - 7 TO 30 DAYS

MOORING

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

ENGINE PREPARATION FOR STORAGE

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

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

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

DURING FLYABLE STORAGE

Each seven days during flyable storage, the propellers shall be rotated by hand. After rotating each engine six revolutions, stop the propellers 60° or 120° from the position they were in.

WARNING

> Before rotation of propeller blades, ascertain magneto/start switches are OFF, throttles are in the CLOSED position, and mixture controls are in the IDLE CUT-OFF position. Always stand in the clear while turning propellers.

If at the end of 30 days, airplane will not be removed from storage, the engines 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.

ENGINES/PITOT TUBE(S)

Install cover(s).

WINDSHIELD AND WINDOWS

Close all windows and window vents.

PREPARATION FOR SERVICE

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

Preflight the airplane.

EXTERNAL POWER

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

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

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

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

CHECKING ELECTRICAL EQUIPMENT

Connect an auxiliary power unit as outlined in Starting Procedures. Ensure that the current is stabilized at 28.5 volts prior to making any electrical equipment or avionics check.

NOTE

If the external power unit has poor voltage regulation or produces voltage transients, the airplane electrical equipment connected to the unit may be damaged.

SERVICING

FUEL SYSTEM

FUEL CELLS

See Consumable Materials for recommended fuel grades.

The standard 142 gallon capacity fuel system has a fuel filler cap in each wing box section. The optional 172 gallon capacity system has a filler cap in each outboard wing leading edge. The optional 200 gallon capacity system has a filler cap in each wet wing tip and in each outboard wing leading edge.

NOTE

> To obtain the maximum capacity of the fuel system when the wet wing tips are installed, fill the fuel system from the wet wing tip tank filler caps to the bottom of the tab marked FULL.

Refer to the LIMITATIONS section for the usable fuel in each system.

CAUTION

> Caution must be taken when the wet wing tip tanks are filled with fuel. DO NOT open the outboard wing leading edge filler cap, as fuel will exit from that opening. If this occurs, wash the fuel from the wing surface to prevent possible paint damage.

Ground the airplane with a static line before refueling and secure the filler caps immediately after filling. Before letting the airplane stand for several days, it is a good practice to fill the wing fuel system to ensure that the cell inner liners do not dry out and crack, allowing fuel to diffuse through the cell walls. Also, less moisture condensation will occur when fuel cells are full. If the cells are to be drained before storage, a coating of light engine oil should be sprayed or flushed onto the inner liners of the cells as a preservative.

NOTE

The optional 200 gallon fuel system should be filled from the wing leading edge filler cap when airplane must stand for several days. Check and fill to capacity at wet wing tip filler cap before flight if required for the mission.

FUEL DRAINS

Open each of the snap-type fuel drains daily to purge any water from the system. The two sump drains extend through the bottom of each wing. The fuel strainer in each wheel well is provided with a drain extending through the wheel well skin. Two additional flush type fuel drains are located at the mid point, inboard lower surface of the wet wing tip fuel system (if installed). These tank drains should be purged daily with the drain wrench provided in the loose tools and accessories.

FUEL STRAINERS

To preclude the possibility of contaminated fuel, always cap any disconnected fuel lines or fittings. The fuel strainer in each wheel well should be inspected and cleaned with solvent at regular intervals. The frequency of inspection and cleaning will depend upon service conditions, fuel handling cleanliness, and local sand and dust conditions. At each 100-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. On serials TH-1 thru TH-384 and TH-766, a leading edge sump strainer, accessible through an access door on the bottom of the wing, should be cleaned periodically.

OIL SYSTEM

The engines are equipped with a wet sump, pressure type oil system. Each engine sump has a capacity of 12 quarts. The oil system may be checked through access doors in the engine cowling. A calibrated dipstick attached to the filler cap indicates the oil level. Due to the canted position of the engines, the dipsticks are calibrated for either right or left engines and are not interchangeable.

The oil and oil filter should be changed every 100 hours under normal operating conditions. The oil drain is accessible through the cowl flap opening. The engines should be warmed to operating temperature to assure complete draining of the oil.

1. Remove the cowling plug button below the aft inboard corner of the oil sump.
2. Open the oil drain valve.
3. Remove the oil filter and replace with a new unit. A torque of 18 to 20 foot-pounds should be applied to the nut of the oil filter.
4. Close oil drain valve and fill with oil.

Moisture that may have condensed and settled in the oil sump should be drained occasionally by opening the oil drain plug and allowing a small amount of oil to escape. This is particularly important in winter, when the moisture will collect rapidly and may freeze.

In order to promote faster ring seating and oil control, a straight mineral oil should be used for the first change period or until oil consumption stabilizes. The engine manufacturer recommends the use of ashless dispersant oils. Dispersant oils must meet the latest revision of Teledyne Continental Motors Corporation Specification MHS-24.

Aviation Grade Oil	Average Ambient Air Temperature
SAE 50	Above 5°C (40°F)
SAE 30	Below 5°C (40°F)

BATTERY

The battery is accessible by opening the forward baggage compartment door and removing the battery box cover from the floor of the compartment. Check the electrolyte level after each 25 hours of operation and add distilled water as necessary. Avoid filling over the baffles and never fill over the split ring or more than one-quarter inch over the separator tops.

Excessive water consumption may be an indication that the voltage regulators require 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 hose connections at the battery box should be checked frequently for obstructions.

TIRES

An inflation pressure of 52 to 56 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 55-60 psi. Maintaining recommended tire inflation will minimize tread wear and aid in preventing tire failure caused from running over sharp stones and ruts. When inflating tires, visually inspect them for cracks, breaks, or evidence of internal damage.

CAUTION

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

CAUTION

DO NOT taxi with a flat shock strut.

The shock struts are filled with compressed air and hydraulic fluid. The same procedure is used for servicing both the main and the nose gear shock struts. To service a strut, proceed as follows:

1. Jack the airplane, remove the air valve cap, depress the valve core, and allow the strut to fully deflate.

WARNING

Do not unscrew the valve body assembly until all air pressure has been released or it may be blown off with considerable force, causing injury to personnel or damage to equipment.

2. Carefully remove the valve body assembly.

3. Compress the strut and fill through the air valve assembly hole with hydraulic fluid (approximately one pint) until the fluid overflows.

4. Cycle the strut from full extension to compressed and refill. Repeat until no more fluid can be added to the strut in the compressed position.

NOTE

Cycling of the shock strut is necessary to expel any trapped air within the strut housing.

5. Install the air valve assembly.

6. With the airplane resting on the ground and the fuel cells full, inflate the nose gear strut until 3-1/2 to 3-3/4 inches of the piston are exposed and inflate the main gear struts until 3 inches of the piston are exposed. Rock the airplane gently to prevent possible binding of the piston in the barrel while inflating.

NOTE

It is recommended that the nose strut inflation dimension and the tire inflation pressures be carefully adhered to. Properly inflated tires and struts reduce the possibility of ground damage occurring to the propellers. Exercise caution when taxiing over rough surfaces.

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

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.

SHIMMY DAMPER

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

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

NOTE

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

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

BRAKES

The brake hydraulic fluid reservoir is accessible through the nose baggage 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. The brake linings should be replaced before the metal back plate is exposed through the abrasive surface. The minimum allowable thickness for the abrasive surface is .010 inch. The brake disc should be replaced when its thickness measures .330 inch.

INDUCTION AIR FILTERS

The filters 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 access plate in the top of the engine cowling.
2. Remove the filter and clean as noted by the manufacturer's instructions.
3. Reinstall the filter and the plate.

PROPELLERS

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

Propeller operation, servicing, and maintenance instructions are contained in the propeller owner's manual furnished with the airplane.

WARNING

When servicing 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.

Hartzell propeller
air pressure settings:

	± 2
70° to 100°F	66 psi
40° to 70°F	62 psi
0° to 40°F	58 psi
-30° to 0°F	53 psi

PROPELLER AND WINDSHIELD ANTI-ICE TANK (FLUID)

The tank is located beneath the floor on the left side of the forward baggage compartment. The filler cap is accessible through an access door in the floor of the compartment. Capacity is 3 U.S. gallons of anti-ice fluid (see Consumable Materials). The tank should be drained and flushed twice a year.

OXYGEN SYSTEM

WARNING

Keep hands, tools, clothing, and oxygen equipment clean and free from grease and oil. KEEP FIRE AWAY FROM OXYGEN.

1. Read the pressure indicator on the oxygen console. (The shutoff valve on the oxygen cylinder must be open.) If the oxygen cylinder is equipped with a gage, system pressure may be checked at the cylinder.

CAUTION

Always open the cylinder shutoff valve slowly to prevent damage to the system.

2. Make certain that the oxygen control valve is closed (PUSH IN).
3. Close the cylinder shutoff valve, remove the cap from the filler valve, and attach the recharging outlet. Open valve on supply bottle.
4. Open the cylinder shutoff valve and fill the cylinder to 1800 ± 50 psi (add 3.5 psi per degree above 70°F; subtract 3.5 psi per degree below 70°F).
5. Close the cylinder shutoff valve, close valve on the supply bottle, remove the recharging outlet, and replace the filler valve cap.
6. Reopen the cylinder shutoff valve to prepare system for use.

OXYGEN CYLINDER RETESTING

Light weight cylinders, stamped "3HT" on the plate on the side, must be hydrostatically tested every three years and the test date stamped on the cylinder. This bottle has a service life of 4,380 pressurizations or twenty-four years, whichever occurs first, and then must be discarded.

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.

HEATING AND VENTILATING SYSTEM

On Serials TH-1 thru TH-175 a fuel filter is installed in the nose wheel well next to the heater fuel pump and filters foreign matter from the fuel. The strainer is equipped with a snap-type drain and should be drained daily during cold weather to remove accumulated moisture which, if allowed to freeze, could cause heater malfunction.

On Serials TH-176 thru TH-772 a heater fuel pump filter is not installed. After each 100 hours of airplane operation, remove the heater fuel pump strainer by turning the base of the pump counterclockwise. Wash the strainer in clean unleaded gasoline and dry with compressed air.

The iris valve at the heater blower inlet should be lubricated occasionally with molybdenum disulfide (see Consumable Materials). The valve should never be lubricated with oil or any liquid lubricant which would collect dust.

Do not reset the overheat circuit breaker until a thorough inspection of the system has determined the cause and the malfunction has been corrected.

ALTERNATORS

Since the alternator 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 alternator 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.
4. Do not operate an alternator on open circuit. Be sure all circuit connections are secure.
5. Do not short across or ground any of the terminals on the alternator or voltage regulator.
6. Do not attempt to polarize an alternator.

MAGNETOS

Ordinarily, the magnetos will require only occasional adjustment, lubrication, and breaker point replacement. This work should be done by an authorized 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. Otherwise, all spark plug leads should be disconnected or the cable outlet plate on the rear of the magneto should be removed.

CLEANING

EXTERIOR PAINTED SURFACES

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 relubricate as necessary.

LANDING GEAR

After operation on salty or muddy runways wash the main and nose landing gears with low-pressure water and a mild detergent as soon as practical. Rinse with clear water and blow dry with low-pressure air immediately after rinsing. Relubricate as necessary.

WINDSHIELD AND WINDOWS

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

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

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

SURFACE DEICE BOOTS

The surfaces of the deice boots should be checked for indication of engine oil after servicing and at the end of each flight. Any oil spots that are found should be removed with a non-detergent soap and water solution. Care should be exercised during cleaning. Avoid scrubbing the surface of the boots as this will tend to remove the special graphite surfacing. The deice boots are made of soft, flexible stock which may be damaged if gasoline hoses are dragged over the surface of the boots or if ladders and platforms are rested against them.

ENGINE

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

CAUTION

Do not use solutions which may attack rubber or plastic. Protect engine switches, controls, and seals; fluid applied at high pressure can unseat seals, resulting in contamination of the sealed systems.

INTERIOR

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

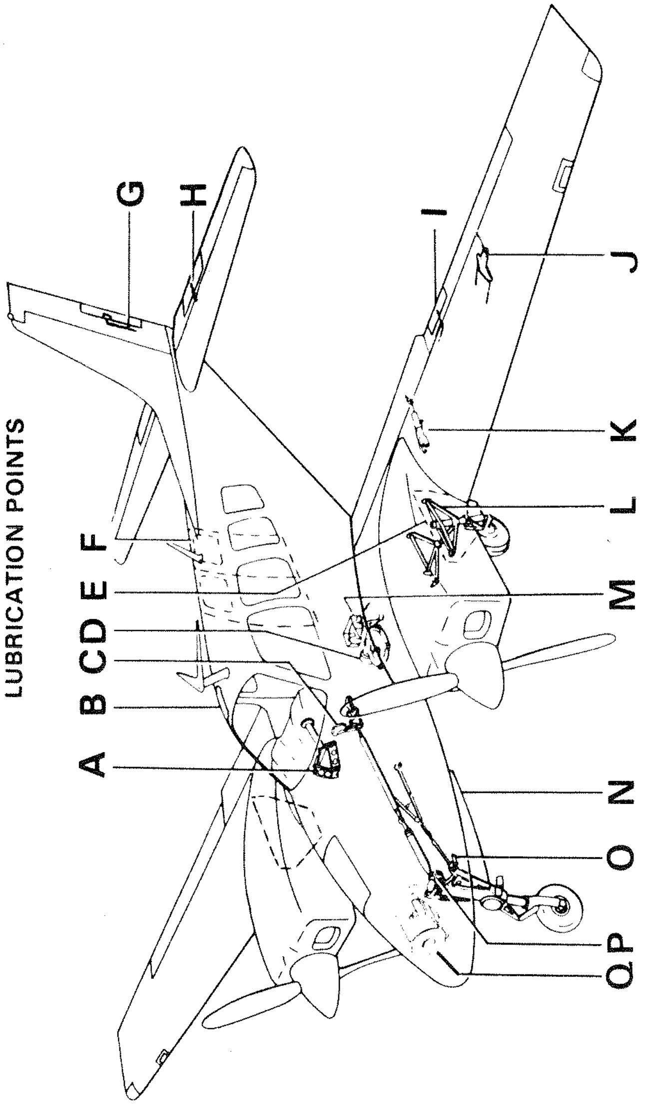
Blot up any spilled liquid promptly wth cleansing tissue or rags. Do not pat the spot; press the blotting material firmly and hold it for several seconds. Continue blotting until no more liquid is taken up. Scrape off sticky materials with a dull knife; then spot-clean the area.

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

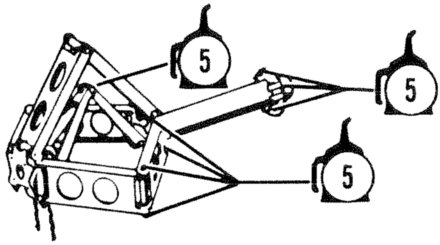
Soiled upholstery and carpet may be cleaned with foam-type detergent used according to the manufacturer's instructions. To minimize wetting the fabric, keep the foam as dry as possible and remove it with a vacuum cleaner.

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

LUBRICATION POINTS

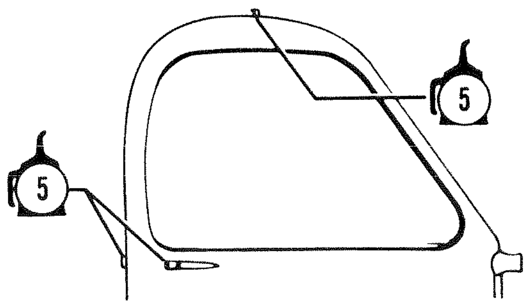


A



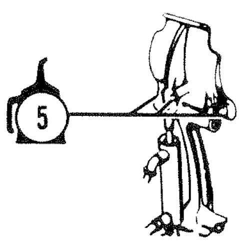
CONTROL COLUMN LINKAGE

B



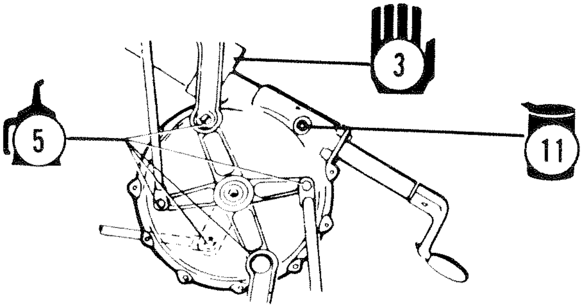
CABIN DOOR

C



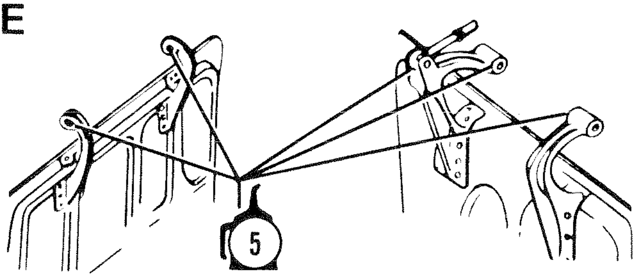
RUDDER PEDALS

D



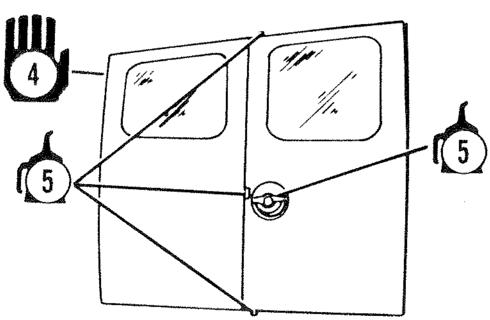
LANDING GEAR ACTUATOR GEAR BOX

E



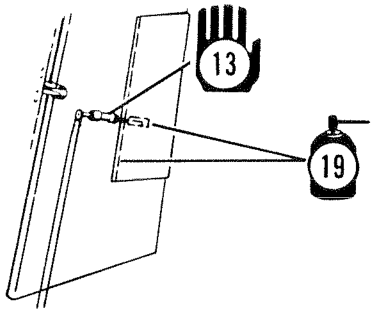
LANDING GEAR DOOR HINGES

F



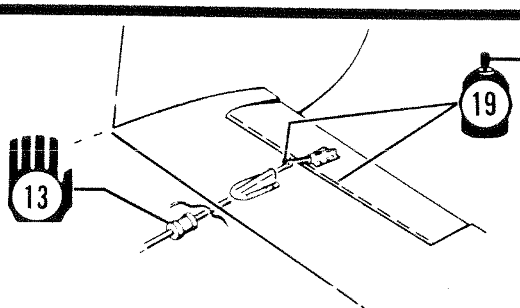
UTILITY DOOR

G



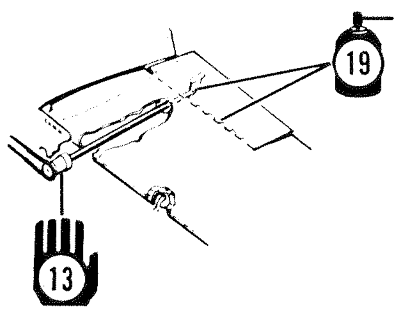
RUDDER TAB

H



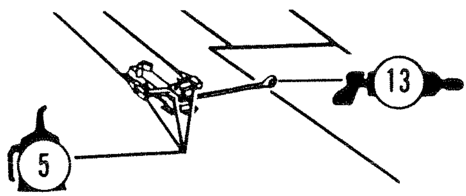
ELEVATOR TAB

I



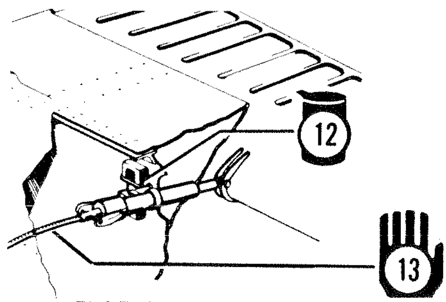
AILERON TAB

J



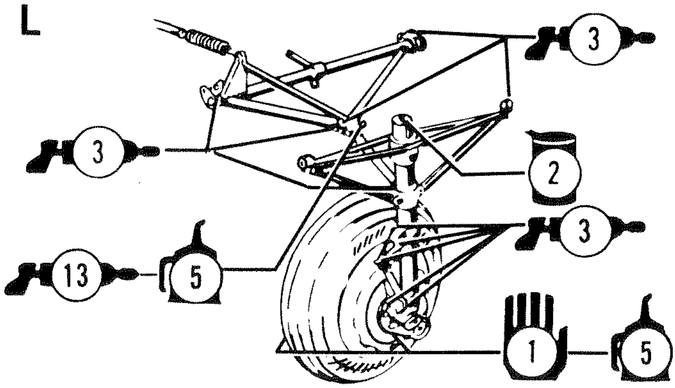
AILERON BELL CRANKS

K



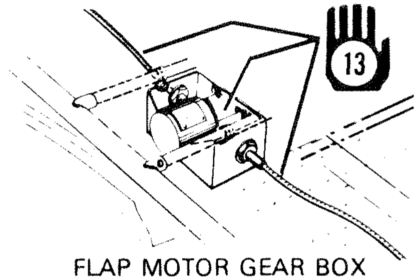
FLAP ACTUATOR AND
FLEXIBLE DRIVE SHAFT

L



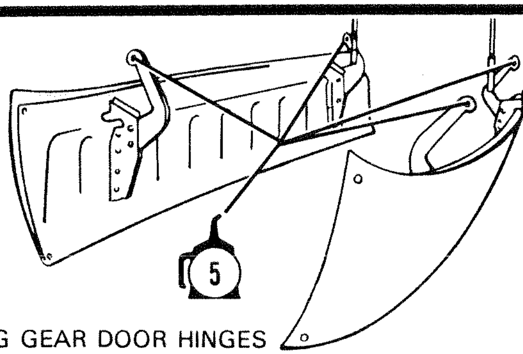
LANDING GEAR RETRACT

M



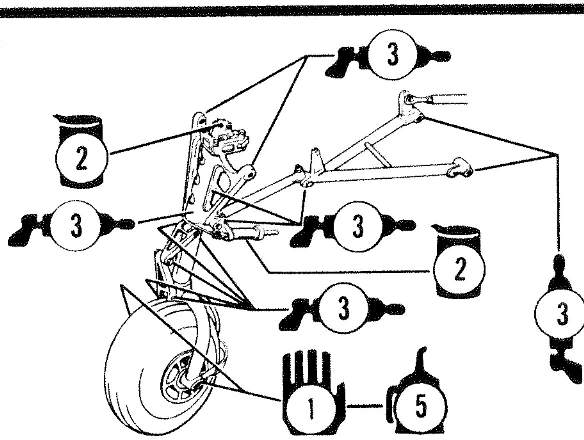
FLAP MOTOR GEAR BOX

N



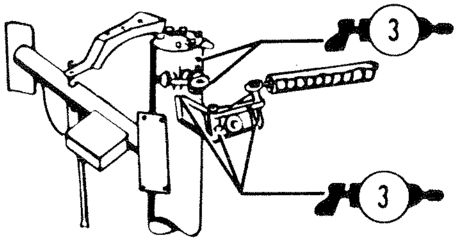
LANDING GEAR DOOR HINGES

O



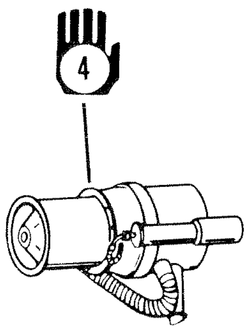
NOSE GEAR RETRACT

P

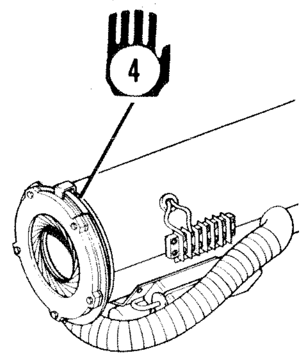


NOSE WHEEL STEERING

Q

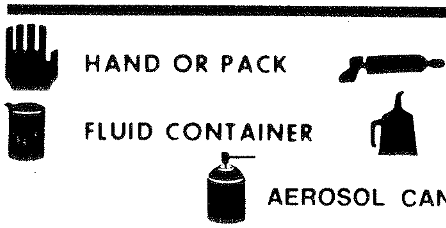


TH-1 thru TH-436



TH-437 thru TH-772

HEATER IRIS VALVE



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

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	(Number refers to item on Consumable Materials)
Pre-flight	Check engine oil level	Access door on upper cowling	6
	Drain heater fuel filter (prior to TH-176)	Nose wheel well	-
	Drain main fuel cell drains	Lower wing surface (leading edge)	-
	Drain fuel strainer drains	Wing surface fwd of main wheel well	-
	Drain box section cell	Aft bottom wing surface	-
	Service fuel cells	Top of wings	7
25 Hrs.	Check battery electrolyte	Fwd baggage compartment under floor	See Shop Manual
50 Hrs.	Clean induction air filter	Access plate, induction scoop	
†	Lubricate landing gear uplock rollers	Main landing gear (L)	5

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	(Number refers to item on Consumable Materials)
100 Hrs.	Change engine oil	Through cowl opening	6
	Replace engine oil filter	Access plate on left cowling door	Hastings oil filter P-128
	Clean fuel strainers	In wheel wells	*9
	Clean fuel injection control valve screen	Access door on side of nacelle	*9
	Clean heater fuel filter (prior to TH-176)	Nose wheel well	*9
	Clean heater fuel pump strainer	Nose wheel well	*9
††	Lubricate landing gear uplock rollers	Main landing gear (L)	3
	Clean and check spark plugs	Under cowl, both sides engine	-
	Check magneto timing	Engine compartment	-

*Clean with solvent and blow dry with compressed air.

100 Hrs. (Cont.)	Lubricate landing gear door hinges	Landing gear wheel wells (E) (N)	5
	Lubricate nose wheel steering mechanism	Nose wheel well (P)	3
	Lubricate landing gear retract mechanism	Nose wheel and main gear wheel wells (O) (L)	3, 5
†††	Lubricate wheel bearings and seals	Landing gear (O) (L)	1
	Lubricate cabin door mechanism	Cabin door latch (B)	5
●	Lubricate aileron bell cranks and control rod ends	Access panel underside wings (J)	5, 13
	Lubricate control column linkage	Forward of instrument panel (A)	5
	Lubricate rudder pedals	Cockpit (C)	5
	Drain static air lines	Left forward cabin sidewall	-
	Utility door	Cabin, right side (F)	5, 4
300 Hrs.	Rod end bearings	Control system and landing gear	Oil or grease as required
	Service landing gear actuator gear box	Under front seats (D)	11, 5

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	(Number refers to item on Consumable Materials)
300 Hrs. (Cont.)	* Replace pressure system filters	Aft of engine firewall	Airborne IJ4-7
	* Replace pressure system inlet filter	Rear engine baffle	Airborne D9-14-1
600 Hrs.	Service landing gear motor-reduction gears	Under front seats (D)	3
	Lubricate flap motor Reduction gears	Under floor in cabin (M)	13
900 Hrs.	Lubricate flap actuators	Forward of flap underside of wing (K)	12
	Lubricate flap flex drives		13

*Or on condition

900 Hrs. or 5 years whichever occurs first	Lubricate rudder and elevator trim tab actuators	Empennage (G, H)	13
	Lubricate aileron trim tab actuators	Aileron (I)	13
As Req.	Service wing fuel system	At wing fillers	7
	Service propeller/windshield anti-ice reservoir	Under left floorboard, forward baggage compartment	8
	Service oxygen cylinder	Nose baggage compartment	18
	Service brake fluid reservoir	Nose baggage compartment	2
	Drain moisture from engine oil sump	Through cowl flap opening	-
	Service main gear struts	Top of each strut (L)	2, 3, 5
	Service nose gear strut	Top of strut (O)	2, 3
	Service shimmy damper	Nose landing gear (O)	2
	Check brake lining wear	Main landing gear wheels	-
	Lubricate heater iris	Forward nose compartment (Q)	4
††††	Trim tab hinges and pushrods	At control surfaces (G) (H) (I)	19

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	(Number refers to item on Consumable Materials)
Note 3	Replace emergency locator transmitter battery	At emergency locator	-

NOTES:

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

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

3. Rechargeable Batteries: Replace after one cumulative hour of use or after 50% of the useful charge life.

   Non-rechargeable Batteries: Replace after one cumulative hour of use or after 50% of the useful charge life.

† TH-1 thru TH-174 which have not been modified per S.I. 0448-211; the uplock roller should be lubricated with oil at 50 hours and hand packed with grease at 100 hours.

†† TH-175 and after, and previous airplanes which have been modified per S.I. 0448-211; the uplock roller will require only greasing through the zerk installed in the bolt head, at each 100 hours.

††† Wheels with felt seals: Lightly saturate felt seals with 10W30 oil (remove excess by pressing slightly); also coat the sides and outer diameter with the same type of grease used on the bearings.
Wheels with lip seals: Place a thin film of the bearing grease on the bushing (spacer) where the grease seal will ride.

†††† Lubricate trim tab hinges and trim tab pushrod end fittings with Item 19, consumable materials after each washing of the airplane (either high-pressure or hand washing) and at each periodic inspection.

- Lubricate aileron control rod ends in place using SAE 20 or SAE 10W30 oil or remove aileron control rod assembly, clean, and relubricate control rod ends using MIL-G-23827 grease. Rotate rod end bearing to assure adequate lubricant coverage. Check aileron rigging after reinstallation of rod end assembly.

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 High Temperature	Aeroshell No. 5 or MIL-G-81322

CAUTION

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

ITEM	MATERIAL	SPECIFICATION
2.	Hydraulic Fluid	MIL-H-5606
*3.	Lubricating Grease, General Purpose, Wide Temperature	MIL-G-81322
4.	Molybdenum Disulfide	MIL-M-7866
5.	Lubricating Oil	SAE No. 20 or SAE 10W-30
**6.	Engine Oil	SAE 30 (Below 40°F) SAE 50 (Above 40°F) Approved Multi-viscosity Oils
***7.	Engine Fuel	Grade 100LL (Blue) preferred, 100 (Green)
8.	Anti-Ice Fluid	MIL-F-5566
9.	Solvent	Federal Specification, PD680
10.	Lubricant	Scintilla 10-86527
11.	Lubricant	Mobil Compound GG or Mobil 636
12.	Lubricating Oil, Gear	MIL-L-10324, or MIL-L-2105C, Grade 75W

ITEM	MATERIAL	SPECIFICATION
13.	Grease, Aircraft and Instrument	MIL-G-23827
†14.	Lubricant, Rubber Seal	Oakite 6 Compound
15.	Naptha, Aliphatic	Federal Specification, TT-N-95
††16.	Tape, Antiseize Tetrafluorethylene	MIL-T-27730
17.	Leak Test Compound, Oxygen Systems	MIL-L-25567
18.	Oxygen, Aviator's Breathing	MIL-O-27210
19.	Lubricating Oil, General Purpose, Preservative (Water-Displacing, Low Temperature)	•Brayco 300 per Federal Specification VV-1-800 (Preferred) Alternates for Brayco 300: ••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 100LL grade fuel (blue) is not available, use 100 (green) as minimum grade. See Engine Manufacturer's Service Letter for recommended maintenance and servicing techniques.

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

†† For sealing tapered pipe threads on high pressure oxygen lines.

•Product of Bray Oil, Co.,
1925 North Marianne
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 the WD-40 Company,
1061 Cudahy Place,
San Diego, Calif. 92110

APPROVED ENGINE OILS

COMPANY	BRAND AND WEIGHT
BP Oil Corporation	BP Aero Oil
Castrol Limited (Australia)	Castrolaero AD Oil
Continental Oil Co.	Conoco Aero S
Delta Petroleum Co.	Delta Avoil Oil
Exxon Company, U.S.A.	Exxon Aviation Oil EE
Gulf Oil Corporation	Gulfpride Aviation AD
Mobil Oil Company	Mobil Aero Oil
Pennzoil Company	Pennzoil Aircraft Engine Oil
Phillips Petroleum Co.	Phillips 66 Aviation Oil Type A
	Phillips X/C Aviation Multiviscosity Oil SAE 20W-50
	Phillips X/C Aviation Multiviscosity Oil SAE 25W-60
Quaker State Oil & Refining Corp.	Quaker State AD Aviation Engine Oil
Red Ram Limited (Canada)	Red Ram X/C Aviation Oil 20W-50

COMPANY	BRAND AND WEIGHT
Shell Oil Company	Aeroshell Oil W SAE 15W/0 Aeroshell Oil W
Sinclair Refining Co.	Sinclair Avoil
Texaco, Inc.	Texaco Aircraft Engine Oil - Premium AD
Union Oil Co. of California	Union Aircraft Engine Oil

NOTE

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

BULB REPLACEMENT GUIDE

LOCATION	NUMBER
Alternator out light	327
Compass light	327
Cowl flap position light	327
Dome light, cabin	1864
Electrical panel light	327
Flap position indicator light	356
Ice light	A-7079B-24
Instrument light, flood	313
Instrument light, post	327
Landing gear position light	327
Landing light	4596
Map light	303
Navigation light, tail	1683
Navigation light, tail w/strobe	A7512-24 Grimes
Navigation light, wing	A7512-24 Grimes
Reading light	303
Rotating beacon	A-7079B-24 Grimes
Tab position indicator light	1819
Taxi light	4526

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 assembly	Every 2000 hours
Nose gear assembly	Every 2000 hours
Actuator assembly	Every 4000 hours
Retract motor	Every 2000 hours
Retract motor brushes	Every 500 hours or on condition
Shimmy damper	Every 1000 hours
Wheels and tires	On condition
Brake assembly	On condition
Brake lining	On condition
Master cylinder	On condition
Shuttle valve assembly	On condition
Parking brake valve	On condition
All hose	On condition

POWER PLANT

NOTE

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

Engine	*Every 1700 hours
Engine controls	On condition
Engine vibration isolator mounts	Engine change or on condition
Exhaust system	On condition
Engine driven fuel pump	1500 hours

COMPONENT	OVERHAUL OR REPLACE
Oil cooler	On condition (replace when contaminated)
Propeller (Hartzell)	**1500 hours or 4 years.
Propeller (McCauley)	***1500 hours or 5 years.
Propeller controls	On condition
Propeller governor	At engine overhaul but not to exceed 1500 hours or 3 years
Dry air pressure pumps	Every 1200 hours
All hose	Hose carrying flammable liquids at engine overhaul or every 5 years. All other hose on condition.

FUEL SYSTEM

Fuel cells and strainer drain valves	On condition
Wing fuel quantity transmitters	On condition
Fuel cell drain valve	On condition
Fuel system check valves	On condition
Fuel selector valves	Inspect every 500 hours Overhaul every 1200 hours
Aux fuel pump	Every 1200 hours
All hose	Hose carrying flammable liquids at engine overhaul or every 5 years. All other hose on condition.
Vent line check valve	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 flow gage	On condition
Manifold pressure indicator	On condition
Tachometer	On condition
Free air temperature indicator	On condition
Deice pressure gage	On condition
All hose	On condition
ELECTRICAL SYSTEM	
Dynamic brake relay	On condition
Battery master relay	On condition
All other relays	On condition
Voltage regulator	On condition
Starter	At engine overhaul or replace on condition
Starter relay	On condition
Alternator	On condition
Landing gear selector switch	1200 hours - replace

COMPONENT	OVERHAUL OR REPLACE
UTILITY SYSTEMS	
Cabin heater	Pressure test every 500 hours of heater operation or every 1000 hours of airplane operation and overhaul every 1500 hours of heater operation or 3000 hours of airplane operation (whichever comes first)
Heater ignition vibrator (TH-1 thru TH-436)	Switch to reserve vibrator points at 1000 hours (see shop manual) Replace after 2000 hours of heater operation
Heater ignition assembly (TH-437 thru TH-772)	Replace every 500 hours of heater operation
Heater spark plug	On condition
Heater fuel pump	On condition
Heater fuel spray nozzle	Replace at heater overhaul
Heater fuel shut-off valve	On condition
Combustion blower	On condition
Combustion blower brushes	Every 500 hours
Heater vent blower	On condition
Heater vent blower brushes	Every 500 hours
Heater blower	On condition
Oxygen regulator	Every 2000 hours or 48 months
Oxygen cylinder (3HT)	Hydrostatically test every 3 years, replace every 24 years or 4,380 refills (ICC Regulation)
All hose	On condition

COMPONENT	OVERHAUL OR REPLACE
FLAPS AND FLIGHT CONTROLS	
Flight controls	On condition
Aileron tab actuator	On condition
Elevator tab actuator	On condition
Rudder tab actuator	On condition
Flap track rollers	On condition
Flap motor and drives	Every 2000 hours
Flap motor brushes	On condition
Flap actuators	Every 2000 hours
Flap flexible shaft	Every 2000 hours

NOTE

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

MISCELLANEOUS

COMPONENT	OVERHAUL OR REPLACE
Seat belts or Shoulder Harnesses	Inspect every 12 months, replace on condition
Hand fire extinguisher	Inspect every 12 months, recharge as necessary

*Reference Teledyne Continental Motors Corporation Service Bulletin M81-22, dated November 2, 1981 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.

** Refer to Hartzell Propeller, Inc. Service Letter No. 61F, dated August 31, 1979, or later issue.

*** Applies only to propellers with hub serial number 71XXXX and higher; all other propellers; 1200 hours or 5 years.

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SECTION IX

SUPPLEMENTS

NOTE

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

NOTE

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

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
1	130598	Landing Gear Safety System	3	1/83
2	96-590010-19	King KN-74 Area Navigation System	1	2/79
3	96-590010-21	Nickel-Cadmium Battery and Charge Current Detector		10/76
4	96-590010-23	100-Amp. Alternator		10/76
5	58-590000-23	Air Conditioning System	3	10/83
6	SA773CE	Hartzell Propellers	3	3/25/76
7	131268	Manual Cowl Flaps		1/82
8	58-590000-37	Dual Voltage Regulators (Kit No. 55-3024)		5/84

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BEECHCRAFT BARON 95-B55 and 95-B55A (TC-1024 thru TC-1607), 95-C55 and 95-C55A (TC-350 and TE-252 thru TE-451), D55 and D55A (TE-452 thru TE-767), E55 and E55A (TE-768 thru TE-942, except TE-938), 58 and 58A (TH-1 thru TH-384), TRAVEL AIR D95A (TD-680 thru TD-707, and E95 (TD-708 thru TD-721) LANDPLANES

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

for the

LANDING GEAR SAFETY SYSTEM

GENERAL

This document is to be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the airplane is equipped with the automatic extension and retraction system which has been installed in accordance with BEECHCRAFT FAA approved data.

The information in this document supersedes the Pilot's Operating Handbook and FAA Approved Flight Manual only where covered in the items contained herein.

LIMITATIONS

The landing gear safety system is designed to help prevent "gear-up" landings and premature or inadvertent operation of the landing gear mechanism. The system is to be used as safety backup device only; normal usage of the landing gear position switch is mandatory.

EMERGENCY PROCEDURES

In the event of an emergency, automatic extension of the landing gear may be prevented by placing the landing gear safety system ON-OFF-TEST switch in the OFF position, thus inactivating the safety system.

NORMAL PROCEDURES

PREFLIGHT CHECK:

1. Throttles - CLOSED OR RETARDED.

2. Battery master switch - ON.

3. Landing gear circuit breaker - either IN or OUT.

4. Place the ON-OFF-TEST switch in the TEST position. Proper functioning of the automatic landing gear extension portion of the system is indicated by the noise or movement of the solenoid in the landing gear position switch. The ON-OFF-TEST switch returns normally to the ON position unless the pilot places the switch in the OFF position.

5. Landing gear circuit breaker - IN before take-off.

OPERATION

1. Landing Gear Extension - With the landing gear safety system ON-OFF-TEST switch in the ON position the landing gear will be automatically extended when: (1) the airspeed is below approximately 104 kts/120 mph IAS and (2) both engines are operating at a throttle position corresponding to approximately 17 inches or less of manifold pressure.

2. Landing Gear Retraction - With the landing gear safety system ON-OFF-TEST switch in the ON position, the landing gear will not retract unless: (1) the landing gear position switch is in the UP position (2) the airspeed is above approximately 61 kts/70 mph IAS and (3) one engine is operating at a throttle position corresponding to approximately 19 inches or more of manifold pressure.

NOTE

If landing gear retraction is desired before the indicated airspeed reaches approximately 61 kts/70 mph, the landing gear safety system must be inactivated by placing the ON-OFF-TEST switch in the OFF position, preferably before placing the landing gear position switch in the UP position.

PERFORMANCE - No change

Approved:

Donald H. Peter

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

**BEECHCRAFT BARONS 95-B55,
95-B55A, E55, E55A, 58, 58A LANDPLANES**

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

for the

**KING KN-74
AREA NAVIGATION SYSTEM**

GENERAL

The information in this supplement is FAA approved material and must be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the airplane is equipped with a King KN-74 Area Navigation System which has been installed in accordance with BEECHCRAFT FAA approved data.

The information in this supplement supersedes or adds to the basic Pilot's Operating Handbook and FAA Approved Airplane Flight Manual only as set forth below.

LIMITATIONS

1. This system shall not be used as a primary system under IFR conditions except on approved approach procedures, approved area navigation airways, and random area navigation routes when approved by Air Traffic Control..

2. This system is to be used only with colocated facilities (VOR and DME signals originate from the same geographical location).

EMERGENCY PROCEDURES

CAUTION

DME may unlock due to loss of signal with certain combinations of distance from station, altitude, and angle of bank.

1. VOR or Distance flag appears while in RNAV mode:
   a. Selected Frequency - CHECK FOR CORRECT FREQUENCY
   b. VOR or Distance Flag Intermittent or Lost - UTILIZE OTHER NAV EQUIPMENT AS REQUIRED
2. VOR or Distance flag appears while in APPR mode:
   a. If flag appears while in an approach, execute published missed approach and utilize other approved facility.

NORMAL PROCEDURES

1. VHF NAV - ON
2. DME - ON
3. Mode Selector - SELECT VOR/DME, RNAV, or APPR
4. NAV Frequency - SET
5. DME Frequency - SET
6. Waypoint Bearing - SET WAYPOINT RADIAL FROM VORTAC
7. Waypoint Distance - SET WAYPOINT DISTANCE FROM VORTAC
8. OBS Control - DESIRED MAGNETIC HEADING
9. Self-Test - PRESS BUTTON (must have VOR reception)

PERFORMANCE - No change

Approved:

Donald H Peter

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

BEECHCRAFT BARONS 95-B55, 95-B55A, E55, E55A, 58, 58A LANDPLANES

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

NICKEL-CADMIUM BATTERY AND CHARGE CURRENT DETECTOR

GENERAL

The information in this supplement is FAA Approved material and must be attached to the Pilot's Operating Handbook and FAA Approved Flight Manual when the airplane is equipped with a Nickel-Cadmium Battery and Charge Current Detector installed in accordance with BEECHCRAFT FAA approved data.

The Battery Charge Current Detector consists of a circuit which illuminates an amber light on the instrument panel whenever the battery charge current is above normal. The system is designed for a continuous monitor of battery condition.

The purpose of the Battery Charge Current Detector is to inform the pilot of battery charge currents which may damage the battery. The system senses all battery current and provides a visual indication of above normal charge current. Following a battery engine start, the battery recharge current is very high and causes the illumination of the BATTERY CHARGE light, thus providing an automatic self test of the detector and the battery. As the battery approaches a full charge and the charge current decreases to a satisfactory amount, the light will extinguish. This will normally occur within a few minutes after an engine start, but may require a longer time, if the battery has a low state of charge, low charge voltage per cell (20 cells battery), or low battery temperature.

The light may occasionally reappear for short intervals when heavy loads switch off, or engine speeds are varied near generator cut-in speed. High battery temperatures or high charge voltage per cell will result in a high overcharge current which will eventually damage the battery and lead to thermal runaway. Illimination of the BATTERY CHARGE light in flight alerts the pilot that conditions may exist that may eventually damage the battery. The battery should be turned off to prevent battery damage. The following procedures outline the actions to be taken in the event the BATTERY CHARGE light illuminates.

EMERGENCY PROCEDURES

DURING CRUISE

The illumination of the amber caution light, placarded BATTERY CHARGE, in flight indicates a possible malfunction of the battery. Turn the Battery Switch - OFF. The caution light should extinguish and the flight may proceed to destination. Failure of the light to extinguish with the battery switch off indicates a battery system or a charge current detector system malfunction. The aircraft should be landed as soon as practicable. (The battery switch should be turned on for landing in order to avoid electrcal transients caused by power fluctuations.) After landing perform a During Shutdown Battery Condition check.

NORMAL PROCEDURES

BEFORE STARTING ENGINES

1. Caution Light (BATTERY CHARGE) - PRESS TO TEST for illumination.

DURING ENGINE START

Provided sufficient energy is used from the battery during the first engine start, the amber caution light, placarded BATTERY CHARGE, will illuminate approximately 6 seconds after the generator is on the line. This indicates a charge current above normal. The light should extinguish within 5 minutes. Failure to do so indicates a partially discharged battery. Continue to charge battery. Make a check each 90 seconds using the procedure outlined below until the charge current fails to decrease and the light extinguishes. Failure of the light to extinguish indicates an unsatisfactory condition. The battery should be removed and checked by a qualified Nickel-Cadmium Battery shop.

1. One Alternator/Generator - OFF.
2. Engine Speed (Engine with Alternator/Generator On) - 1000 RPM (Voltmeter indicating approximately 28 volts).
3. After loadmeter needle stabilizes, momentarily turn the battery switch off and note the change in meter indication.

NOTE

The change in load meter indications is the battery charge current and should be no more than .025 (only perceivable needle movement) within 5 minutes. Failure to obtain a reading below .025 within 5 minutes indicates a partially discharged battery. Continue to charge battery repeating the check each 90 seconds until the charge current decreases below .025. No decrease of current between checks indicates an unsatisfactory condition. The battery should be removed and checked by a qualified Nickel-Cadmium Battery shop.

DURING SHUTDOWN

Battery - CONDITION AND CHARGE (If the BATTERY CHARGE light is extinguished, the battery is charged and the condition is good. If the light is illuminated and fails to extinguish within 3 minutes of charging, perform the following check:

1. One Alternator/Generator - OFF.
2. Engine Speed (Engine with Alternator/Generator ON) - 1000 RPM (Voltmeter indicating approximately 28 volts).
3. After loadmaster needle stabilizes, momentarily turn the battery switch off and note change in meter indication.

NOTE

The change in loadmeter indication is the battery charge current and should be no more than .025 (only perceivable needle movement). If the result of this check is not satisfactory, allow the battery to charge repeating the check each 90 seconds. If the results are not satisfactory within 3 minutes, the battery should be removed and checked by a qualified Nickel-Cadmium Battery shop.

PERFORMANCE - No change

Approved:

for Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

BEECHCRAFT BARONS
E55, E55A, 58, 58A LANDPLANES

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

for the

100-AMP ALTERNATOR SYSTEM

GENERAL

This document is to be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the airplane is equipped with two 100-Amp Alternators, which have been installed in accordance with BEECHCRAFT drawings by Beech Kit 58-3001.

LIMITATIONS

Loadmeters indicate individual alternator output reading in percentage of load on system. Meter reading of 1.0 is a load of 100 amperes.

ENGINE INSTRUMENT MARKINGS

Loadmeter

Do not exceed (Red Radial) .... .85

NORMAL PROCEDURES - No Change

EMERGENCY PROCEDURES

EXCESSIVE LOADMETER INDICATION (over .85 Red Radial)

1. Battery Switch - OFF (Monitor Loadmeter)

If loadmeter still indicates above .85 Red Radial:

2. Non-Essential Loads - OFF
3. Battery Switch - ON

ILLUMINATION OF ALTERNATOR OUT LIGHT

In the event of the illumination of a single ALTERNATOR OUT light:

1. Check the respective loadmeter for load indication
   a. No Load - TURN OFF AFFECTED ALTERNATOR
   b. Remaining Loadmeter - MONITOR (load must not exceed limitation)

In the event of the illumination of both ALTERNATOR OUT lights:

1. Check loadmeters for load indication
   a. No load indicates failure of regulators

2. If condition indicates malfunction of both alternator circuits
   a. Both ALT Switches - OFF
   b. Non-Essential Loads - OFF (since only battery power will be available)

Approved:

for Chester A. Rembleske
Beech Aircraft Corporation
DOA CE-2

ter) and BARON E55/E55A (TE-1084 and After) LAND-PLANES

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

for the

AIR CONDITIONING SYSTEM

GENERAL

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

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

LIMITATIONS

The air conditioning system must be off during takeoff.

PROPELLERS

Baron E55/E55A (TE-1084 and after) and Baron 58/58A (TH-680 and TH-773 through TH-1395, except TH-1389): Hartzell BHC-J2YF-2CUF or -2CF (two-blade) or PHC-J3YF-2UF or -2F (three-blade) hubs and C-2285-5P (two-blade) or C-3567-4P (three-blade) spinner assemblies.

Baron 58/58A (TH-1389, TH-1396, and after): McCauley 3AF32C512 (three-blade) hubs and D-5310 spinner assemblies.

EMERGENCY PROCEDURES

The air conditioning system must be OFF during the following conditions:

Engine fire on the ground
Engine fire in flight
Engine failure after lift-off and in flight
Air start procedure
Air conditioning system malfunctioning

NOTE

If air conditioning system circuit breaker trips, do not reset until cause of malfunction has been determined and corrected.

One engine inoperative

WARNING

Climb performance with one engine inoperative is degraded when air conditioning system is operating. The system must be turned OFF in event of engine failure.

NORMAL PROCEDURES

STARTING

Air conditioner may be on as desired after engine start for cabin cooling before takeoff.

BEFORE TAKEOFF

Air conditioning system must be turned off before takeoff. After landing gear is retracted and airplane is clear of all obstacles, air conditioning system may be turned on as desired.

SHUTDOWN

Turn off air conditioner before engine shutdown.

PERFORMANCE

CRUISE PERFORMANCE

With air conditioner operating, range and airspeed will decrease approximately 3% due to extension of air conditioner air scoop to mid-position. This should be taken into consideration during flight planning.

WEIGHT AND BALANCE/EQUIPMENT LIST - No change.

SYSTEMS DESCRIPTION

COOLING

The refrigerant 12 air conditioning system has a capacity of 14,000 BTU's per hour and consists of forward and aft evaporator modules, compressor in the left engine section, condenser and condenser blower in the left nacelle, and nacelle door to introduce prop blast and ram air for condenser cooling.

Controls consist of a two position switch placarded AIR COND ON-OFF and a three position evaporator blower switch placarded HI-OFF-LO. Both switches are located adjacent to each other on the pilot's subpanel. The evaporator blowers may be turned on independent of the air conditioning system to provide cabin air circulation when the air conditioner is turned off.

When the air conditioning system is ON (while in flight), the nacelle scoop door opens to the mid-position. If the system is ON while on the ground, with engines operating, the nacelle scoop door will open fully and the condenser blower will operate to assist air flow through the condenser during ground operation. The blower goes off when the system is off. After the air passes through the condenser, it is ducted overboard through the opening in the aft nacelle.

One evaporator is mounted on the aft cabin bulkhead and distributes air to the overhead cabin air outlets. The other evaporator is located in the nose baggage compartment and distributes air to the pilot and copilot outlets.

HANDLING, SERVICING, AND MAINTENANCE

Check air conditioner evaporator module filter, forward of closure bulkhead, every 100 hours; replace filter, if required.

Approved: Donald H Peter

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

REG. NO. ______________________

SER. NO. ______________________

FAA APPROVED
Date 4/23/71
REVISED 8/30/73
REVISED 10/29/75
REVISED 3/25/76

HARTZELL PROPELLER, INC.
350 WASHINGTON AVENUE
PIQUA, OHIO
FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
BEECH MODELS 58 & 58A LANDPLANES
WITH HARTZELL PROPELLERS PER STC SA773CE

THIS DOCUMENT MUST BE KEPT IN THE AIRPLANE AT ALL TIMES WHEN HARTZELL PROPELLERS ARE INSTALLED PER STC SA773CE. INFORMATION CONTAINED HEREIN SUPPLEMENTS OR SUPERSEDES CORRESPONDING INFORMATION IN PLACARDS, AIRCRAFT SPECIFICATIONS, OR BASIC AIRPLANE FLIGHT MANUAL (IF APPLICABLE).

I. LIMITATIONS

C. PROPELLERS:

1. Two Hartzell constant-speed, full feathering, three-bladed propellers (87 lbs. @ Station +14.75; 91 lbs. for propellers designated by "U")
Hubs: PHC-J3YF-2 or PHC-J3YF-2F or PHC-J3YF-2UF or PHC-J3YF-2U
Blades: C7663-2R or FC7663-2R
Spinner: C-3567 or C-3567-1 (or C-3567-4P with air conditioning)
Governor: D210439 or 210662
Pitch Settings at 30 inch station: Low 13.0° - High 82.0°.
Diameter: Not over 76 inches, not under 74 inches

OR

2. Two Hartzell constant-speed, full feathering, two-bladed propellers (69 lbs. @ Station +14.75; 73 lbs. for propellers designated by "U")
Hubs: BHC-J2YF-2C or BHC-J2YF-2CF or BHC-J2YF-2CUF or BHC-J2YF-2CU
Blades: C8475-6 or FC8475-6
Spinner: C-2285 or C-2285-1 or C-2285-6 (or C-2285-4 or C-2285-5 with air conditioning)
Governor: D210439 or 210662
Pitch Settings at 30 inch station: Low 14.5° - High 80.0°
Diameter: Not over 78 inches, not under 76 inches

II. PROCEDURES

B. EMERGENCY PROCEDURES:

1. Single-engine procedures and speeds are identical to those in the basic Airplane Flight Manual.

III. PERFORMANCE

No Change.

FAA APPROVED W. F. Horn Jr.
for Keith D. Anderson, Chief
Engineering & Manufacturing
Great Lakes Region
Des Plaines, Illinois

BEECHCRAFT BARON 95-C55 and 95-C55A (TC-350, and TE-1 through TE-451), D55 and D55A (TE-452 through TE-767), E55 & E55A (TE-768 through TE-942, except TE-938), and Baron 58, 58A (TH-1 through TH-384) LANDPLANES PILOTS OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT

for

MANUAL COWL FLAPS (BEECH KIT NO. 55-9013)

GENERAL

The information in this supplement is FAA-approved material and must be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the airplane has been modified by installation of manual cowl flaps in accordance with Beech-approved data.

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

LIMITATIONS - No change

EMERGENCY PROCEDURES - No change

NORMAL PROCEDURES

The cowl flaps are to be used in the manner prescribed in the applicable Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. The cowl flaps are opened and closed by manually actuating the cowl flap control levers rather than by a system of switches and electric motors.

PERFORMANCE - No change

WEIGHT AND BALANCE - No change

SYSTEMS DESCRIPTION

INDUCTION AIR

Induction air is available from filtered ram air or unfiltered alternate air. Filtered ram air enters from the intake airscoop on the engine cowling. Should the filter become obstructed, a spring-loaded door on the alternate air intake will open automatically and the induction system will operate on alternate air.

COWL FLAPS

The cowl flap control for each engine is located on the lower center console. The cowl flap is closed when the control lever is in the up position and open when the lever is in the down position.

Approved: Donald St. Peter

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

BEECHCRAFT BARON D55/D55A (TE-452 thru TE-767), E55/E55A (TE-768 thru TE-1083), and 58/58A (TH-1 thru TH-1395, Except TH-1389) LANDPLANES

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

for the

DUAL VOLTAGE REGULATORS (KIT NO. 55-3024)

GENERAL

The information in this supplement is FAA-approved material and must be attached to the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual when the airplane has been modified by the installation of Dual Voltage Regulators (Kit No. 55-3024) in accordance with Beech-approved data.

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

LIMITATIONS

No Change.

EMERGENCY PROCEDURES

ILLUMINATION OF ALTERNATOR-OUT ANNUNCIATOR

In the event of the illumination of a single ALTERNATOR-OUT annunciator:

1. Check corresponding loadmeter for load indication.

   a. No Load - Turn off affected alternator.
   b. Regulate load to less than 100% on remaining alternator.
   c. Affected Alternator - ON. Check loadmeter for load indication.
   d. No Load - Turn off affected alternator and leave off.

In the event of the illumination of both ALTERNATOR-OUT annunciators:

1. Check load meters for load indication.

   a. No Load - Turn both alternator switches off.
   b. Reduce load to minimum (must be less than the rating for one alternator).
   c. Left Alternator - ON. If no indication on loadmeter, turn off and leave off.
   d. Right Alternator - ON. If no indication on loadmeter, turn off and leave off.
   e. Adjust electrical load.

2. If condition indicates malfunction of both alternator circuits:

   a. Both ALT Switches - OFF
   b. Minimize electrical load since only battery power will be available.

NORMAL PROCEDURES

No Change.

PERFORMANCE

No Change.

WEIGHT AND BALANCE

No Change.

SYSTEMS DESCRIPTION

ALTERNATORS

Two standard 60-ampere, or optional 100-ampere, 28-volt, gear-driven alternators are individually controlled by alternator control units which regulate the voltage, balance the load, and provide overvoltage protection. Each alternator system is controlled by a switch located on the subpanel.

HANDLING, SERVICING AND MAINTENANCE

No Change.

Approved: Donald H Petto

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

SECTION X

SAFETY INFORMATION

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INTRODUCTION

The best engineering and manufacturing craftsmanship have gone into the design and building of all BEECHCRAFTS. Like any other high performance airplane, they operate efficiently and safely only in the hands of a skilled pilot.

You must be thoroughly familiar with the contents of your operating manuals, placards, and check lists to insure safe utilization of your airplane. When the airplane was manufactured, it was equipped with one or more of the following: placards, Owners Manual, FAA Flight Manual, Pilots Operating Handbook and FAA Approved Flight Manual. For simplicity and convenience we will refer to all official manuals in various models as the "Information Manual". If the airplane has changed ownership, the Information Manual may have been misplaced or may not be current. If missing or out of date, replacement Information Manuals must be obtained from any BEECHCRAFT Aviation Center as soon as possible.

For your added protection and safety, we have developed this special publication of safety information to refresh owners' and pilots' knowledge of a number of safety subjects. These subjects must be reviewed periodically and kept with the airplane, along with the Information Manual and other documents required for operation of the airplane.

Topics in this publication are dealt with in more detail in FAA Documents and other articles pertaining to the subject of safe flying. The safe pilot is familiar with this literature.

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

WARNING

> Because your aircraft 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 manual and the other operating and maintenance manuals which accompany the aircraft;

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 Information Manual, to operate the aircraft. IMPROPER OPERATION OR MAINTENANCE OF AN AIRCRAFT, NO MATTER HOW WELL BUILT INITIALLY, CAN RESULT IN CONSIDERABLE DAMAGE OR TOTAL DESTRUCTION OF THE AIRCRAFT ALONG WITH SERIOUS OR FATAL INJURIES TO ALL OCCUPANTS.

. . . . .BEECH AIRCRAFT CORPORATION

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 Section 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/proficient.

Pre-plan all aspects of your flight - including weather and adequate fuel reserves.

Use services available - Weather briefing, in-flight weather and Flight Service Station.

Carefully pre-flight your airplane.

Use the approved check list.

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

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

Pilot(s) and passengers must use seat belts and shoulder harnesses at all times.

Be sure all loose articles and baggage are secured.

Check freedom of all controls during pre-flight inspection and before takeoff.

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

Avoid big airplane wake turbulence.

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.

Practice emergency procedures at safe altitudes and airspeeds, preferably with a qualified instructor pilot, until the required action is instinctive.

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, careless manner.

Don't fly into thunderstorms or severe weather.

Don't fly in possible icing conditions unless the airplane is approved and properly equipped.

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 attempt any take off or landing without using the check list.

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

Don't trust to luck.

GENERAL 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 faster. Take advantage of this knowledge and be prepared for an emergency in the remote event that one should occur.

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

RULES AND REGULATIONS

F.A.R. Part 91, General Operating and Flight Rules, is a document of law governing operation of aircraft and the owner's and pilot's responsibilities. This document covers such subjects as:

Responsibilities and authority of the pilot-in-command

Certificates required
Liquor and drugs
Flight plans
Pre-flight action
Fuel requirements
Flight rules
Maintenance, preventative maintenance, alterations, inspection, and maintenance records

These are only some of the topics covered. It is the owner's and pilot's responsibility to be thoroughly familiar with all items in F.A.R. Part 91 and to follow them.

AIRWORTHINESS DIRECTIVES

F.A.R. 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 INFORMATION, ADVISORIES, AND NOTICES - FAA AIRMAN'S INFORMATION MANUAL

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 used in the Air Traffic Control System, information on safety, and accident and hazard reporting. It is revised at six-month intervals and can be purchased locally or 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 Air Space
Services Available to Pilots
Radio Phraseology and Technique
Airport Operations
Clearances and Separations
Pre-flight
Departures - IFR
Enroute - IFR
Arrival - IFR
Emergency Procedures
Weather and Icing
Mountain Flying
Wake Turbulence - Vortices

Medical Facts for Pilots
Bird Hazards
Good Operating Practices
Airport Location Directory

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, enroute navigational aids out of service, etc.

Airmen can subscribe to services to obtain FAA NOTAMS and Airman Advisories, and these are also available at FAA Flight Service Stations.

FAA ADVISORY CIRCULARS

The FAA issues advisory circulars to inform the aviation public in a systematic way of non-regulatory 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 Advisory Circular

AC00-2, 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. Some of the advisory circulars of interest to pilots are:

*	00-6A	Aviation Weather
	00-24	Thunderstorms
	00-30	Rules of Thumb for Avoiding or Minimizing Encounters with Clear Air Turbulence
*	00-45A	Aviation Weather Services
	00-46A	Aviation Safety Reporting Program
	00-50	Low Level Wind Shear
	20-5D	Plane Sense
	20-93	Flutter Due to Ice or Foreign Substance on or in Aircraft Control Surfaces
	20-105	Engine Power-Loss Accident Prevention
	39-7	Airworthiness Directives for General Aviation Aircraft
	43-12	Preventive Maintenance
	60-4	Pilot's Spatial Disorientation

	60-6A	Airplane Flight Manuals (AFM), Approved Manual Materials, Markings and Placards - Airplanes
	60-9	Induction Icing - Pilot Precautions and Procedures
	60-12	Availability of Industry-Developed Guidelines for the Conduct of the Biennial Flight Review
	60-13	The Accident Prevention Counselor Program
*	61-8D	Instrument Rating Written Test Guide
	61-9B	Pilot Transition Courses for Complex Single-Engine and Light, Twin Engine Airplanes
*	61-10A	Private and Commercial Pilots Refresher Courses
	61-12J	Student Pilot Guide
	61-19	Safety Hazard Associated with Simulated Instrument Flights
*	61-21	Flight Training Handbook
*	61-23A	Pilot's Handbook of Aeronautical Knowledge
*	61-27B	Instrument Flying Handbook
*	61-32B	Private Pilot - Airplane - Written Test Guide
*	61-34B	Federal Aviation Regulations Written Test Guide for Private, Commercial and Military Pilots

	61-47	Use of Approach Slope Indicators for Pilot Training
*	61-54A	Private Pilot Airplane - Flight Test Guide
*	61-55A	Commercial Pilot Airplane . . . Flight Test Guide
*	61-56A	Flight Test Guide - Instrument Pilot Airplane
*	61-58	Flight Instructor Practical Test Guide
	61-65	Part 61 (Revised) Certification Pilot and Flight Instructors
	61-67	Hazards Associated with Spins in Airplanes Prohibited from Intentional Spinning
*	61-70	Flight Instructor Instrument - Airplane - Written Test Guide
*	61-71A	Commercial Pilot Airplane Written Test Guide
*	61-72A	Flight Instructor - Airplane Written Test Guide
	61-84	Role of Preflight Preparation
*	67-2	Medical Handbook for Pilots
	90-23D	Wake Turbulence
	90-34	Accidents resulting from Wheelbarrowing in Tricycle Gear Equipped Aircraft

90-42A	Traffic Advisory Practices at Non-tower airports
90-43D	Operations Reservation for High-Density Traffic Airports
90-48	Pilots' role in Collision Avoidance
90-64	Automated Radar Terminal System (ARTS) III
90-66	Recommended Standard Traffic Patterns for Airplane Operations at Uncontrolled Airports
91-6A	Water, Slush and Snow on runway
91-8A	Use of Oxygen by General Aviation Pilots/Passengers
91-11B	Annual Inspection Reminder
91-13C	Cold Weather Operation of Aircraft
91-17	The use of View Limiting Devices on Aircraft
* 91-23A	Pilot's Weight and Balance Handbook
91-24	Aircraft Hydroplaning or Aquaplaning on Wet Runways
91-25A	Loss of Visual Cues During Low Visibility Landings
91-28	Unexpected Opening of Cabin Doors

91-33	Use of Alternate Grades of Aviation Gasoline for Grade 80/87
91-35	Noise, Hearing Damage, and Fatigue in General Aviation Pilots
91-43	Unreliable Airspeed Indications
91-46	Gyroscopic Instruments - Good Operating Practices
91-51	Airplanes Deice and Anti-Ice Systems
103-4	Hazard Associated with Sublimation of Solid Carbon Dioxide (Dry Ice) Aboard Aircraft
150/ 5200-3A	Bird Hazards to Aircraft
210-1A	National Notice to Airmen System
210-5	Military Flying Activities

* Advisory Circulars that are 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 aircraft. 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 Stations (FSS), or Fixed Base Operator (F.B.O.), 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.

GENERAL INFORMATION ON SPECIFIC TOPICS

FLIGHT PLANNING

F.A.R. 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 pre-flight 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 take-off 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 Information Manual. The resultant effect of temperature and pressure altitude must be taken into account in determining performance if not accounted for on the charts. An applicable FAA Approved Flight Manual, if one is provided, must be aboard the airplane at all times including 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 Aviation or Aero Center. A pilot should not only be familiar with the information contained in the cards himself, but should, prior to flight, always inform passengers of the information contained in the information cards. If a passenger information card is not available for your model of airplane, 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.

INSPECTIONS - MAINTENANCE

In addition to maintenance inspections and pre-flight information required by F.A.R. Part 91, a complete pre-flight inspection is imperative. 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.

Each airplane has a checklist for the pre-flight inspection which must be followed. USE THE CHECKLIST!

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/or placards installed.

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 severe turbulence and thunderstorms. It is not always possible to detect individual storm areas or find the in-between clear areas.

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.

Turboprop Engines - Thunderstorms also pose the possibility of a lightning strike on an aircraft. 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 aircraft, should be thoroughly inspected and any damage repaired prior to additional flight. The Pratt & Whitney or

AiResearch Engine Maintenance Manual and Hartzell Service Letter No. 104 include inspection and maintenance requirements for engines and propellers involved in lightning strike incidents.

A roll cloud ahead of a squall line or thunderstorm is visible evidence of violent 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 Information Manual. These speeds give the best assurance of avoiding excessive stress loads, and at the same time providing the proper margin against inadvertent stalls due to gusts.

Beware of overcontrolling in attempting 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 nose 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.

FLIGHT IN ICING CONDITIONS

Every pilot of Beech airplanes (for that matter the pilot of any airplane) should be intimately acquainted with the FAA Approved National Weather Service definitions for ice intensity and accumulation which we have reprinted below:

INTENSITY	ICE ACCUMULATION
Trace	Ice becomes perceptible. Rate of accumulation slightly greater than rate

INTENSITY	ICE ACCUMULATION (Cont'd)
Trace (Cont'd)	of sublimation. It is not hazardous even though deicing/anti-icing equipment is not utilized, unless encountered for an extended period of time (over 1 hour).
Light	The rate of accumulation may create a problem if flight is prolonged in this environment (over 1 hour). Occasional use of deicing/anti-icing equipment removes/prevents accumulation. It does not present a problem if the deicing/anti-icing equipment is used.
Moderate	The rate of accumulation is such that even short encounters become potentially hazardous and use of deicing/anti-icing equipment or diversion is necessary.
Severe	The rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard. Immediate diversion is necessary.

It is no longer unusual to find deicing and anti-icing equipment on a wide range of airplane sizes and types. Since the capability of this equipment varies, it becomes the pilot's primary responsibility to understand limitations which restrict the use of his airplane in icing conditions and the conditions which may exceed the systems capacity.

Pilots and airplane owners must carefully review the Information Manual in order to ascertain the required operable equipment needed for flight in icing conditions. In addition, they must ascertain from the same sources the limits of approval or certification of their airplane for flight in icing conditions, and plan the flight accordingly, if icing conditions are known or forecast along the route.

Every owner and pilot of an airplane should understand that it is not uncommon to find aircraft equipped with less than the full complement of available systems and equipment. For example, props and pitot tube may be protected, but the aircraft might not have wing boots or tail boots. The reverse might be true. Windshield, pitot and airfoil surfaces might be protected, but the props might not be. Before undertaking any flight into areas where icing conditions might be suspected, inspect the aircraft and review the Information Manual to be certain that you are supported by the full complement of required IFR and deicing/anti-icing equipment.

Remember that regardless of its combination of deicing/anti-icing equipment, any aircraft not fully equipped and functional for IFR flight is not properly equipped for flight in icing conditions.

An airplane which is not approved or certificated for flight in icing conditions, not fully equipped, or which does not have all critical areas protected in the required manner by fully operational equipment must not be exposed to icing encounters of any intensity. When icing is detected, the pilot of such an aircraft must make an immediate diversion by flying out of the area of visible moisture or going to an altitude where icing is not encountered.

Some models of Beech airplanes were approved for flight in certain limited icing conditions under the FAA's Bureau of Flight Standards Release No. 434. Under this release, properly equipped airplanes are approved for flight in light to moderate icing conditions only. These aircraft are not approved for extended flight in moderate icing conditions or flights in any severe icing conditions. Flight in these conditions must be avoided.

Even airplanes fully equipped and certified for flight in the icing conditions described in Appendix C to FAR Part 25 must avoid flights into those conditions defined by the National Weather Service as

"Severe". The National Weather Service definition of "severe icing" describes that condition as: "the rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard." No airplane equipped with any combination of deicing/anti-icing equipment can be expected to cope with such conditions. As competent pilots know, there appear to be no predictable limits for the severest weather conditions. For essentially the same reasons that airplanes, however designed or equipped for IFR flight, cannot be flown safely into conditions such as thunderstorms, tornados, hurricanes or other phenomena likely to produce severe turbulence, airplanes equipped for flight in icing conditions cannot be expected to cope with "severe" icing conditions as defined by the National Weather Service. The prudent pilot must remain alert to the possiblity that icing conditions may become "severe", and that his equipment will not cope with them. At the first indication that such condition may have been encountered or may lie ahead, he should immediately react by selecting the most expeditious and safe course for diversion.

Every pilot of a properly and fully-equipped Beech airplane who ventures into icing conditions must maintain the minimum speed (KIAS) for operation in icing conditions, which is set forth in the Normal Procedures Section of his Information Manual. If a minimum speed for flight in icing conditions is not specified in the manual, the following indicated airspeeds must be maintained:

All Baron and Travel Air Models - 130 KIAS

All other Beechcraft twin-engine models - 140 KIAS

The pilot must remain aware of the fact that if he allows his airspeed to deteriorate below this minimum speed, he will increase the angle of attack of his airplane to the point where ice may build up on the under side of the wings aft of the area protected by the boots.

The fact or extent of ice build-up in unprotected areas will not be directly observable from the cockpit. Due to distortion of the wing airfoil, increased drag and reduced lift, stalling speeds will increase as ice accumulates on the airplane. For the same reasons, stall warning devices are not accurate and cannot be relied upon in icing conditions.

Even though the pilot maintains the prescribed minimum speed for operating in icing conditions, ice is still likely to build up on other unprotected areas (the fuselage and the unprotected wing leading edge inboard of the engine nacelle). Under some atmospheric conditions, it may even build up aft of the boots despite the maintenance of the prescribed minimum speed. The effect of ice accumulation on any unprotected surface is aggravated by the length of exposure to the icing conditions. Ice buildup on unprotected surfaces will increase drag, add weight, reduce lift, and generally, adversely affect the aerodynamic characteristics and performance of the airplane. It can progress to the point where the airplane is no longer capable of flying. Therefore, the pilot operating even a fully-equipped airplane in sustained icing conditions must remain sensitive to any indication, such as observed ice accumulation, loss of airspeed, the need for increased power, reduced rate of climb, or sluggish response, that ice is accumulating on unprotected surfaces and that continued flight in these conditions is extremely hazardous, regardless of the performance of the deicing/anti-icing equipment.

Rapid cycling of the deice boots or cycling before at least one-quarter inch (1/4") of ice has accumulated (measured in the chordwise direction or forward from the leading edge), may cause the ice to grow outside the contour of the inflated boots and prevent ice removal.

For any owner or pilot whose use pattern for an aircraft exposes it to icing encounters, the following references are required reading for safe flying:

The aircraft's Information Manual, expecially the sections on Normal Procedures, Emergency Procedures, Systems, and Safety Information.

FAA Advisory Circular 91-51 - Airplane Deice and Anti-ice Systems.

Weather Flying, by Robert N. Buck.

Finally, the most important ingredients to safe flight in icing conditions - regardless of the aircraft or the combination of deicing/anti-icing equipment - are a complete and current weather briefing, sound pilot judgment, close attention to the rate and type of ice accumulations, and the knowledge that "severe icing" as defined by the National Weather Service is beyond the capability of modern aircraft and immediate diversion must be made. It is the inexperienced or uneducated pilot who presses on "regardless", hoping that steadily worsening conditions will improve, only to find himself flying an airplane which has become so loaded with ice that he can no longer maintain altitude. At this point he has lost most, if not all, of his safety options, including perhaps a 180 degree turn to retreat along the course already traveled. The responsible and well-informed pilot recognizes the limitations of weather conditions, his airplane and its systems and reacts promptly; he lives to fly again.

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 any 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 certain 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 altitude 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 safety 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 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 Information 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 aircraft, 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, control surfaces are designed to be used to their fullest extent only below a certain speed - 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.

FLIGHT OF MULTI-ENGINE AIRPLANES WITH ONE ENGINE INOPERATIVE.

The major difference between flying a twin-engine and single-engine airplane is knowing how to manage the flight if one engine loses power for any reason. Safe flight with one engine out requires an understanding of the basic aerodynamics involved - as well as proficiency in engine out procedures.

Loss of power from one engine affects both climb performance and controllability of any light twin. Climb performance depends on an excess of power over that required for level flight. Loss of power from one engine obviously represents a 50% loss of horsepower but, in virtually all light twins, climb performance is reduced by at least 80%. A study of the charts in your Information Manual will confirm this fact.

Single engine climb performance depends on four factors:

Airspeed	too little, or too much, will decrease climb performance.
Drag	gear, flaps, cowl flaps, prop, and speed.
Power	amount available in excess of that needed for level flight.
Weight	passengers, baggage, and fuel load greatly affect climb performance.

Loss of power on one engine creates yaw due to asymmetrical thrust. Yaw forces must be balanced with the rudder. Loss of power on one engine also reduces prop wash over the wing. In addition, yaw affects the lift distribution over the wing causing a roll toward the "dead" engine. These roll forces may be balanced by banking slightly (up to 5°) into the operating engine.

Airspeed is the key to safe single engine operations. For most light twins there is an:

	Symbol
- airspeed below which directional control cannot be maintained	Vmca
- airspeed below which an intentional engine cut should never be made	Vsse
- airspeed that will give the best single engine rate-of-climb (or the slowest loss of altitude)	Vyse
- airspeed that will give the steepest angle-of-climb with one engine-out	Vxse

MINIMUM CONTROL SPEED AIRBORNE (Vmca)

Vmca is designated by the red radial on the airspeed indicator and indicates the minimum control speed, airborne at sea level. Vmca is determined by FAA regulations as the minimum airspeed at which it is possible to recover directional control of the airplane within 20 degrees heading change, and thereafter maintain straight flight, with not more than 5 degrees of bank if one engine fails suddenly with:

- Take-off power on both engines,
- Rearmost allowable center of gravity,
- Flaps in takeoff position,
- Landing gear retracted,
- Propeller windmilling in takeoff pitch configuration (or feathered if automatically featherable).

However, sudden engine failures rarely occur with all of the factors listed above, and therefore, the actual Vmca under any particular situation may be a little slower than the red radial on the airspeed indicator. Most airplanes will not maintain level flight at speeds at or near Vmca. Consequently, it is not advisable to fly at speeds approaching Vmca, except in training situations or during flight tests. Adhering to the practice of never flying at or below the published Vmc speed for your aircraft will virtually eliminate loss of directional control as a problem in the event of engine failure.

INTENTIONAL ONE-ENGINE INOPERATIVE SPEED (Vsse)

Vsse is specified by the airplane manufacturer and is the minimum speed at which to perform intentional engine cuts. Use of Vsse is intended to reduce the accident potential from loss of control after engine cuts at or near minimum control speed. Vmca demonstrations are necessary in training, but should only be made at a safe altitude above the terrain and with the power reduction on one engine made at or above Vsse.

BEST SINGLE ENGINE RATE-OF-CLIMB SPEED (Vyse)

Vyse is designated by the blue radial on the airspeed indicator. Vyse delivers the greatest gain in altitude in the shortest possible time, and is based on the following criteria:

- critical engine inoperative, and its propeller in the minimum drag position.
- operating engine set at not more than maximum continuous power.
- landing gear retracted.
- wing flaps in the most favorable (i.e., best lift/drag ratio position).
- cowl flaps as required for engine cooling.
- aircraft flown at recommended bank angle.

Drag caused by a windmilling propeller, extending landing gear, or flaps in the landing position, will severely degrade or destroy single engine climb performance. Since engine climb performance varies widely with type of airplane, weight, temperature, altitude, and airplane configuration, the climb gradient (altitude gain or loss per mile) may be marginal - or even negative - under some conditions. Study the Information Manual for your specific airplane and know what performance to expect with one-engine out.

BEST SINGLE ENGINE ANGLE-OF-CLIMB AIRSPEED (Vxse)

Vxse is used only to clear obstructions during initial climb-out as it gives the greatest altitude gain per unit of horizontal distance. It provides less engine cooling and requires more rudder control than Vyse.

SINGLE ENGINE SERVICING CEILING

The single engine service ceiling is the maximum altitude at which an airplane will climb, at a rate of at least 50 feet per minute in smooth air, with one engine feathered.

The single engine service ceiling chart should be used during flight planning to determine whether the airplane, as loaded, can maintain the Minimum Enroute Altitude (MEA) if IFR, or terrain clearance if VFR, following an engine failure.

BASIC SINGLE ENGINE PROCEDURES

Know and follow, to the letter, the single-engine emergency procedures specified in your Information Manual for your specific make and model airplane. However, the basic fundamentals of all the procedures are as follows:

- Maintain aircraft control and airspeed at all times. This is cardinal rule No. 1.
- Usually, apply maximum power to the operating engine. However, if the engine failure occurs at

a speed below Vmca, or during cruise or in a steep turn, you may elect to use only enough power to maintain a safe speed and altitude. If the failure occurs on final approach, use power only as necessary to complete the landing.
- Reduce drag to an absolute minimum.
- Secure the failed engine and related sub-systems.

The first three steps should be done promptly and from memory. The check list should then be consulted to be sure that the inoperative engine is secured properly and that the appropriate switches are placed in the correct position. The airplane must be banked about 5° into the live engine, with the "slip/skid" ball out of center toward the live engine, to achieve rated performance.

Another note of caution: Be sure to identify the dead engine, positively, before feathering it. Remember: First, identify the suspected engine (i.e., "Dead foot means dead engine"), second, verify with cautious throttle movement, then feather.

ENGINE FAILURE ON TAKE-OFF

If an engine fails before attaining lift-off speed, or below Vmca, the only proper action is to discontinue the take-off. If the engine fails after lift-off with the landing gear still down, the take-off should still be discontinued if touch-down and roll-out on the remaining runway is still possible.

If you do find yourself in a position of not being able to climb, it is much better to pull the power on the good engine and land straight ahead than try to force a climb and lose control.

Your Information Manual contains charts that are used in calculating the runway length required to stop if the engine fails before reaching lift-off speed and also has charts showing single engine performance after lift-off.

Study your charts carefully. No airplane is capable of climbing out on one engine under all weight, pressure altitude, and temperature conditions. Know, before you take the actual runway, whether you can maintain control and climb-out if you lose an engine while the gear is still down. It may be necessary to off-load some weight, or wait for more favorable temperature or wind conditions.

WHEN TO FLY Vx, Vy, Vxse and Vyse

During normal two-engine operations, always fly Vy (Vx if necessary for obstacle clearance) on initial climb-out. Then, accelerate to your cruise climb airspeed, which may be Vy plus 10 to 15 knots after you have obtained a safe altitude. Use of cruise climb airspeed will give you better engine cooling, increased inflight visibility and better fuel economy. However, at the first indication of an engine failure during climb-out, or while on approach, establish Vyse or Vxse, whichever is appropriate. (Consult your Information Manual for specifics).

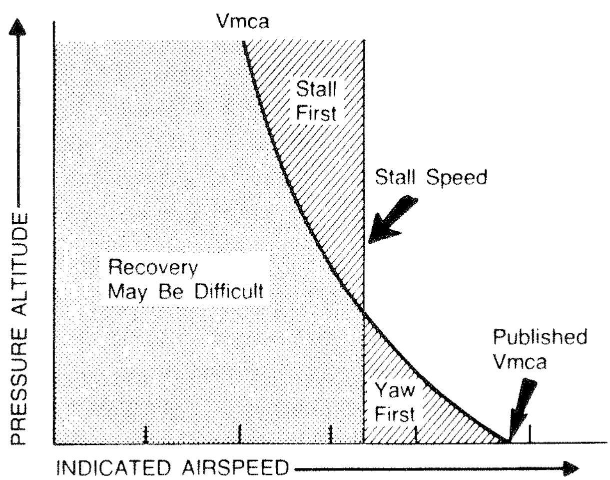
STALLS, SLOW FLIGHT AND TRAINING

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 and multi-engine airplanes during engine-out practice, or stall demonstrations, because the stall speed is critical in all low speed operations of high-performance airplanes.

Training should be accomplished under the supervision of a qualified instructor-pilot; with careful reference to the applicable sections of the FAA Flight Test Guide and FAA Pilot Transition Courses for Complex Single Engine and Light Twin Engine Airplanes (AC61-9B). In particular, observe carefully the warnings in the flight test guides.

The single engine stall speed of a twin engine aircraft is generally slightly below the power off (engines idle) stall speed, for a given weight condition. Single engine stalls in multi-engine airplanes are not recommended. Single engine stalls have never been required by the FAA regulations for multi-engine flight tests, and should not be practiced in high performance airplanes by other than qualified engineering test pilots.

Engine out minimum control speed demonstrations in multi-engine airplanes should be conducted in



Relationship Between Stall Speed And Vmca For Aircraft With Normally Aspirated Engines.

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strict accordance with the warning of the FAA Flight Test Guide. Engine out minimum control speed generally decreases with altitude, while the single engine stall speed remains approximately constant, for normally aspirated engines. No such demonstration should be attempted when the density altitude and temperature are such that the engine out minimum control speed is known, or discovered to be, close to the stalling speed. Loss of directional or lateral control, just as a stall occurs, is potentially hazardous.

Vsse, the airspeed below which an engine should not be intentionally rendered inoperative for practice purposes, was established because of the apparent practice of some pilots, instructors, and examiners, of intentionally rendering an engine inoperative at a time when the airplane is being operated at a speed close to, or below the power idle stall speed. Unless the pilot takes immediate and proper corrective action under such circumstances, it is possible to enter an inadvertent spin.

It is recognized that flight below Vsse with one engine inoperative, or simulated inoperative, may be required for conditions such as practice demonstration of Vmca for multi-engine pilot certification. Refer to the procedure set forth in the Information Manual for your aircraft. This procedure calls for simulating one engine inoperative by reducing the power lever (throttle) on one engine to idle while operating at an airspeed above Vsse. Power on the other engine is set at maximum, then airspeed is reduced at approximately one knot per second until either Vmca or stall warning is obtained. During this transition, rudder should be used to maintain directional control, and ailerons should be used to maintain a 5° bank toward the operative engine. At the first sign of either Vmca or stall warning (which may be evidenced by inability to maintain longitudinal, lateral or directional control, aerodynamic stall buffet, or stall warning horn sound), recovery must be initiated immediately by reducing power to idle on operative engine and lowering the nose to regain Vsse. Resume normal flight. This entire procedure should be used at a safe altitude of at least 5,000 feet above the ground in clear air only.

If stall warning is detected prior to the first sign of Vmca, an engine-out minimum control speed demonstration cannot be accomplished under the existing density altitude and gross weight conditions and should not be attempted.

SPINS

A major cause of fatal accidents in general aviation aircraft is a stall and 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 aircraft 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 aircraft 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 movement with the controls as the aircraft 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.

In any twin engine airplane, fundamental aerodynamics dictate that if the airplane is allowed to become fully stalled while one engine is providing lift-producing thrust the yawing movement which can induce a spin will be present. Consequently, it is important to immediately reduce power on the operating engine, lower the nose to reduce the angle of attack, and increase the airspeed to recover from the stall. In any twin engine aircraft, if application of stall recovery controls is delayed a rapid rolling and yawing motion may develop, even against full aileron and rudder, resulting in the airplane becoming inverted during the onset of a spinning motion. Once the airplane has been permitted to progress beyond the stall and is allowed to reach the rapid rolling and yawing condition, the pilot must then immediately initiate the generally accepted spin recovery procedure for multi-engine airplanes, which is as follows:

> Immediately move the control column full forward, apply full rudder opposite to the direction of the spin and reduce power on both engines to idle. These three actions should be done as near simultaneously as possible; then continue to hold this control position until rotation stops and then neutralize all controls and execute a

smooth pullout. Ailerons should be neutral during recovery. THE LONGER THE PILOT DELAYS BEFORE TAKING PROPER CORRECTIVE ACTION, THE MORE DIFFICULT RECOVERY WILL BECOME.

Always remember that extra alertness and pilot techniques are required for slow flight maneuvers, including the practice or demonstration of stalls or Vmca. In addition to the foregoing mandatory procedures, always:

1. 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 flatten out, which delays recovery.
2. Whenever a student pilot will be required to practice slow flight or single-engine maneuvers, be certain that the qualified instructor pilot has a full set of operable controls in front of him. FAA regulations prohibit flight instruction without full dual controls.
3. 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.

4. 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. For twin engine aircraft, when descending to traffic altitude and during pattern entry and all other flight operations, maintain speed no lower than Vsse. On final approach maintain at least the airspeed shown in the flight manual. Should a go-around be required, do not apply more power than necessary until the airplane has accelerated to Vsse. Recognize that under some conditions of weight, density altitude, and aircraft configuration, a twin engine aircraft cannot climb or accelerate on a single engine. Hence a single engine go-around is impossible and the aircraft is committed to a landing. Plan your approach accordingly.
5. 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.
6. Finally, never forget that stall avoidance is your best protection against an inadvertent spin. MAINTAIN YOUR AIRSPEED.

DESCENT

In piston-powered airplanes, whether single or twin engines, 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 temperatures 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 space. 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 beyond the airplane. Plan to fly slightly above and to the windward side of the 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, provides 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 retract 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 in a crosswind pattern.

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 pre-flight 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 himself 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 times and causes errors due to inattention. In addition to the most common cause of fatigue; insufficient rest and loss of sleep, the pressures of business, financial worries, and family problems can be important contributing factors. If you are tired, don't fly.

HYPOXIA

Hypoxia, in simple terms, is a lack of sufficient oxygen to keep the brain and other body tissues functioning properly. There is a wide individual variation in susceptibility to hypoxia. In addition to progressively insufficient oxygen at higher altitudes, anything interfering with the blood's ability to carry oxygen can contribute to hypoxia (anemias, carbon monoxide, and certain drugs). Also, alcohol and various drugs decrease the brain's tolerance to hypoxia.

Your body has no built-in alarm system to let you know when you are not getting enough oxygen. It is impossible to predict when or where hypoxia will occur during a given flight, or how it will manifest itself. Some of the common symptoms of hypoxia are increased breathing rate, a light-headed or dizzy sensation, tingling or warm sensation, sweating, reduced visual field, sleepiness, blue coloring of skin, fingernails, and lips, and behavior changes. A particularly dangerous feature of hypoxia is an increased sense of well-being, called euphoria. It obscures a person's ability and desire to be critical of himself, slows reaction time, and impairs thinking ability. Consequently, an 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, an hypoxic individual has a limited time to make decisions and perform useful acts, even though he may remain conscious for a longer period. If pressurization equipment fails at certain altitudes the pilot and passengers have only a certain amount of time to get an oxygen mask on before they exceed their time of useful consciousness. The time of useful consciousness is approximately 3-5 minutes at 25,000 feet of altitude in the average individual and diminishes markedly as altitude increases. At 30,000 feet altitude, for example, the time of useful consciousness is approximately 1 to 2 minutes. Therefore, in the event of depressurization, oxygen masks should be obtained and used immediately.

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).

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; hot and cold sensations; tingling of the hands, legs and feet; tetany; 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 judgment; 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. In other words, "the higher you get, the higher you get".

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 effect visual sensitivity equal to an increase of 8,000 feet altitude.

ADDITIONAL INFORMATION

In addition to the coverage of subjects in this section, 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, and are very good sources of information and are highly recommended for study. Some of these are titled:

Airman's Information Manual
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
Flying Light Twins Safely

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

SPECIAL CONDITIONS

MAINTENANCE

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).