PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL

for the

Beechcraft®

FAA APPROVED IN THE NORMAL CATEGORY BASED ON FAR 23, 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. N1808A

FAA Approved by: Donald Fetters

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

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INTRODUCTION

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

Attention is called to Section X (SAFETY INFORMATION). BEECHCRAFT feels that it is very 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 insure airworthiness and suitability for use in Beech airplane applications. Parts purchased from sources other than BEECHCRAFT, even though outwardly identical in appearance, may not have had the required tests and inspections performed, may be different in fabrication

techniques and materials, and may be dangerous when installed in an airplane.

Salvaged airplane parts, reworked parts obtained from non-BEECHCRAFT approved sources, or parts, components, or structural assemblies, the service history of which is unknown or cannot be authenticated, may have been subjected to unacceptable stresses or temperatures or have other hidden damage, not discernible through routine visual or usual nondestructive testing techniques. This may render the part, component or structural assembly, even though originally manufactured by BEECHCRAFT, unsuitable and unsafe for airplane use.

BEECHCRAFT expressly disclaims any responsibility for malfunctions, failures, damage or injury caused by use of non-BEECHCRAFT approved parts.

DUCHESS 76

PILOT'S OPERATING HANDBOOK

AND

FAA APPROVED AIRPLANE FLIGHT MANUAL

TABLE OF DIVISIONS

SECTION I
GENERAL

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THANK YOU . . .

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

IMPORTANT NOTICE

This handbook should be read carefully by the owner and the operator in order to become familiar with the operation of the airplane. Suggestions and recommendations have been made within it to aid in obtaining maximum performance without sacrificing economy. Be familiar with, and operate the airplane in accordance with, the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual, and/or placards which are located in the airplane.

As a further reminder, the owner and the operator 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 should 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 continued airworthiness to maintain the 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 the FAA and Beech Aircraft Corporation, which are designed to get maximum utility and safety from the airplane.

USE OF THE HANDBOOK

The Pilot's Operating Handbook is designed to facilitate maintaining the documents necessary for the safe and efficient operation of the airplane. The handbook has been prepared in loose leaf form for ease in maintenance and in a convenient size for storage. The handbook has been arranged with quick reference tabs imprinted with the title of each section and contains ten basic divisions.

Section 1	General
Section 2	Limitations
Section 3	Emergency Procedures
Section 4	Normal Procedures
Section 5	Performance
Section 6	Weight and Balance/Equipment List
Section 7	Systems Description
Section 8	Handling, Servicing, and Maintenance
Section 9	Supplements
Section 10	Safety Information

NOTE

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.

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 airplane owners 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 any BEECHCRAFT Aero or Aviation Center, International Distributor, or International Dealer, or refer to the latest revision of BEECHCRAFT Service Instructions No. 0250-010.

Due to the large variety of airplane configurations available through optional equipment, it should be noted that where information pertaining to optional equipment appears in the handbook, the optional equipment will not normally be designated as such. Due to custom design variations, the illustrations in this handbook will not be typical of every airplane.

Beech Aircraft Corporation expressly reserves the right to supersede, cancel, and/or declare obsolete, without prior notice, any part, part number, kit, or publication that may be referenced in this handbook.

REVISING THE HANDBOOK

Immediately following the Title Page is the "Log of Revisions" page(s). The Log of Revisions pages are used for maintaining a listing of all effective pages in the handbook (except the SUPPLEMENTS section), and as a record of revisions to these pages. In the lower right corner of the outlined portion is a box containing a capital letter which denotes the issue or reissue of the handbook. It will be advanced one letter, alphabetically, per reissue. This letter will be suffixed by a number whenever the handbook is revised. When a revision to 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 complete 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

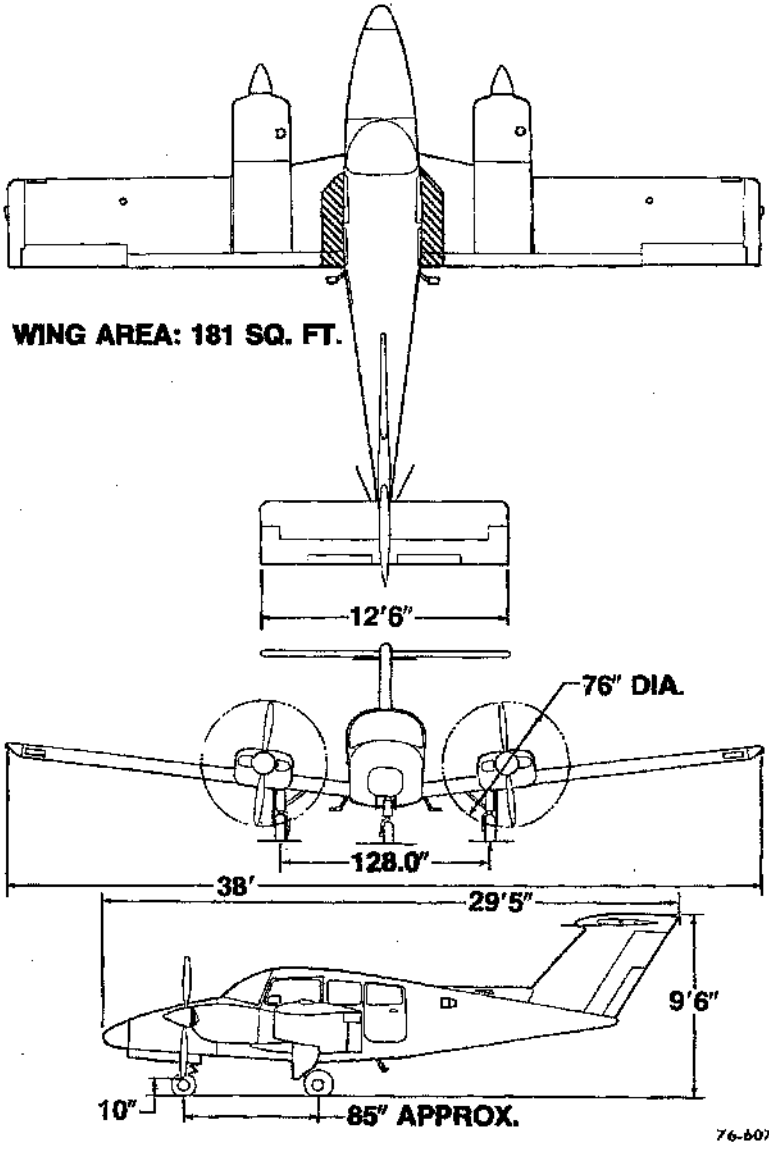
Section IX contains the FAA Approved Airplane Flight Manual Supplements headed by a Log of Supplements page. On the "Log" page is a listing of the FAA Approved Supplemental Equipment available for installation on the airplane. When new supplements are received or existing supplements are revised, a new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

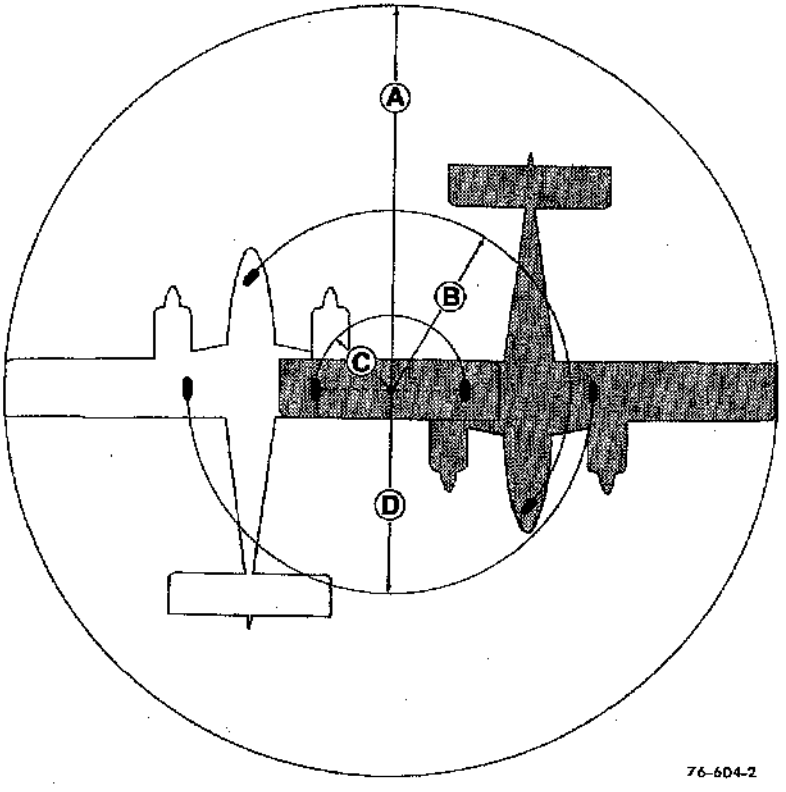
Upon receipt of a new or revised supplement, compare the "Log" page just received with the existing "Log" page in the manual. Retain the "Log" page with the latest date on the bottom of the page and discard the other log.

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.


WING AREA: 181 SQ. FT.
12'6"
76" DIA.
128.0"
38'
29'5"
9'6"
10"
85" APPROX.
76-607-4

THREE-VIEW



GROUND TURNING CLEARANCE

Ⓐ Radius for Wing Tip .....27 feet 2 inches
Ⓑ Radius for Nose Wheel.....9 feet 10 inches
Ⓒ Radius for Inside Gear.....3 feet 1 inch
Ⓓ Radius for Outside Gear ..... 13 feet 8 inches

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

DESCRIPTIVE DATA

ENGINES

Two Avco Lycoming engines are installed; one O-360-A1G6D (clockwise rotating) located on the left wing, and one LO-360-A1G6D (counterclockwise rotating) located on the right wing. The engines are four-cylinder, direct-drive, horizontally opposed, and each rated at 180 horsepower at 2700 rpm.

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

Recommended Maximum
Cruise Power . . . . . 24 in. Hg, 2700 rpm

PROPELLERS

The airplane is equipped with two Hartzell, constant-speed, full-feathering, two-blade propellers: the left engine (clockwise rotating) has an HC-M2YR-2CEUF hub with FC 7666A blades and a C2285-3P spinner; the right engine (counterclockwise rotating) incorporates an HC-M2YR-2CLEUF hub with FJC 7666A blades and a C2285-3LP spinner.

Pitch settings at the 30 inch station: Low, 12.1° ± .1°; High, 17° to 20°; Feathered, 81° ± 1°.

Diameter is 76 inches, with cut-off permitted to 74.0 inches.

FUEL

Aviation Gasoline, grade 100 (green) or grade 100 LL (blue).

Total Capacity . . . . . 103 gallons
Total Usable . . . . . 100 gallons

OIL

Engine oils must meet Avco Lycoming Specification No. 301F and be used in accordance with Avco Lycoming Service Instructions No. 1014J or subsequent revisions. Refer to HANDLING, SERVICING, AND MAINTENANCE section for a list of oils meeting this specification.

Average Ambient Air Temperature	MIL-L-6082 Grades	MIL-L-22851 Ashless Dispersant Grades
Above 60°F	SAE 50	SAE 40 or SAE 50
30° to 90°F	SAE 40	SAE 40
0° to 70°F	SAE 30	SAE 40, SAE 30 or SAE 20W40
Below 10°F	SAE 20	SAE 30 or SAE 20W30

Oil Capacity .....8 quarts each engine

MAXIMUM CERTIFICATED WEIGHTS

Maximum Ramp Weight . . . . . 3916 lbs
Maximum Take-off Weight . . . . . 3900 lbs
Maximum Landing Weight . . . . . 3900 lbs
Maximum Zero Fuel Weight . . . . . 3500 lbs
Maximum Weight in Baggage Compartment . . . 200 lbs

STANDARD AIRPLANE WEIGHTS

Standard Empty Weight	2446 lbs
Maximum Useful Load	1470 lbs

CABIN AND ENTRY DIMENSIONS

Cabin Width (maximum)	3 ft 8 in.
Cabin Length (maximum)	7 ft 11 in.
Cabin Height (maximum)	4 ft
Cabin Door	36 in. x 38 in.
Door Sill Height	2 in.

BAGGAGE SPACE AND ENTRY DIMENSIONS

Compartment Volume	19.5 cu ft
Compartment Width (nominal)	38 in.
Compartment Length (nominal)	26 in.
Compartment Height (nominal)	37 in.
Door Width (minimum)	22 in.
Door Height (minimum)	33 in.

SPECIFIC LOADINGS

Wing Loading at Maximum Take-off Weight	21.5 lbs/sq ft
Power Loading at Maximum Take-off Weight	10.8 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

IAS	Indicated Airspeed is the speed of an airplane as shown on its airspeed indicator. As used within this handbook IAS assumes no instrument error.
CAS	Calibrated Airspeed is the indicated airspeed of an airplane, corrected for position and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.
TAS	True Airspeed is the airspeed of an airplane relative to undisturbed air which is the CAS corrected for altitude, temperature, and compressibility.
GS	Ground Speed is the speed of an airplane relative to the ground.
V_{MCA}	Air Minimum Control Speed is the minimum flight speed at which the airplane is directionally controllable as determined in accordance with Federal Aviation Regulations. The airplane certification conditions include one engine becoming inoperative and windmilling, a 5-degree bank towards the operative engine, take-off 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 subscale has been set to 29.92 in. Hg (1013.2 millibars).
Pressure Altitude	Altitude measured from standard sea level pressure (29.92 in. Hg) by a pressure or barometric altimeter. It is the indicated pressure altitude corrected for position and instrument error. In this handbook, altimeter instrument errors are assumed to be zero. Position errors may be obtained from the Altimeter Correction graph.
Station Pressure	Actual atmospheric pressure at field elevation.
Wind	The wind velocities recorded as variables on the charts of this handbook are to be understood as the headwind or tailwind components of the reported winds.

POWER TERMINOLOGY

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

ENGINE CONTROLS AND INSTRUMENTS TERMINOLOGY

Throttle Control	The lever used to control power by introducing fuel-air mixture into the intake passages of the engine. Settings are reflected by readings on the manifold pressure gage.
Propeller Control	This lever requests the governor to maintain rpm at a selected value and, in the maximum decrease rpm position, feathers the propeller.
Mixture Control	This lever is used to set fuel flow in all modes of operation and cuts off fuel completely for engine shutdown.
Tachometer	Indicates the rotational speed of the engine/propeller in revolutions per minute (rpm).
Propeller Governor	Regulates the rpm of the engine/propeller by increasing or decreasing the propeller pitch through a pitch change mechanism in the propeller hub.
Manifold Pressure	An instrument that measures the absolute pressure in the intake manifold of an engine, expressed in inches of mercury (in. Hg).
EGT	The Exhaust Gas Temperature Indicator is used to identify the lean and best-power fuel flow mixtures for various power settings during cruise.

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 an airplane 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 an airplane 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.

WEIGHT AND BALANCE TERMINOLOGY

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.
Usable Fuel	Fuel available for flight planning.
Unusable Fuel	Fuel remaining after a runout test has been completed in accordance with governmental regulations.
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.
Maximum Zero Fuel Weight	Maximum weight exclusive of usable fuel.

Loading Condition	That combination of airplane weight and corresponding moment applicable to the various loadings computed for weight and balance purposes.
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 (CG) 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 (CG)	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.
CG Arm	The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.
CG Limits	The extreme center of gravity locations within which the airplane must be operated at a given weight.

Tare	The apparent weight which may be indicated by a scales before any load is applied.
Leveling Points	Those points which are used during the weighing process to level the airplane.
Jack Points	Points on the airplane identified by the manufacturer as suitable for supporting the airplane for weighing or other purposes.

SECTION II

LIMITATIONS

TABLE OF CONTENTS

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

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

AIRSPEED LIMITATIONS

SPEED	CAS KTS	IAS KTS	REMARKS
Never Exceed V_{NE}	194	194	Do Not Exceed This Speed in Any Operation.
Maximum Structural Cruising V_{NO}	154	154	Do Not Exceed This Speed Except in Smooth Air and Then Only With Caution.
Maneuvering V_A	132	132	Do Not Make Full or Abrupt Control Movements Above This Speed.
Maximum Flap Extension/Extended V_F and V_{FE} (Full Down 35°)	110	110	Do Not Extend Flaps or Operate With Flaps Extended Above This Speed.
Maximum Landing Gear Extended V_{LE}	140	140	Do Not Exceed This Speed With Landing Gear Extended.
Maximum Landing Gear Operating V_{LO}			Do Not Extend or Retract Landing Gear Above This Speed.
Extension	140	140	
Retraction	113	112	
Air Minimum Control V_{MCA}	67	65	Minimum Speed for Directional Controllability After Sudden Loss of Engine.

*AIRSPEED INDICATOR MARKINGS

MARKING	CAS VALUE OR RANGE KTS	IAS VALUE OR RANGE KTS	SIGNIFICANCE
White Arc	58-110	60-110	Full Flap Operating Range
Blue Radial	86	85	Single-Engine Best Rate-of-Climb
Red Radial	67	65	Minimum Single-Engine Control (V_{MCA})
Green Arc	68-154	70-154	Normal Operating Range
Yellow Arc	154-194	154-194	Operate With Caution, Only In Smooth Air
Red Radial	194	194	Maximum Speed For All Operations (Never Exceed)

*The airspeed indicator is marked in IAS values.

POWER PLANT LIMITATIONS

ENGINES

Two Avco Lycoming engines installed; one O-360-A1G6D (clockwise rotating) located on the left wing, and one LO-360-A1G6D (counterclockwise rotating) located on the right wing. The engines are four-cylinder, direct-drive, horizontally opposed, and each rated at 180 horsepower at 2700 rpm.

Take-off and Maximum
Continuous Power ..... Full Throttle, 2700 RPM
Maximum Oil Temperature ..... 245°F
Maximum Cylinder Head Temperature ..... 500°F

Minimum Oil Pressure (Idle)..... 25 psi
Maximum Oil Pressure..... 100 psi
Minimum Fuel Pressure..... 0.5 psi
Maximum Fuel Pressure..... 8.0 psi

FUEL

Aviation Gasoline, grade 100 (green) or grade 100 LL (blue).

FUEL ADDITIVES

ALCOR TCP Concentrate, mixed according to the instructions provided by Alcor, Inc.

OIL

Engine oils must meet Avco Lycoming Specification No. 301F and be used in accordance with Avco Lycoming Service Instruction No. 1014J or subsequent revisions. Refer to the Approved Engine Oils, Section VIII, SERVICING.

PROPELLERS

Two Hartzell, constant-speed, full-feathering, two-blade propellers: the left engine (clockwise rotating) has an HC-M2YR-2CEUF hub with FC 7666A blades and C2285-3P spinner; the right engine (counterclockwise rotating) incorporates an HC-M2YR-2CLEUF hub with FJC 7666A blades and a C2285-3LP spinner.

Pitch settings at the 30-inch station: Low, 12.1° ± .1°; High, 17° to 20°; Feathered, 81° ± 1°.
Diameter is 76 inches, with cut-off permitted to 74.0 inches.

POWER PLANT INSTRUMENT MARKINGS

Oil Temperature
Caution Range (Yellow Arc) ..... 60 to 120°F
Normal Operating Range (Green Arc) ..... 120 to 245°F
Maximum (Red Radial) ..... 245°F

Oil Pressure
Minimum Idle (Red Radial) ..... 25 psi
Caution Range (Yellow Arc) ..... 25 to 60 psi
Normal Operating Range (Green Arc) ..... 60 to 100 psi
Maximum (Red Radial) ..... 100 psi

Manifold Pressure
Normal Operating Range (Green Arc) ..... 15 to 29.6 in. Hg

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

Fuel Pressure
Minimum (Red Radial) ..... 0.5 psi
Normal Operating Range (Green Arc) ..... 0.5 to 8.0 psi
Maximum (Red Radial) ..... 8.0 psi

Cylinder Head Temperature
Normal Operating Range (Green Arc) ..... 200 to 500°F
Maximum (Red Radial) ..... 500°F

MISCELLANEOUS INSTRUMENT MARKINGS

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

Fuel Quantity
Yellow Arc.....E to 9 Gallons

WEIGHT LIMITS

Maximum Ramp Weight..... 3916 lbs
Maximum Take-off Weight..... 3900 lbs
Maximum Landing Weight ..... 3900 lbs
Zero Fuel Weight ..... 3500 lbs
Maximum Baggage Compartment Load ..... 200 lbs

CENTER OF GRAVITY (Landing Gear Extended)

Forward Limits: 106.6 inches aft of datum at 3250 lbs and under, then straight line variation to 110.6 inches aft of datum at a weight of 3900 lbs.

Aft Limit: 117.5 inches aft of datum at all weights.
Reference Datum: 129.37 inches forward of the center of wing spar jack points.

MAC Leading Edge: 99.08 inches aft of datum.

MAC Length: 57.65 inches.

MANEUVERS

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

Maximum slip duration..... 30 seconds

FLIGHT LOAD FACTORS (3900 POUNDS)

Positive maneuvering load factors:
Flaps Up 3.8G
Flaps Down (DN) 2.0G

Negative maneuvering load factor:
Flaps Up ..... −1.52G

MINIMUM FLIGHT CREW ..... One pilot

KINDS OF OPERATION

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 PROHIBITED.

FUEL

TOTAL FUEL with left and right wing fuel systems full:

Capacity..... 103 gallons*
Usable ..... 100 gallons

*Value given is nominal. Tank capacity will vary with temperature, and manufacturing tolerances.

FUEL MANAGEMENT

Do not take off when Fuel Quantity indicators indicate in the yellow band on either indicator.

Maximum slip duration is 30 seconds.

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

SEATING

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

STRUCTURAL LIFE

The basic wing structure has a substantiated life of 20,000 flight hours provided the mandatory inspection requirements of chapter four of the BEECHCRAFT DUCHESS 76 MAINTENANCE MANUAL are complied with.

REQUIRED EQUIPMENT FOR VARIOUS CONDITIONS OF FLIGHT

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

Regulations also require that all airplanes be certified 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 were 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.

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

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

SYSTEM and/or COMPONENT	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 system	1	1	1	1	-
DC alternator	2	2	2	2	-
DC loadmeter	2	2	2	2	-

Alternator-out overvoltage indicator light	2	2	2	2	-
Alternator-out undervoltage indicator light	2	2	2	2	-
Starter Engaged Warning Light (ME-333, ME-346 and after)	1	1	1	1	- May be inoperative provided loadmeters are operative and monitored.
EQUIPMENT AND FURNISHINGS					
Seat belts and shoulder harnesses	1	1	1	1	- Per Person or Per FAR 91
Emergency locator transmitter	1	1	1	1	- Per FAR 91
FIRE PROTECTION					
Portable fire extinguisher	*	*	*	*	- *Optional

SYSTEM and/or COMPONENT	VFR Day	VFR Night	IFR Day	IFR Night	Remarks and/or Exceptions
FLIGHT CONTROLS					
Trim tab indicators - Rudder	1	1	1	1	- May be inoperative provided that tabs are visually checked in the neutral position prior to each takeoff and checked for full range of operation.
Elevator	1	1	1	1	
Flap position indicator	1	1	1	1	- May be inoperative provided flap travel is visually inspected prior to takeoff.
Stall warning system	1	1	1	1	-

FUEL EQUIPMENT					
Engine driven fuel pump	2	2	2	2	-
Electrically driven aux fuel pump	2	2	2	2	-
Fuel quantity indicator	2	2	2	2	- One may be inoperative provided other side is operational and amount of fuel on board can be established to be adequate for the intended flight.
Fuel pressure indicator	2	2	2	2	-
ICE AND RAIN PROTECTION					
Alternate static air source	1	1	1	1	-
Pitot heater	-	-	1	1	-

SYSTEM and/or COMPONENT	VFR Day	VFR Night	IFR Day	IFR Night	Remarks and/or Exceptions
LANDING GEAR					
Landing gear motor	1	1	1	1	
Landing gear position lights	4	4	4	4	
Landing gear warning horn	1	1	1	1	
LIGHTS					
Cockpit and instrument lights	-	*	-	*	- *Lights must be operative
Taxi Light (2)	-	-	-	-	

Landing light (1)	-	*	-	*	-	*Per FAR 91
Strobe light	*	2	*	2	-	*Optional
Position light	-	3	-	3	-	
NAVIGATION INSTRUMENTS						
Altimeter	1	1	1	1	-	
Airspeed indicator	1	1	1	1	-	
Vertical speed	-	-	-	-	-	
Magnetic compass	1	1	1	1	-	
Attitude indicator	-	-	1	1	-	
Turn and slip indicator	-	-	1	1	-	
Directional gyro	-	-	1	1	-	
Clock	-	-	1	1	-	
Transponder	*	*	*	*	-	*Per FAR 91
Navigation equipment	-	-	*	*	-	*Per FAR 91

SYSTEM and/or COMPONENT	VFR Day	VFR Night	IFR Day	IFR Night	Remarks and/or Exceptions
PNEUMATIC					
Pressure system for instrument air	-	-	1	1	-
Pressure gage	-	-	1	1	-
ENGINE INDICATING INSTRUMENTS					
Engine tachometer indicator	2	2	2	2	-
Exhaust gas temperature indicator	*	*	*	*	- *Optional

Manifold pressure indicator	2	2	2	2	-
Cylinder head temperature indicator	2	2	2	2	-
ENGINE OIL INSTRUMENTS					
Oil pressure indicator	2	2	2	2	-
Oil temperature indicator	2	2	2	2	-

PLACARDS

On Left Cabin Door (ME-I thru ME-282, ME-284 thru ME-286) or On Left Cabin Sidewall (ME-283, ME-287 and after):

OPERATION LIMITATIONS

THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATION STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS. MAXIMUM WEIGHT IS 3900 LBS. THIS AIRPLANE APPROVED FOR VFR, IFR, DAY AND NIGHT NON-ICING FLIGHT WHEN EQUIPPED IN ACCORDANCE WITH FAR 91 OR FAR 135.

NO ACROBATIC MANEUVERS INCLUDING SPINS APPROVED.

WARNING – TURN OFF STROBE LIGHTS WHEN TAXIING IN VICINITY OF OTHER AIRCRAFT OR DURING FLIGHT THROUGH CLOUD, FOG OR HAZE.

AIRSPEEDS

NEVER EXCEED	194 KNOTS
MAX. STRUCTURAL CRUISE	154 KNOTS
MAX. MANEUVERING	132 KNOTS
MAX. FLAPS 20°	120 KNOTS
MAX. FULL DOWN FLAPS 35°	110 KNOTS
MAX. LANDING GEAR EXTENSION	140 KNOTS
MAX. LANDING GEAR RETRACTION	113 KNOTS
ALTITUDE LOST IN ONE ENGINE INOP STALL & 10° PITCH DOWN	150 FEET

Lower Sidewall Adjacent to Pilot:

WARNING

ALTERNATE STATIC AIR SOURCE

SEE PERFORMANCE SECTION OF PILOTS OPERATING HANDBOOK FOR AIRSPEED & ALTIMETER CALIBRATION ERROR

PLACARDS (Cont'd)

On Left Cabin Door:

EMERGENCY GEAR
EXTENSION HANDLE

On Floorboard in Front of Pilot's Seat:

EMERGENCY
GEAR EXTENSION
—ACCESS DOOR—

On Inside of Emergency Gear Extension Access Door:

EMERGENCY LANDING GEAR EXTENSION

1. Landing Gear Motor Circuit Breaker - OFF (Pull)
2. Gear Position Switch - DOWN
3. Maximum Indicated Airspeed - 100 KNOTS

4. Emergency Extension Valve - OPEN
   (Use Handle - Turn Counterclockwise)

On Lower Left Sidewall Panel:

TO LEVEL AIRCRAFT — LEVEL
BAGGAGE COMPARTMENT FLOOR

On Left Side Panel:

DEFROST
PULL ON

CABIN AIR
PULL OFF

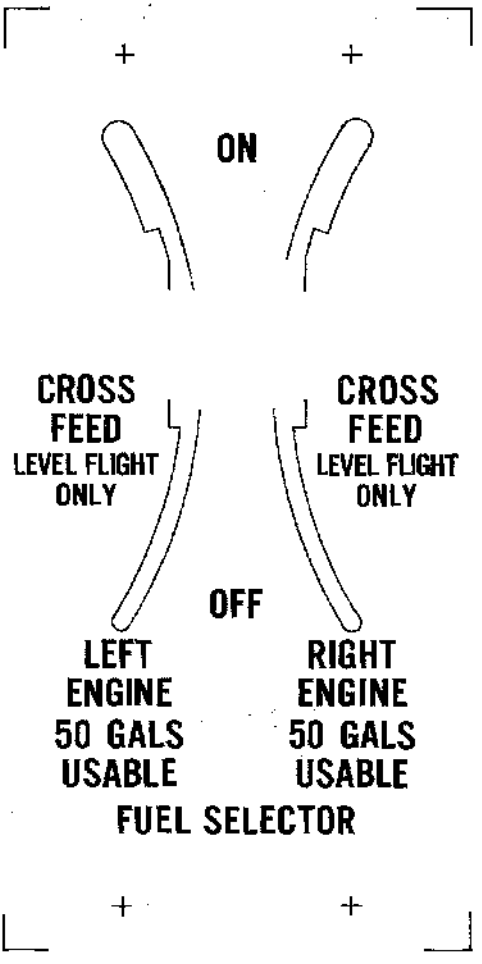
CABIN HEAT
PULL INCREASE

On Aft Cabin Bulkhead:

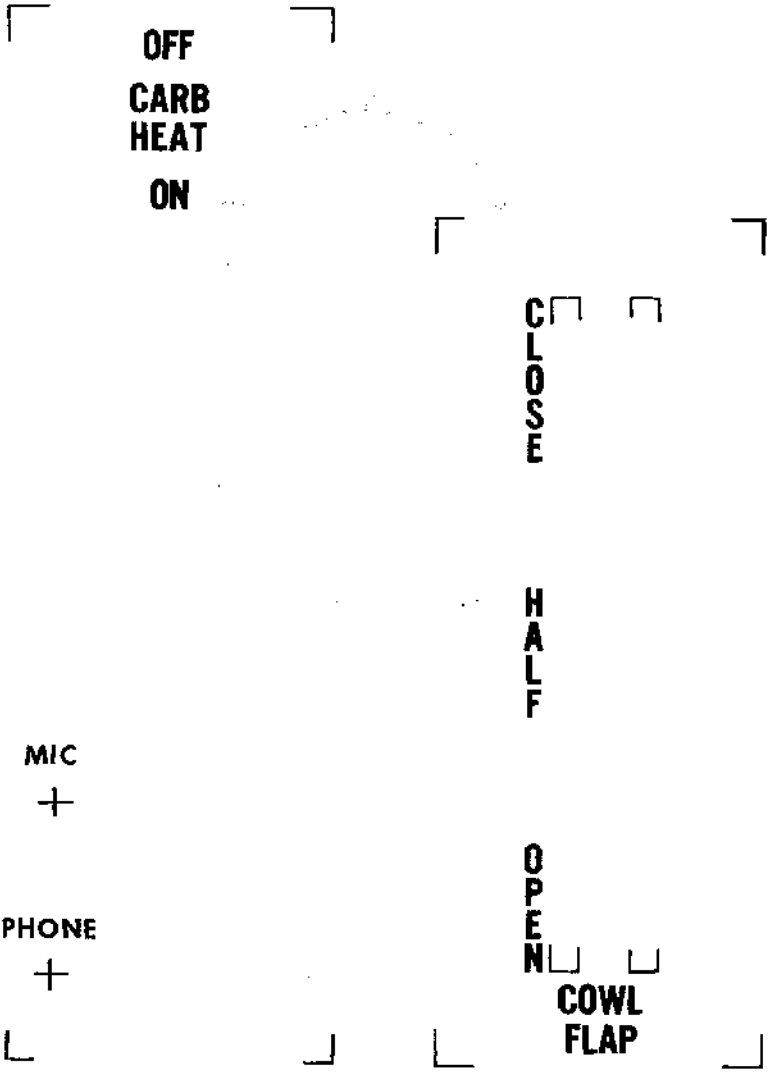
HAT SHELF
NO HEAVY OBJECTS

PLACARDS (Cont'd)

On Fuel Selector Panel:

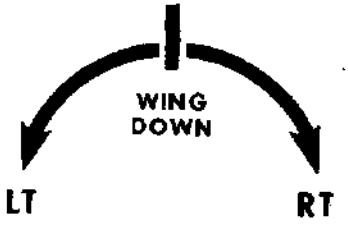


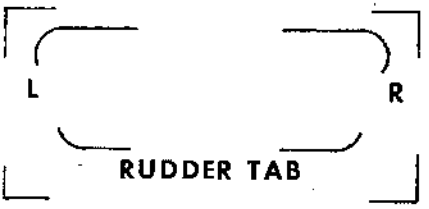
On Pedestal :

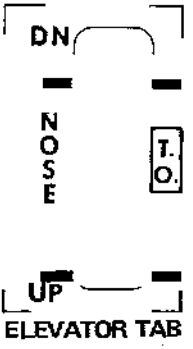


PLACARDS (Cont'd)

On Pedestal Between Front Seats:







Adjacent to Each Seat:

INSTRUCTION-SHOULDER STRAP

1. OCCUPANTS SHORTER THAN 4 FT. 7 IN. **DO NOT** USE SHOULDER STRAP.
2. PLACE SEAT BACK IN THE UPRIGHT POSITION DURING TAKEOFF AND LANDING.

On Baggage Door Adjacent to Handle:

On Baggage Compartment Door:

BAGGAGE COMPARTMENT
LOAD IN ACCORDANCE WITH WEIGHT AND BALANCE INSTRUCTION
MAXIMUM STRUCTURAL CAPACITY - 200 POUNDS

SECTION III

EMERGENCY PROCEDURES

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

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

EMERGENCY AIRSPEEDS (3900 LBS)

One-Engine-Inoperative Best Angle-of-Climb (V_X)	85 kts
One-Engine-Inoperative Best Rate-of-Climb (V_Y)	85 kts
Air Minimum Control Speed (V_{MCA})	65 kts
One-Engine-Inoperative Enroute Climb	85 kts
Emergency Descent	140 kts
One-Engine-Inoperative Landing:	
Maneuvering to Final Approach	90 kts
Final Approach (Flaps Down)	85 kts
Intentional One-Engine-Inoperative Speed (V_{SSE})	71 kts
Maximum Glide Range	95 kts

Stall warning horn is inoperative when the Battery and Alternator Switches are turned off.

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.

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 operative 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 GROUND ROLL

1. Throttles - IDLE
2. Braking - MAXIMUM
3. Fuel Selectors - OFF
4. Battery, Alternator, and Magneto/Start Switches - OFF

NOTE

Braking effectiveness is improved if the brakes are not locked.

ENGINE FAILURE AFTER LIFT-OFF AND IN FLIGHT

An immediate landing is advisable regardless of take-off weight. Continued flight can not 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) - IDLE
3. Propeller (inoperative engine) - FEATHER
4. Power (operative engine) - AS REQUIRED
5. Airspeed - AT OR ABOVE THE 50-FT TAKE-OFF SPEED (80 KNOTS)

After positive control of the airplane is established:

6. Secure inoperative engine:
   a. Mixture Control - IDLE CUT-OFF
   b. Fuel Selector - OFF
   c. Aux Fuel Pump - OFF
   d. Magneto/Start Switch - OFF
   e. Alternator Switch - OFF
   f. Cowl Flap - CLOSE
7. Airspeed - ESTABLISH 85 KTS
8. Electrical Load - MONITOR (Maximum load of 100% on remaining engine)

NOTE

The most important aspect of engine failure is the necessity to maintain lateral and directional control. If airspeed is below 65 knots, reduce power on 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.

NOTE

Airspeed should be maintained at or above 100 KIAS to ensure the engine will windmill.

WITH UNFEATHERING ACCUMULATORS:

1. Fuel Selector - ON
2. Throttle - SET approximately ¼ travel
3. Aux Fuel Pump - ON
4. Magneto/Start Switch - BOTH
5. Propeller Control - MOVE FULL FORWARD UNTIL ENGINE WINDMILLS, THEN BACK TO MIDRANGE. USE STARTER MOMENTARILY IF AIRSPEED IS BELOW 100 KTS.

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

6. Mixture - FULL RICH
7. If engine fails to run, clear engine by allowing it to windmill with mixture in the FULL LEAN position. When engine fires, advance mixture to FULL RICH.
8. When Engine Starts - ADJUST THROTTLE, PROPELLER, AND MIXTURE CONTROLS
9. Aux Fuel Pump - OFF (when reliable power has been regained)
10. Alternator Switch - ON
11. Oil Pressure and Oil Temperature - CHECK
12. Warm Up Engine (approximately 2000 rpm and 15 in. HG)
13. Set power as required and trim.

WITHOUT UNFEATHERING ACCUMULATORS:

CAUTION

Numerous air starts without unfeathering accumulators can shorten engine-mount life.

1. Fuel Selector - ON
2. Throttle - SET approximately ¼ travel
3. Aux Fuel Pump - ON
4. Magneto/Start Switch - BOTH
5. Mixture - FULL RICH
6. Propeller Control - MOVE FORWARD OF FEATHERING DETENT TO MIDRANGE
7. Magneto/Start Switch - START and PUSH TO PRIME (hold on START until windmilling begins and continue to prime as required)

NOTE

If air start is unsuccessful, return propeller control to the FEATHER position and secure engine.

8. When Engine Starts - ADJUST THROTTLE, PROPELLER, AND MIXTURE CONTROLS
9. Aux Fuel Pump - OFF (when reliable power has been regained)
10. Alternator Switch - ON
11. Oil Pressure and Oil Temperature - CHECK
12. Warm Up Engine (approximately 2000 rpm and 15 in. Hg)
13. Set power as required and trim.

ENGINE FIRE (GROUND)

1. Mixture Controls - IDLE CUT-OFF
2. Continue to crank affected engine
3. Fuel Selectors - OFF
4. Battery and Alternator Switches - OFF
5. Extinguish fire with extinguisher

ENGINE FIRE 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 - OFF
2. Mixture Control - IDLE CUT-OFF
3. Propeller - FEATHER
4. Aux Fuel Pump - OFF
5. Magneto/Start Switch - OFF
6. Alternator Switch - OFF

EMERGENCY DESCENT

1. Propellers - 2700 RPM
2. Throttles - IDLE
3. Airspeed - 140 KTS
4. Landing Gear - DOWN

MAXIMUM GLIDE CONFIGURATION

1. Propellers - FEATHER
2. Wing Flaps - UP
3. Landing Gear - UP
4. Cowl Flaps - CLOSE
5. Airspeed - 95 KTS

The glide ratio in this configuration is approximately 2 nautical miles of gliding distance for each 1000 feet of altitude above the terrain.

LANDING EMERGENCIES

GEAR-UP LANDING

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

1. Cowl Flaps - CLOSE
2. Wing Flaps - FULL DOWN (DN)
3. Throttles - IDLE
4. Mixture Controls - IDLE CUT-OFF
5. Battery, Alternator, and Magneto/Start Switches - OFF
6. Fuel Selectors - 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. Airspeed - 85 KTS
3. Power - AS REQUIRED

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

4. Wing Flaps - FULL DOWN (DN)
5. Execute normal landing.

ONE-ENGINE-INOPERATIVE GO-AROUND

WARNING

Level flight may 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. Wing Flaps - UP
4. Airspeed - MAINTAIN 85 KTS MINIMUM

SYSTEMS EMERGENCIES

OPERATION ON CROSSFEED

NOTE

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

Left Engine Inoperative:

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

Right Engine Inoperative:

1. Left Aux Fuel Pump - ON
2. Right Fuel Selector - OFF
3. Left Fuel Selector - CROSSFEED
4. Left Aux Fuel Pump - ON 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 instruments and stall warning horn will become inoperative.

2. All Electrical Switches - OFF
3. Battery and Alternator Switches - ON
4. 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. To aid in smoke evacuation, open pilot's storm window if required.

COMPLETE LOSS OF ELECTRICAL POWER

INDICATIONS

1. Dimming of lights, with loadmeters showing 100% or much greater than normal, or loadmeters showing 0% accompanied by no ALTERNATOR-OUT Lights.

ACTION

1. Both Alternator Switches - OFF
2. Battery Switch - OFF
3. Both BUS-ISO Circuit Breakers - PULL
4. Remove all electrical loads.
5. Both Alternator Switches - ON.
6. Minimize all electrical loads. Select only that electrical equipment which is essential for safe flight.
7. Extend landing gear with emergency system.
8. LAND AS SOON AS PRACTICAL; HAVE THE COMPLETE ELECTRICAL SYSTEM CHECKED BEFORE THE NEXT FLIGHT.

CAUTION

Since the battery is off line when this procedure is used, large changes in electrical load should be minimized in order to reduce the possibility of damage to electrical components.

ILLUMINATION OF ALTERNATOR-OUT LIGHT

In the event of the illumination of a single ALTERNATOR-OUT UNDERVOLTAGE light or a single ALTERNATOR-OUT OVERVOLTAGE light:

Check the respective loadmeter for load indication:

a. No Load - Turn off affected alternator.
b. Reduce load to single alternator capability.
c. Reset the affected alternator with the alternator switch. Monitor overvoltage and undervoltage lights and loadmeter for proper operation.

CAUTION

If proper operation is not restored, turn alternator switch OFF.

In the event of the illumination of both ALTERNATOR-OUT UNDERVOLTAGE lights or both ALTERNATOR-OUT OVERVOLTAGE lights:

Check loadmeters for load indication. If condition indicates malfunction of both alternator circuits:

a. Both ALT Switches - OFF
b. Minimize electrical load since only battery power will be available.
c. Reset the alternators with the alternator switches. Monitor overvoltage and undervoltage lights and loadmeters for proper operation.

CAUTION

If proper operation is not restored, turn alternator switches OFF.

STARTER ENGAGED WARNING LIGHT ILLUMINATED (If installed)

After engine start, should the starter relay remain engaged, the starter will remain energized and the starter engaged warning light will remain illuminated. Continuing to supply power to the starter will result in eventual loss of electrical power.

Illuminated On the Ground:

1. Battery and Alternator Switches - OFF
2. Do not take off

Illuminated In Flight After Air Start:

1. Perform action for COMPLETE LOSS OF ELECTRICAL POWER (see this section)
2. Land as soon as practical

UNSCHEDULED ELECTRIC ELEVATOR TRIM

1. Airplane Attitude - MAINTAIN using elevator control.
2. Elevator Trim Thumb Switch (on control wheel) - DEPRESS AND MOVE IN DIRECTION OPPOSITE UNSCHEDULED PITCH TRIM.
3. Elevator Trim ON-OFF Switch (on instrument panel) - OFF
4. Manual Elevator Trim Control Wheel - RETRIM AS DESIRED

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. Landing GEAR MOTOR Circuit Breaker - OFF (pull out)
2. Landing Gear Switch Handle - DOWN position
3. Airspeed - 100 KTS MAXIMUM
4. Emergency Extension Valve - OPEN (Use Emergency Extension Wrench - Turn Counterclockwise)
5. If electrical system is operative, check landing gear position lights and warning horn. (Check Landing GEAR CONTROL circuit breaker engaged.)

WARNING

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 can only be retracted electrically, as follows:

CAUTION

Do not operate landing gear electrically, or turn on landing light or taxi light, if battery is off the line.

1. Emergency Extension Valve - CLOSE (Use Emergency Extension Wrench - Turn Clockwise)
2. Landing GEAR MOTOR Circuit Breaker - ON (push in)
3. Landing Gear Switch Handle - UP

ALTERNATE STATIC AIR SOURCE

THE ALTERNATE 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 obstruction 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 alternate 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 Alternate Static Air System is desired for use:

1. Pilot's Alternate Static Air Source - Switch to ON ALTERNATE (lower sidewall adjacent to pilot)
2. For Airspeed Calibration and Altimeter Correction, refer to PERFORMANCE section.

NOTE

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

EMERGENCY EXIT

The forward cabin doors and/or the aft utility door may be used for egress if required.

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 availabiliy of power to counter potential hazards.

1. Throttle Lever - SET 8.0 in. Hg MANIFOLD PRESSURE
2. Propeller Lever - RETARD TO FEATHER DETENT

NOTE

This setting will approximate Zero Thrust using recommended one-engine-inoperative climb speeds.

UNLATCHED DOOR IN FLIGHT

If the cabin door is not secured it may come unlatched in flight. This usually occurs during or just after takeoff. The door will trail in a position approximately 3 inches open. A buffet may be encountered with the door open in flight. Return to the field in a normal manner. If practicable, during the landing flare-out have a passenger hold the door to prevent it from swinging open.

SPINS

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 nearly 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 class; therefore, no spin tests have been conducted. The recovery technique is based on the best available information.

SECTION IV
NORMAL PROCEDURES

TABLE OF CONTENTS

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

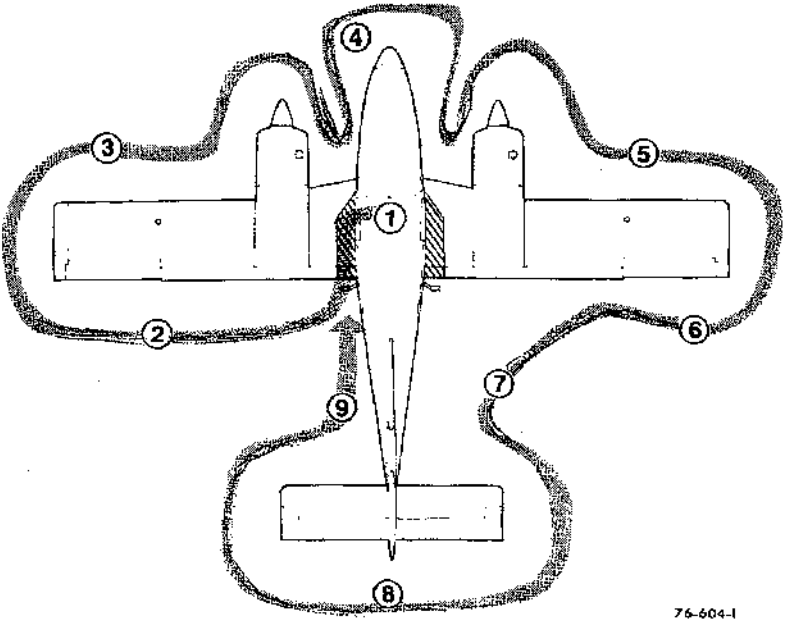
SPEEDS FOR SAFE OPERATION (3900 LBS)

Maximum Demonstrated Crosswind Component..... 25 kts
Takeoff:
- Lift-off..... 71 kts
- 50-ft Speed..... 80 kts

Two-Engine Best Angle-of-Climb (V_X)..... 71 kts
Two-Engine Best Rate-of-Climb (V_Y)..... 85 kts
Cruise Climb..... 100 kts
Turbulent Air Penetration..... 132 kts
Landing Approach:
- Flaps UP..... 87 kts
- Flaps DOWN (DN)..... 76 kts

Balked Landing Climb..... 71 kts
Intentional One-Engine-Inoperative Speed (V_{SSE})..... 71 kts
Air Minimum Control Speed (V_{MCA})..... 65 kts

PREFLIGHT INSPECTION



1. COCKPIT

a. Control Lock - REMOVE AND STOW
b. Parking Brake - SET
c. All Switches - OFF
d. Trim Tabs - SET TO ZERO
e. Flush-type Fuel Drain/Emergency Gear Extension Tool - OBTAIN (refer to SYSTEMS section for information pertaining to flush-type fuel drains). This tool can also be used for opening the oil and fuel filler caps.

2. LEFT WING TRAILING EDGE

a. Flap - CHECK GENERAL CONDITION
b. Fuel Vent - CHECK, UNOBSTRUCTED
c. Aileron - CHECK GENERAL CONDITION AND FREEDOM OF MOVEMENT
d. Wing Tip - CHECK
e. Position and Strobe Light - CHECK

3. LEFT WING LEADING EDGE

a. Pitot - REMOVE COVER, EXAMINE FOR OBSTRUCTIONS
b. Landing and Taxi Light - CHECK
c. Stall Warning Vane - CHECK FREEDOM OF MOVEMENT
d. Fuel Tank - CHECK QUANTITY; Cap - SECURE
e. Tiedown and Chocks - REMOVE
f. Flush-type Fuel Sump - DRAIN (use fuel-drain tool)
g. Fuel Selector - DRAIN
h. Engine Cowling - CHECK CONDITION AND SECURITY

i. Air Intakes - CLEAR
j. Propeller - EXAMINE FOR NICKS, SECURITY, AND OIL LEAKS
k. Engine Oil - CHECK QUANTITY; Cap and Door - SECURE
l. Cowl Flap - CHECK
m. Wheel Well, Door, Tire, Brake Line, and Strut - CHECK
n. Flush-type Crossfeed Fuel Drains (2) - DRAIN (use fuel-drain tool)

4. NOSE SECTION

a. Nose Cowling and Nose Cone - CHECK CONDITION AND SECURITY
b. Heater Air Intake - CLEAR
c. Heater Exhaust and Vents - CLEAR
d. Wheel Well, Doors, Tire, and Strut - CHECK

5. RIGHT WING LEADING EDGE

a. Flush-type Crossfeed Fuel Drains (2) - DRAIN (use fuel-drain tool)
b. Wheel Well, Door, Tire, Brake Line, and Strut - CHECK
c. Engine Cowling - CHECK CONDITION AND SECURITY
d. Air Intakes - CLEAR
e. Propeller - EXAMINE FOR NICKS, SECURITY, AND OIL LEAKS
f. Engine Oil - CHECK QUANTITY; Cap and Door - SECURE

g. Cowl Flap - CHECK
h. Fuel Selector - DRAIN
i. Flush-type Fuel Sump - DRAIN
j. Tiedown and Chocks - REMOVE
k. Fuel Tank - CHECK QUANTITY; Cap - SECURE
l. Stall Warning Vane - CHECK FREEDOM OF MOVEMENT
m. Taxi Light - CHECK
n. Wing Tip - CHECK
o. Position and Strobe Light - CHECK

6. RIGHT WING TRAILING EDGE

a. Aileron - CHECK CONDITION AND FREEDOM OF MOVEMENT
b. Fuel Vent - CHECK, UNOBSTRUCTED
c. Flap - CHECK GENERAL CONDITION

7. FUSELAGE RIGHT SIDE

a. Battery Vents - CHECK, UNOBSTRUCTED
b. Static Port - CLEAR OF OBSTRUCTIONS
c. Emergency Locator Transmitter - ARMED

8. EMPENNAGE

a. Control Surfaces and Trim Tabs - CHECK
b. Tail Cone and Position Light - CHECK
c. Tiedown - REMOVE
d. Cabin Air Inlet - CHECK

9. FUSELAGE LEFT SIDE

a. Static Port - CLEAR OF OBSTRUCTIONS
b. Cabin Air Outlet - CHECK
c. All Antennas - CHECK
d. Load Distribution - CHECK AND SECURE
e. Aft Utility Door - CHECK SECURE

NOTE

Check operation of lights if night flight is anticipated.

BEFORE STARTING

1. Fuel Drain/Emergency Extension Tool - STOW
2. Seats - POSITION AND LOCK; Seat Backs - UPRIGHT
3. Seat Belts and Shoulder Harnesses - FASTEN
4. Parking Brake - SET
5. All Avionics - OFF
6. Circuit Breakers - IN
7. Landing Gear Handle - DOWN
8. Carburetor Heat - OFF (up position)
9. Cowl Flap Controls - OPEN (down position)
10. Fuel Selectors - CHECK OPERATION, THEN ON
11. Light Switches - OFF
12. Battery and Alternator Switches - ON
13. Fuel Quantity Indicators - CHECK QUANTITY (See LIMITATIONS for take-off fuel)
14. Landing Gear Position Lights - CHECK

EXTERNAL POWER

The following precautions shall be observed while using external power:

CAUTION

Exercise caution when connecting the external power cable to prevent shorting the battery to the airframe or arcing the clamps of the cable together.

1. Make certain the battery switch is ON and all avionics, and electrical switches are 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).

2. 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.

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

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 13.5 to 14.25 volts (If 28-volt system - SET OUTPUT 27.0 to 28.5 volts)

5. Auxiliary Power Unit - ON
6. Left Engine - START (use normal start procedures)
7. Auxiliary Power Unit - OFF (after engine has been started)
8. Auxiliary Power Unit - DISCONNECT (before starting right engine)
9. Alternator Switches - ON

STARTING

1. Battery Switch - ON; Both ALTERNATOR-OUT UNDERVOLTAGE Lights - ILLUMINATED
2. Mixture - FULL RICH
3. Propeller - HIGH RPM (Low Pitch)
4. Throttle - FAST IDLE (1/4 Travel)
5. Aux Fuel Pump - ON
6. Magneto/Start Switch - Engage starter - PUSH TO PRIME as engine is cranking - Release to BOTH position when engine starts.

WARNING

Do not pump throttles during starting procedures.

Hot Start (Engine Hot)

a. Mixture - FULL RICH
b. Throttle - FAST IDLE (1/4 Travel)
c. Fuel Boost Pump - OFF
d. Starter - ENGAGE (Do Not Prime)

Flooded Engine:

a. Mixture - IDLE CUT-OFF
b. Throttle - FAST IDLE (1/4 Travel)

c. Starter - ENGAGE (After 2 to 3 seconds prime briefly, intermittently)
d. Mixture - ADVANCE TO FULL RICH when engine starts.

CAUTION

Maximum starter engage duty cycle is 30 seconds ON, followed by a minimum of two minutes OFF.

7. Engine Warm-up - 1000 to 1200 RPM
8. Oil Pressure - ABOVE RED RADIAL WITHIN 30 SECONDS
9. External Power (if used) - DISCONNECT
10. Alternator Switch - ON; CHECK FOR CHARGING
11. Starter Engaged Warning Light (if installed) - CHECK; should be illuminated during start and extinguished after start.
12. Using same procedure, start other engine.
13. Left Alternator Switch and Battery Switch - OFF. Check for Left ALTERNATOR-OUT UNDERVOLTAGE Light illuminated, and an indication of less than 75% (14-volt system) or 40% (28-volt system) on the right loadmeter.
14. Left Alternator Switch and Battery Switch - ON.
15. Right Alternator Switch and Battery Switch - OFF. Check for Right ALTERNATOR-OUT UNDER-VOLTAGE Light illuminated, and an indication of less than 75% (14-volt system) or 40% (28-volt system) on the left loadmeter.
16. Right Alternator Switch and Battery Switch - ON.

CAUTION

If the starter engaged warning light remains illuminated after starting, or the loadmeters and/or ALTERNATOR-OUT UNDERVOLTAGE lights do not indicate/illuminate properly, an electrical malfunction is indicated. The battery switch and both alternator switches should be placed in the OFF position. Do not take off.

If the starter engaged warning light is not installed or is inoperative, and the loadmeters and/or ALTERNATOR-OUT UNDERVOLTAGE lights do not indicate/illuminate properly, an electrical malfunction is indicated. The battery switch and both alternator switches should be placed in the OFF position. Do not take off.

AFTER STARTING, AND TAXI

CAUTION

Never taxi with a flat tire or flat shock strut. During taxi operations, particular attention should be given to propeller tip clearance. Extreme caution is required when operating on unimproved or irregular surfaces or when high winds exist.

1. Avionics - ON, AS REQUIRED
2. Lights - AS REQUIRED

NOTE

Turn strobe lights off when taxiing in the vicinity of other aircraft or when flying in fog or clouds. Standard position lights are to be used for all night operations.

3. Annunciator Warning Lights - PRESS-TO-TEST
4. Aux Fuel Pumps - OFF, THEN ON (check fuel pressure indicators to verify operation of engine-driven pumps)
5. All Engine Instruments - CHECK
6. Brakes - RELEASE AND CHECK

CAUTION

Detuning the counterweight system of the engine can occur by rapid throttle operation, high rpm (low pitch) and low manifold pressure, or propeller feathering. (See latest revision of Lycoming Service Bulletin No. 245.)

BEFORE TAKEOFF

1. Seat Belts and Shoulder Harnesses - CHECK
2. Parking Brake - SET
3. Radios - CHECK
4. Flight Instruments - CHECK AND SET
5. Engine Instruments - CHECK
6. Starter Engaged Warning Light (if installed) - CHECK (should not be lit). If light is not installed or is inoperative, monitor loadmeters for proper indications.
7. Fuel Selectors - ON
8. Flight Controls - CHECK PROPER DIRECTION AND FREEDOM OF MOVEMENT

9. Wing Flaps - CHECK OPERATION
10. Electric Trim - CHECK OPERATION
11. Trim - SET TO TAKE-OFF RANGE
12. Throttles - 2200 RPM
13. Propellers - EXERCISE (100-200 rpm drop)
14. Magnetos - CHECK (175 rpm maximum drop, within 50 rpm of each other)

NOTE

Avoid operation on one magneto for more than 5 to 10 seconds. If rpm drop is excessive, lean to smooth operation and recheck.

15. Carburetor Heat - CHECK and set OFF (cold) for takeoff
16. Throttles - 1500 RPM
17. Propellers - FEATHER CHECK (Do not exceed 500 rpm drop.) Repeat 3 or 4 times in cold weather.
18. Gyro Pressure and Loadmeters - CHECK
19. Throttles - IDLE
20. Aux Fuel Pumps - CHECK ON
21. Doors and Window - SECURE
22. Parking Brake - RELEASE
23. Engine Instruments - CHECK

TAKEOFF

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

1. Power - SET TAKE-OFF POWER (before brake release)
2. Mixtures - FULL RICH or lean to smooth operation as required by field elevation
3. Airspeed - ACCELERATE TO AND MAINTAIN TAKE-OFF SPEED

4. Landing Gear - RETRACT when airplane is positively airborne

NOTE

If red in-transit light remains illuminated after 30 seconds, place landing gear switch handle in the down position, make a normal landing and have the landing gear system checked.

5. Airspeed - ESTABLISH DESIRED CLIMB SPEED when clear of obstacles

CLIMB

Maximum Climb ..... Full Throttle, 2700 RPM
Cruise Climb ..... Full Throttle, 2600 RPM

1. Engine Temperatures - MONITOR
2. Power - SET
3. Mixtures - LEAN AS REQUIRED
4. Cowl Flaps - AS REQUIRED
5. Aux Fuel Pumps - OFF

CRUISE

Maximum Cruise Power . . . . . 24.0 in. Hg or full throttle, at 2700 rpm
Recommended Cruise Power . . . . . 24.0 in. Hg or full throttle, at 2500 rpm
Recommended Cruise Power . . . . . 24.0 in. Hg or full throttle, at 2300 rpm
Economy Cruise Power . . . . . 20.0 in. Hg or full throttle, at 2300 rpm

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

LEANING MIXTURE USING THE EXHAUST GAS TEMPERATURE INDICATOR (EGT)

For level flight at 75% power or less, the EGT unit should be used in the following manner:

1. Lean the mixture and note the point on the indicator at which the temperature peaks and starts to fall.

   a. CRUISE (LEAN) MIXTURE - Enrich mixture (push mixture control forward) until EGT indicator shows a drop of 25°F to 50°F on rich side of peak.

   b. BEST POWER MIXTURE - Enrich mixture (push mixture control forward) until EGT indicator shows a drop of 75°F to 100°F on rich side of peak.

   CAUTION

   Do not continue to lean mixture beyond the point necessary to establish peak temperature. Continuous operation is recommended at 25°F or below peak EGT only on rich side of peak.

2. Changes in altitude and power setting require EGT to be rechecked and mixture reset.

3. A mixture resulting in an EGT 25°F on the rich side of peak should also result in fuel flow and TAS values approximately equal to those presented in the Cruise Power Settings tables in the PERFORMANCE Section. If not, the values derived from the Range, Endurance, and Cruise Speeds charts must be revised accordingly. In very cold weather, EGT's 25°F rich of peak may not be obtainable.

DESCENT

1. Altimeter - SET
2. Cowl Flaps - CLOSE
3. Windshield Defroster - AS REQUIRED
4. Carburetor Heat - FULL ON or FULL OFF, AS REQUIRED
5. Power - AS REQUIRED (avoid prolonged idle settings and low cylinder head temperatures)
6. Mixtures - ENRICH AS REQUIRED

BEFORE LANDING

1. Seat Belts and Shoulder Harnesses - FASTENED, SEAT BACKS UPRIGHT
2. Fuel Selectors - CHECK ON
3. Aux Fuel Pumps - ON
4. Mixture Controls - FULL RICH (or as required by field elevation)
5. Carburetor Heat - FULL ON or FULL OFF AS REQUIRED

NOTE

In the event of a go-around, Carburetor Heat shall be in the full OFF (cold) position after full throttle application.

6. Cowl Flaps - AS REQUIRED
7. Landing Gear - DOWN (140 KTS Maximum)
8. Landing and Taxi Lights - AS REQUIRED
9. Wing Flaps - FULL DOWN (DN) (110 KTS Maximum)
10. Airspeed - ESTABLISH LANDING APPROACH SPEED
11. Propellers - HIGH RPM

BALKED LANDING

1. Propellers - HIGH RPM
2. Throttles - FULL FORWARD
3. Airspeed - 71 KTS
4. Wing Flaps - UP
5. Landing Gear - UP
6. Cowl Flaps - AS REQUIRED

AFTER LANDING

1. Landing and Taxi Lights - AS REQUIRED
2. Wing Flaps - UP
3. Trim Tabs - SET TO TAKE-OFF RANGE
4. Cowl Flaps - OPEN

SHUTDOWN

1. Parking Brake - SET
2. Aux Fuel Pumps - OFF
3. Electrical and Avionics Equipment - OFF
4. Propellers - HIGH RPM
5. Throttles - 1000 RPM
6. Mixtures - IDLE CUT-OFF
7. Magneto/Start Switches - OFF, after engines stop
8. Battery and Alternator Switches - OFF
9. Controls - LOCKED
10. Install wheel chocks and release brakes if the airplane is to be left unattended.

ENVIRONMENTAL SYSTEMS

HEATING AND VENTILATION

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

ELECTRIC ELEVATOR TRIM

1. On/Off Switch - ON
2. Control Wheel Trim Switch - Depress and move forward for nose down, aft for nose up, and when released, the switch returns to the center (OFF) position.

Procedure for UNSCHEDULED ELECTRIC ELEVATOR TRIM is given in EMERGENCY PROCEDURES Section.

COLD WEATHER OPERATION

PREFLIGHT INSPECTION

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

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

ENGINES

Use engine oil in accordance with Consumable Materials in the HANDLING, SERVICING AND MAINTENANCE section.

WARNING

Ascertain that magneto/start switches and battery master switch are OFF before moving propeller by hand.

Always pull the propeller through by hand, opposite the direction of rotation, several times to clear the engine and "limber up" the cold, heavy oil before using the starter. This will also lessen the load on the battery if external power is not used.

Under very cold conditions, it may be necessary to preheat the engines prior to a start. Particular attention should be given to the oil cooler, engine sump and propeller hub to

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

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

NOTE

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

During warm-up, monitor engine temperatures closely, since it is quite possible to exceed the cylinder head temperature limit in trying to bring up the oil temperature. Exercise the propellers several times to remove cold oil from the pitch change mechanism. 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.

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.

PRACTICE DEMONSTRATION OF VMCA

VMCA 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 VSSE SPEED OF 71 KTS ARE PROHIBITED.

1. Landing Gear - UP
2. Wing Flaps - UP
3. Airspeed - ABOVE 71 KTS (VSSE)
4. Propeller Levers - HIGH RPM
5. Throttle (simulated inoperative engine) - IDLE
6. Throttle (other engine) - FULL FORWARD
7. Airspeed - REDUCE approximately 1 knot per second until either VMCA 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 VMCA 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 VSSE.

NOISE CHARACTERISTICS

Approach to and departure from an airport should be made so as to avoid prolonged flight at low altitude near noise-sensitive areas. Avoidance of noise-sensitive areas, if practical, is preferable to overflight at relatively low altitudes.

For VFR operations over outdoor assemblies of persons, recreational and park areas, and other noise-sensitive areas, pilots should make every effort to fly not less than 2000 feet above the surface, weather permitting, even though flight at a lower level may be consistent with the provisions of government regulations.

NOTE

The preceding recommended procedures do not apply where they would conflict with Air Traffic Control clearances or instructions, or where, in the pilot's judgement, an altitude of less than 2000 feet is necessary to adequately exercise his duty to see and avoid other airplanes.

Flyover noise level established in compliance with FAR 36 is:

78.7 dB(A)

No determination has been made by the Federal Aviation Administration that the noise level of this airplane is or should be acceptable or unacceptable for operation at, into, or out of any airport.

SECTION V
PERFORMANCE

TABLE OF CONTENTS

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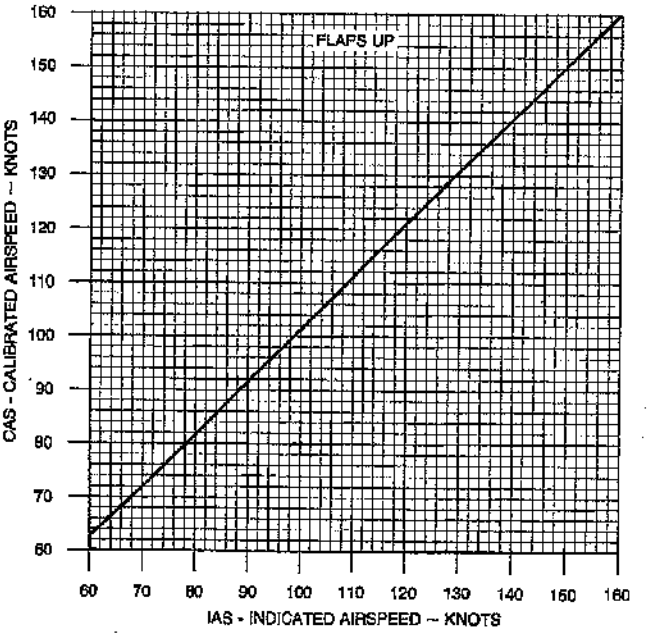
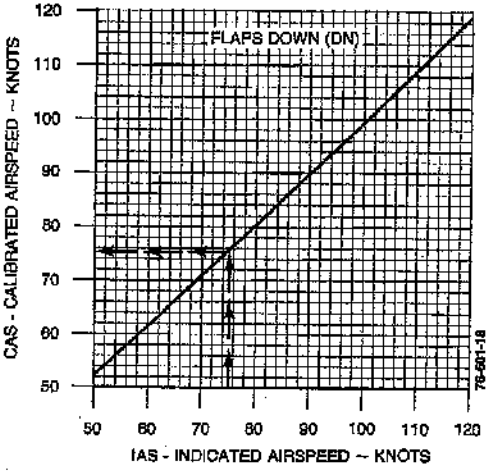
AIRSPEED CALIBRATION - NORMAL SYSTEM

NOTE: INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR



EXAMPLE:

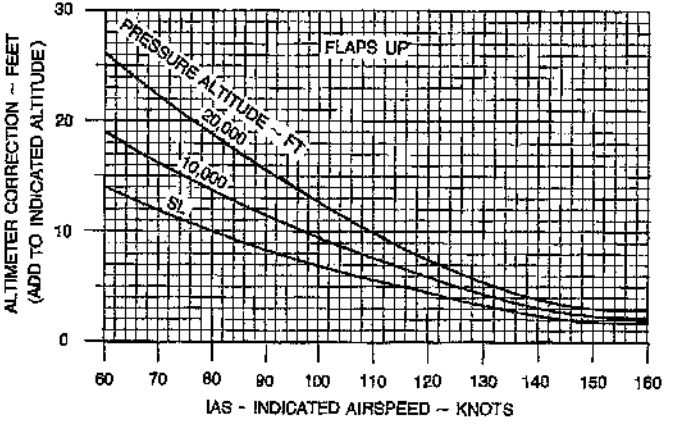
IAS	75 KTS
FLAPS	DOWN (DN)
CAS	75 KTS

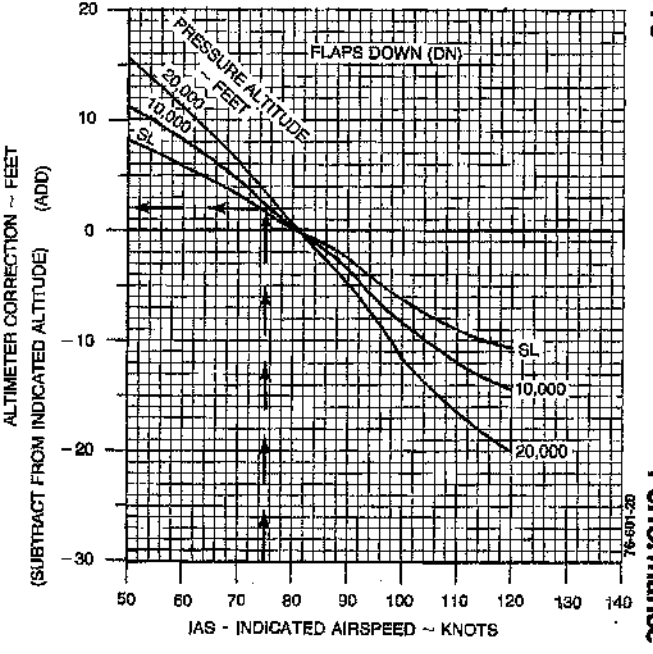


ALTIMETER CORRECTION - NORMAL SYSTEM

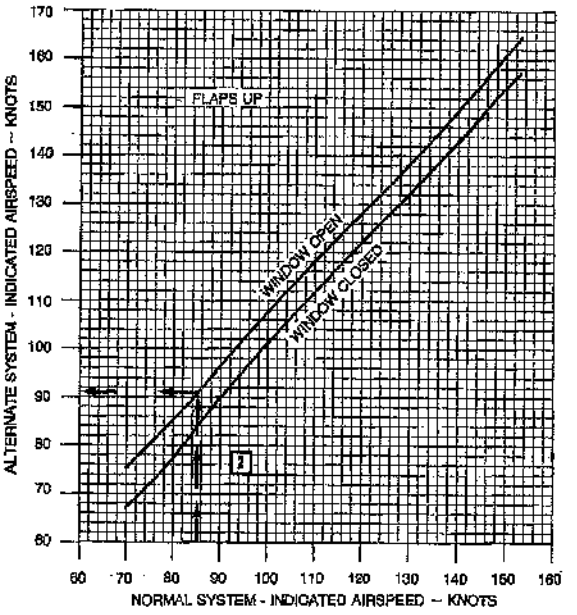
EXAMPLE:

IAS	75 KTS
FLAPS	DOWN (DN)
INDICATED PRESSURE ALTITUDE	4000 FT
ALTIMETER CORRECTION	+2 FT
ACTUAL PRESSURE ALTITUDE	4002 FT





AIRSPEED CALIBRATION - ALTERNATE SYSTEM



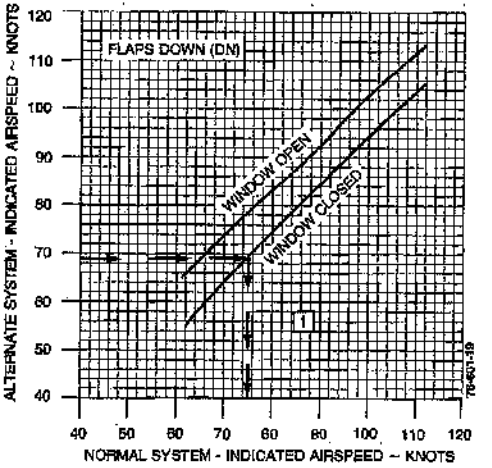
EXAMPLE:

1 FLAPS ..... DOWN (DN)
STORM WINDOW ..... CLOSED
IAS - ALTERNATE SYSTEM ..... 89 KTS

IAS - NORMAL SYSTEM ..... 76 KTS
CAS - (SEE AIRSPEED CALIBRATION NORMAL SYSTEM) ..... 75 KTS

2 FLAPS ..... UP
STORM WINDOW ..... OPEN
IAS - NORMAL SYSTEM ..... 86 KTS

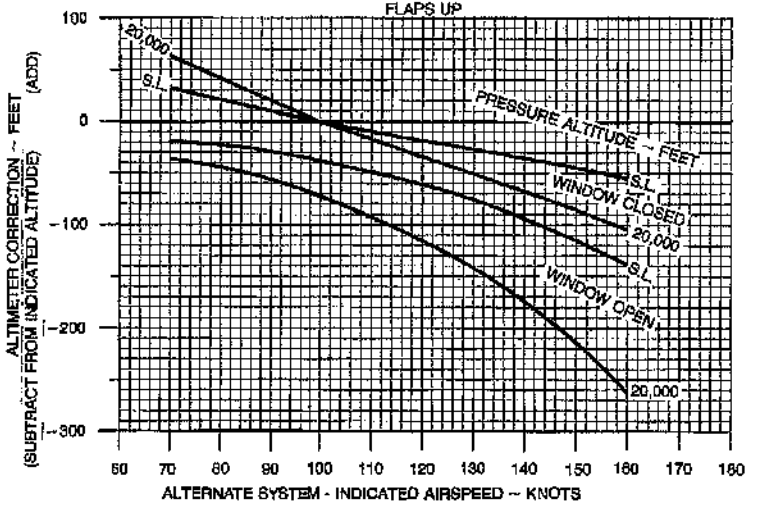
IAS - ALTERNATE SYSTEM ..... 91 KTS

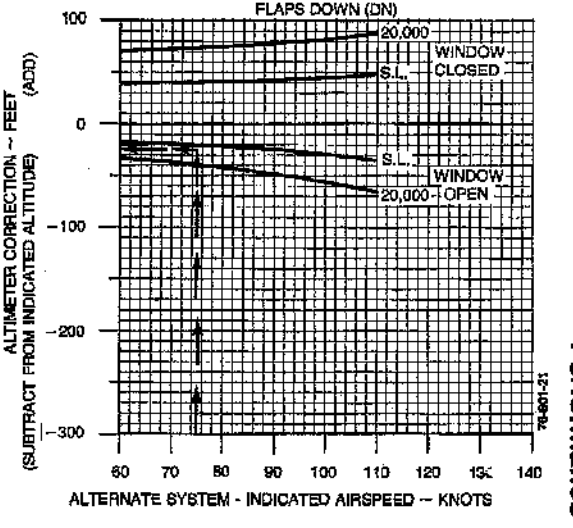


ALTIMETER CORRECTION - ALTERNATE SYSTEM

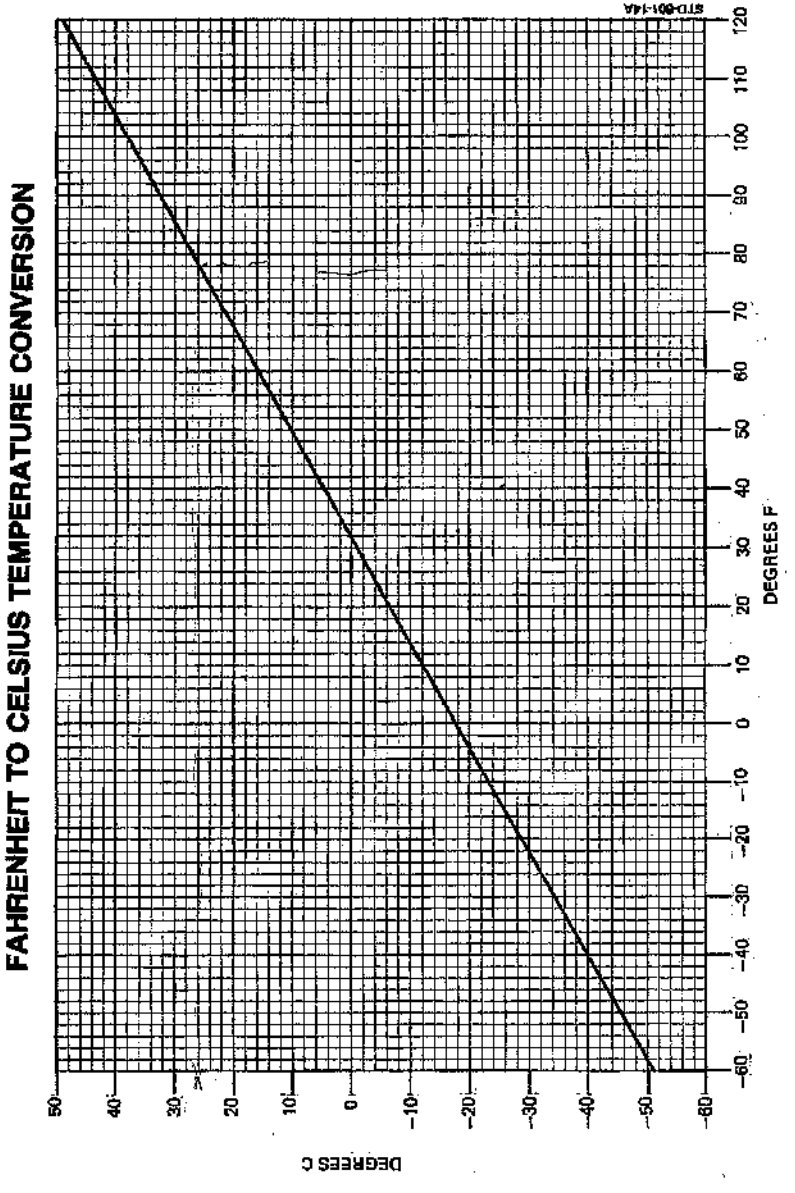
EXAMPLE:

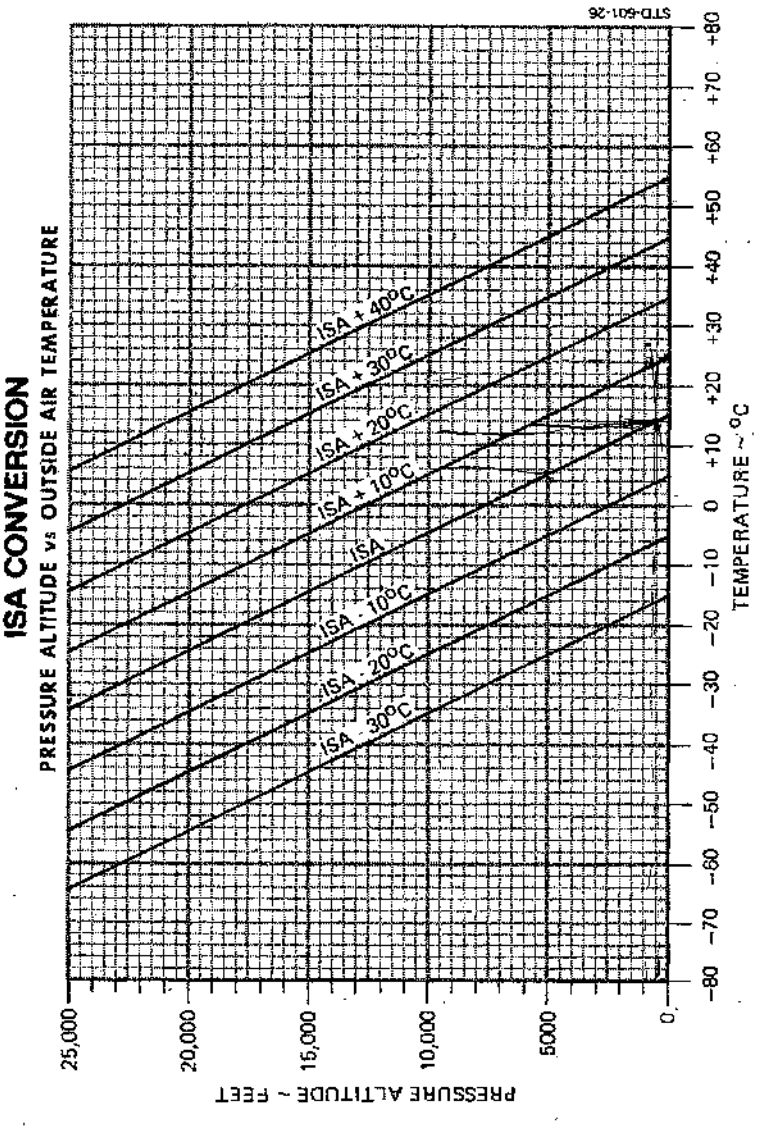
IAS	75 KTS
FLAPS	DOWN (DN)
INDICATED PRESSURE ALTITUDE	4000 FT
STORM WINDOW	OPEN
ALTIMETER CORRECTION	−25 FT
ACTUAL PRESSURE ALTITUDE	3975 FT



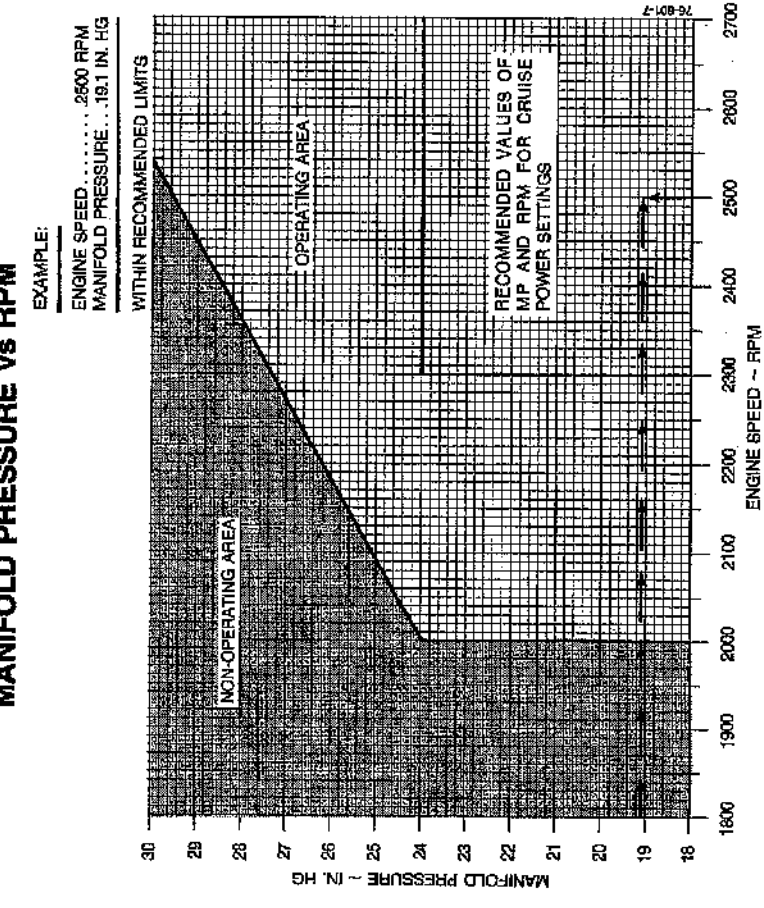


FAHRENHEIT TO CELSIUS TEMPERATURE CONVERSION




STD-601-26
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
PRESSURE ALTITUDE ~ FEET
25,000
20,000
15,000
10,000
5000
0
TEMPERATURE ~ °C
+80
+70
+60
+50
+40
+30
+20
+10
0
-10
-20
-30
-40
-50
-60
-70
-80

MANIFOLD PRESSURE vs RPM



TAKE-OFF WEIGHT

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

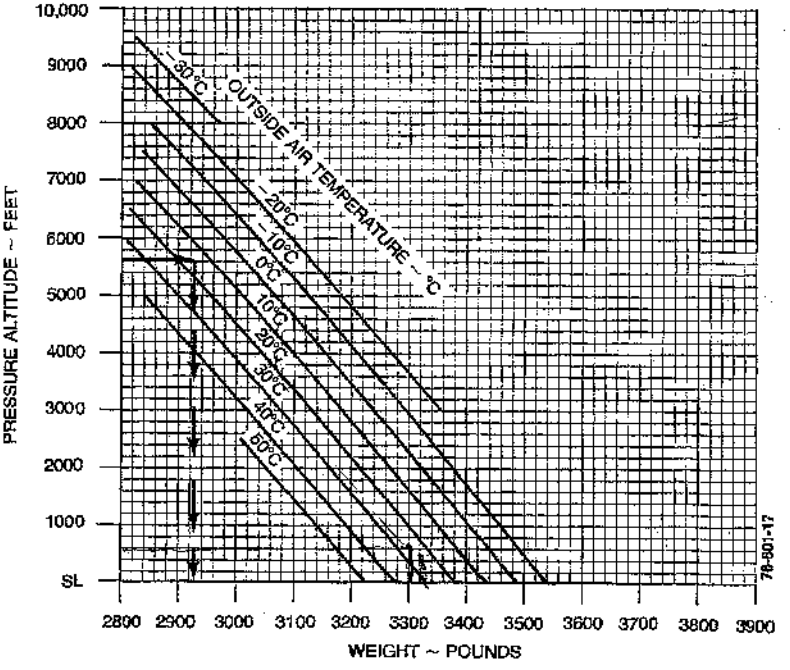
ASSOCIATED CONDITIONS:

AIRPLANE. . . . . AIRBORNE
POWER. . . . . TAKE-OFF AT 2700 RPM
FLAPS. . . . . UP
LANDING GEAR . . . . . DOWN
INOPERATIVE PROPELLER . . FEATHERED

EXAMPLE:

PRESSURE ALTITUDE. . . . . 5650 FT
OAT . . . . . 15°C

TAKE-OFF WEIGHT . . . . . 2925 LBS

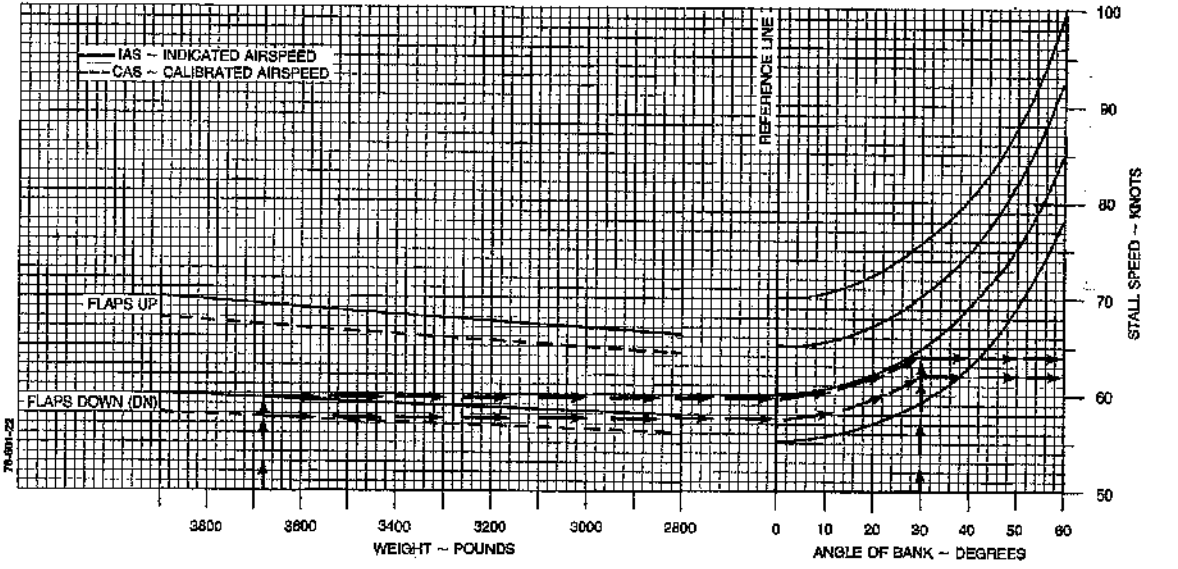


STALL SPEEDS - POWER IDLE

NOTES:
1. THE MAXIMUM ALTITUDE LOSS EXPERIENCED WHILE CONDUCTING STALLS IN ACCORDANCE WITH FAR 23.201 WAS 400 FEET.
2. MAXIMUM NOSE DOWN PITCH ATTITUDE AND ALTITUDE LOSS DURING RECOVERY FROM ONE ENGINE INOPERATIVE STALLS PER FAR 23.205 ARE 5° AND 100 FEET RESPECTIVELY.
3. A NORMAL STALL RECOVERY TECHNIQUE MAY BE USED.

EXAMPLE:

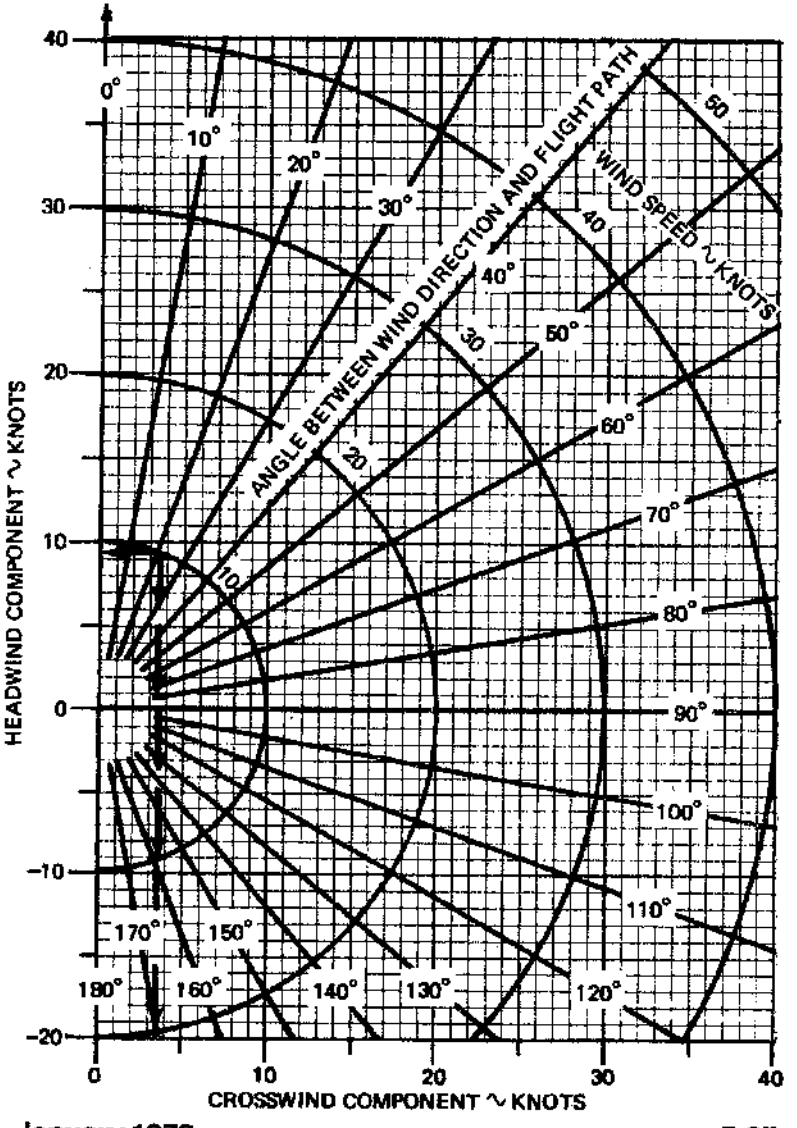
WEIGHT	3677 LBS
FLAPS	DOWN (DN)
ANGLE OF BANK	30°
STALL SPEED	64 KTS IAS 62 KTS CAS



WIND COMPONENTS
Demonstrated Crosswind is 25 kts

EXAMPLE:

WIND SPEED	10 KNOTS
ANGLE BETWEEN WIND DIRECTION AND FLIGHT PATH	20°
HEADWIND COMPONENT	9.5 KNOTS
CROSSWIND COMPONENT	3.5 KNOTS



TAKE-OFF DISTANCE

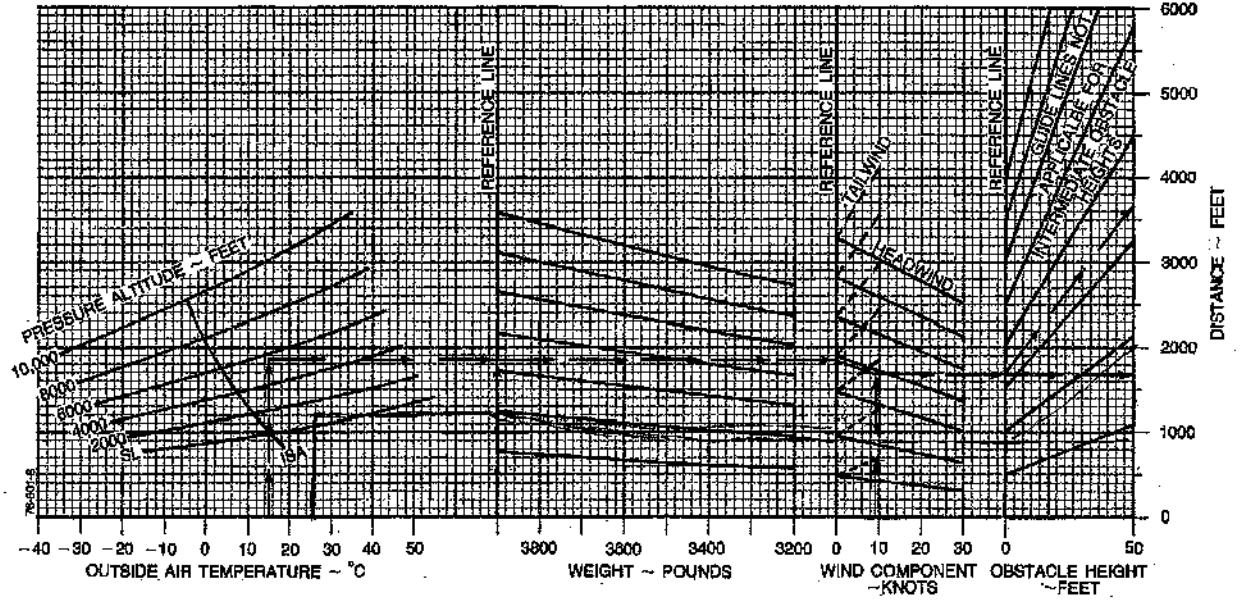
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER AT 2700 RPM SET BEFORE BRAKE RELEASE
MIXTURE	FULL RICH (ABOVE 5000 FT LEAN TO 75°-100°F ON RICH SIDE OF PEAK EGT)
FLAPS	UP
LANDING GEAR	RETRACT AFTER POSITIVE CLIMB ESTABLISHED
RUNWAY	PAVED, LEVEL, DRY SURFACE
COWL FLAPS	OPEN

TAKE-OFF SPEEDS (ALL WEIGHTS)	
LIFT-OFF	71 KNOTS
50 FEET	80 KNOTS

EXAMPLE:

OAT	15°C
PRESSURE ALTITUDE	5650 FT
TAKE-OFF WEIGHT	3900 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1680 FT
TOTAL DISTANCE OVER 50-FT OBSTACLE	3870 FT



TAKE-OFF DISTANCE - GRASS SURFACE

ASSOCIATED CONDITIONS:

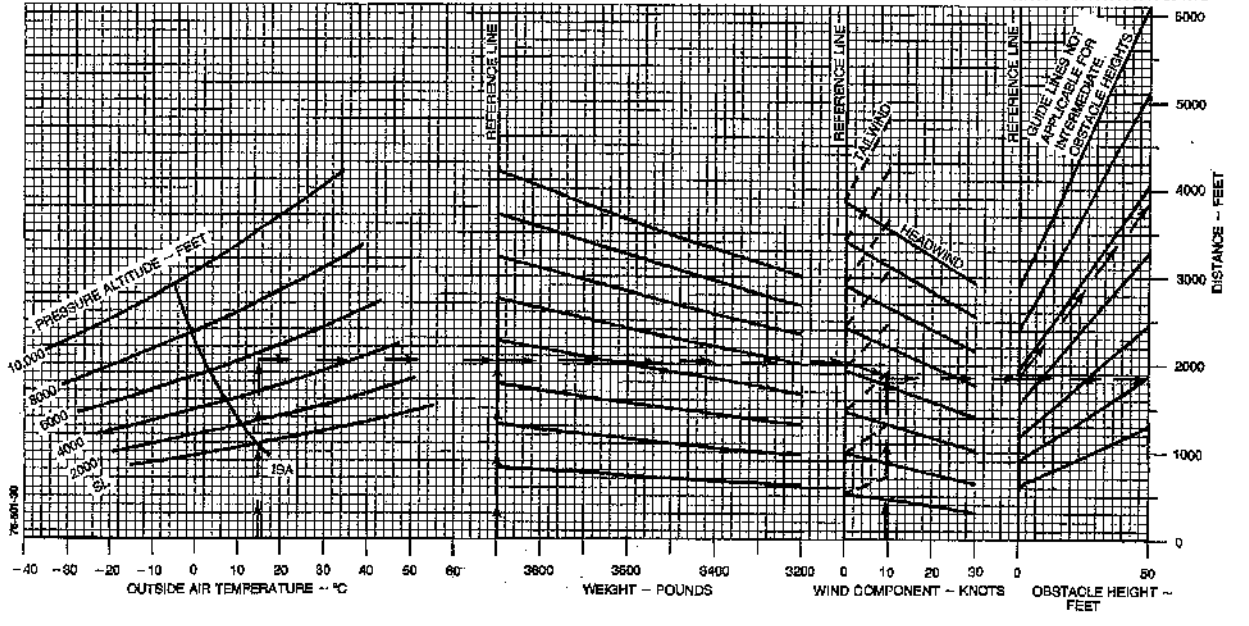
POWER ..... TAKE-OFF AT 2700 RPM SET BEFORE BRAKE RELEASE
FLAPS ..... UP
LANDING GEAR ..... RETRACT AFTER POSITIVE CLIMB ESTABLISHED
RUNWAY ..... SHORT, DRY GRASS, LEVEL SURFACE
COWL FLAPS ..... OPEN
MIXTURE ..... FULL RICH (ABOVE 5000 FT LEAN TO 75° – 100°F ON RICH SIDE OF PEAK EGT)

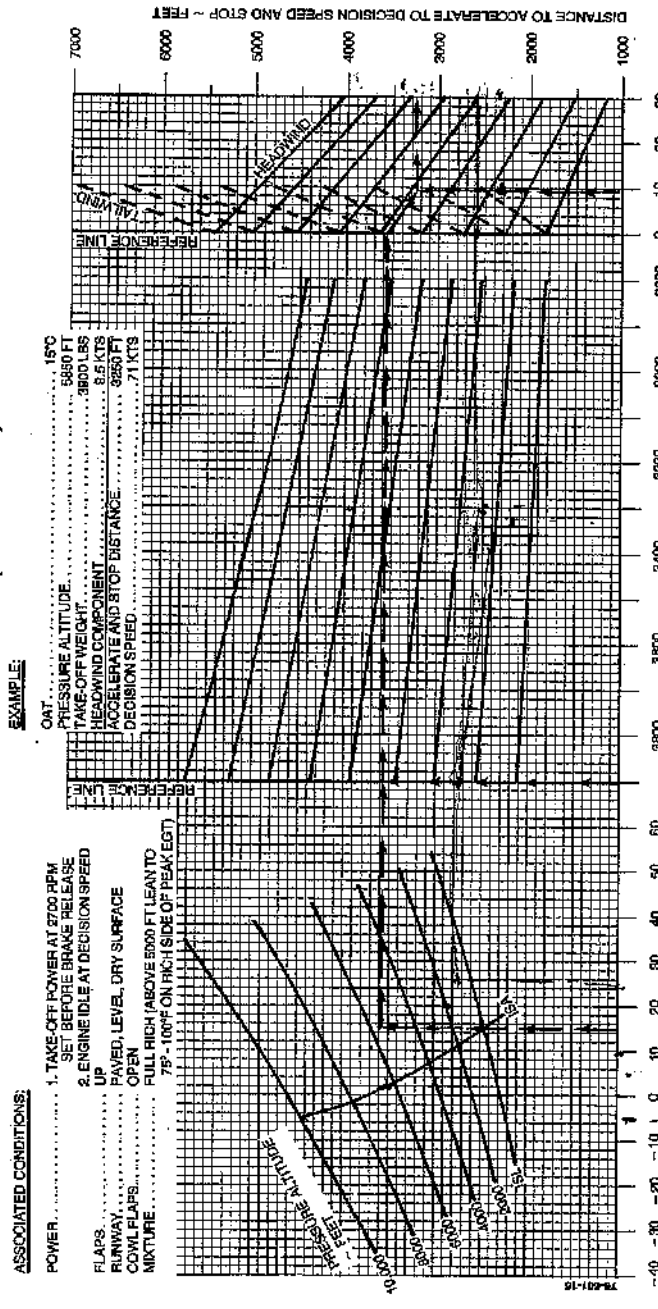
TAKE-OFF SPEEDS (ALL WEIGHTS)	
LIFT-OFF	71 KNOTS
50 FEET	80 KNOTS

EXAMPLE:

OAT ..... 15°C
PRESSURE ALTITUDE ..... 5850 FT
TAKE-OFF WEIGHT ..... 3900 LBS
HEADWIND COMPONENT ..... 9.5 KTS

GROUND ROLL ..... 1850 FT
TOTAL DISTANCE OVER 50 FT OBSTACLE ..... 3850 FT
TAKE-OFF SPEED: AT LIFT-OFF ..... 71 KTS
AT 50 FT ..... 80 KTS




ACCELERATE - STOP DISTANCE
DECISION SPEED 71 KNOTS (ALL WEIGHTS)
EXAMPLE:
OAT ..... 15°C
PRESSURE ALTITUDE ..... 5850 FT
TAKE-OFF WEIGHT ..... 3900 LBS
HEADWIND COMPONENT ..... 8.5 KTS
ACCELERATE AND STOP DISTANCE ..... 3250 FT
DECISION SPEED ..... 71 KTS
REFERENCE LINE
ASSOCIATED CONDITIONS:
POWER ..... 1. TAKE-OFF POWER AT 2700 RPM SET BEFORE BRAKE RELEASE
2. ENGINE IDLE AT DECISION SPEED
FLAPS ..... UP
RUNWAY ..... PAVED, LEVEL, DRY SURFACE
COWL FLAPS ..... OPEN
MIXTURE ..... FULL RICH (ABOVE 5000 FT LEAN TO 75° - 100°F ON RICH SIDE OF PEAK EGT)
PRESSURE ALTITUDE ~ FEET
10,000
8000
6000
4000
2000
SEA LEVEL
OUTSIDE AIR TEMPERATURE ~ °C
-40 -30 -20 -10 0 10 20 30 40 50 60
WEIGHT ~ POUNDS
3800 3400 3200 3000 2800
WIND COMPONENT ~ KNOTS
0 10 20 30
HEADWIND
TAILWIND
REFERENCE LINE
DISTANCE TO ACCELERATE TO DECISION SPEED AND STOP ~ FEET
1000 2000 3000 4000 5000 6000 7000
TM-601-16

ACCELERATE-GO DISTANCE

ASSOCIATED CONDITIONS:

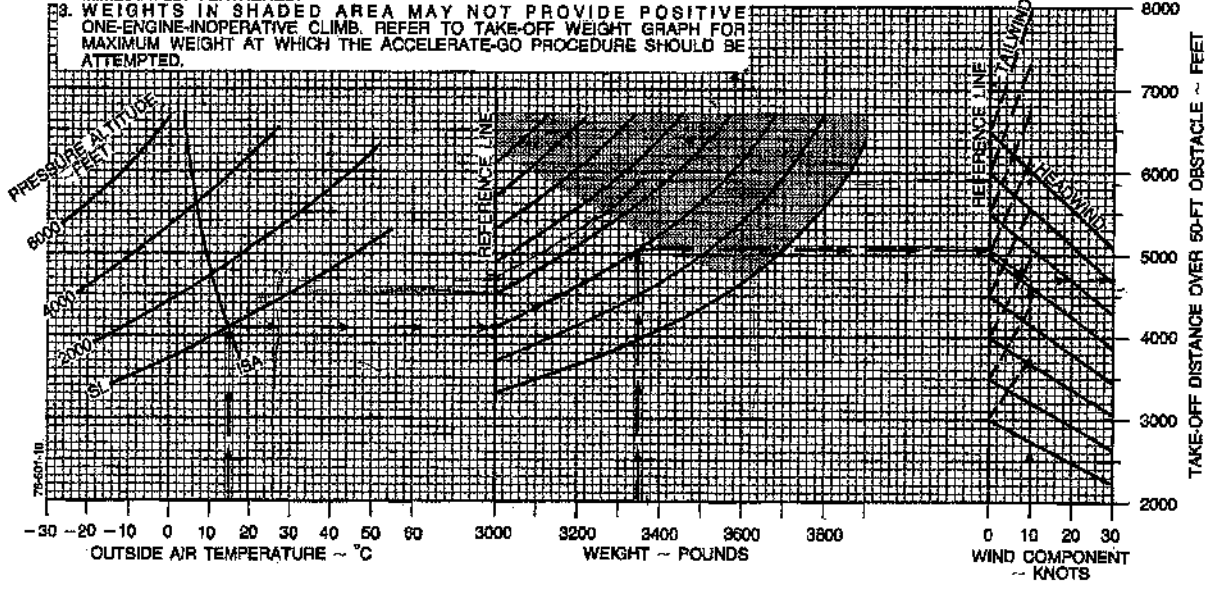
POWER	TAKE-OFF POWER AT 2700 RPM. SET BEFORE BRAKE RELEASE.
FLAPS	UP
LANDING GEAR	RETRACT AFTER LIFT-OFF.
RUNWAY	PAVED, LEVEL, DRY SURFACE.
COWL FLAPS	OPEN
MIXTURE	FULL RICH (ABOVE 5000 FT, SET TO 75-100°F ON RICH SIDE OF PEAK EGT)

TAKE-OFF SPEEDS (ALL WEIGHTS)	
LIFT-OFF	71 KNOTS
50 FT	80 KNOTS

EXAMPLE:

OAT	15°C
PRESSURE ALTITUDE	SL
TAKE-OFF WEIGHT	3350 LBS
HEADWIND COMPONENT	10 KTS
TOTAL DISTANCE OVER 50-FT OBSTACLE	4700 FT
GROUND ROLL	940 FT

NOTE: 1. GROUND ROLL DISTANCE IS 20% OF TAKE-OFF DISTANCE OVER 50-FT OBSTACLE.
2. DISTANCES ASSUME AN ENGINE FAILURE AT LIFT-OFF AND PROPELLER IMMEDIATELY FEATHERED.
3. 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.



CLIMB - TWO ENGINE

CLIMB SPEED 85 KNOTS (ALL WEIGHTS)

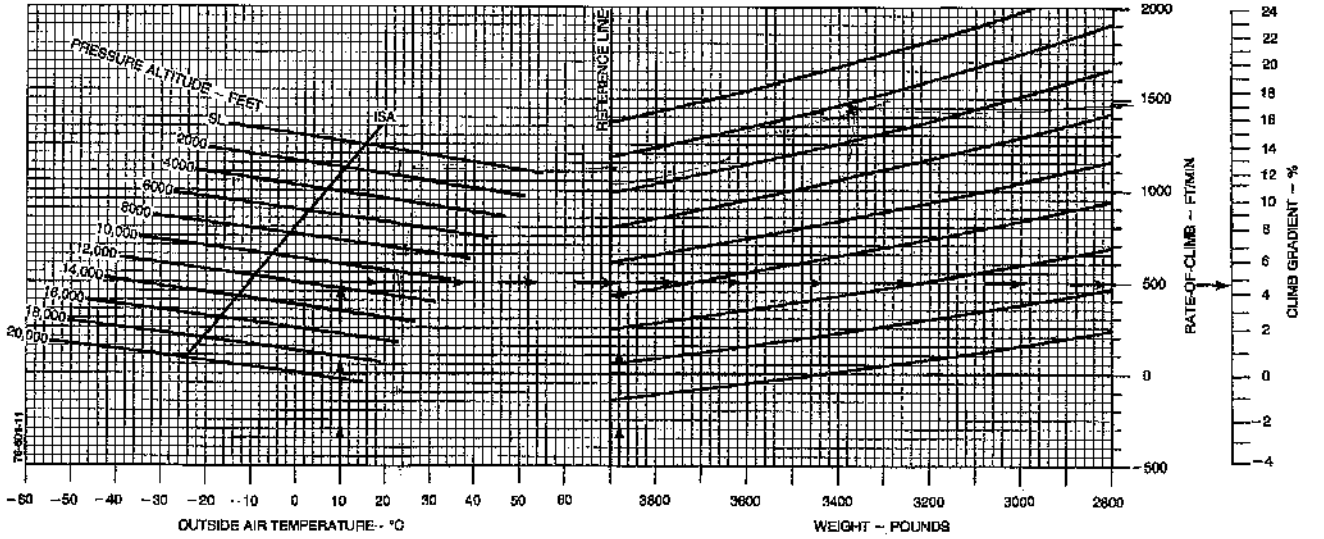
ASSOCIATED CONDITIONS:

POWER..... MAXIMUM CONTINUOUS AT 2700 RPM
FLAPS..... UP
LANDING GEAR..... UP
COWL FLAPS..... OPEN
MIXTURE..... FULL RICH (ABOVE 5000 FT LEAN TO 75° - 100°F ON RICH SIDE OF PEAK EGT)

EXAMPLE:

OAT.....10°C
PRESSURE ALTITUDE.....11,500 FT
WEIGHT.....3980 LBS

RATE OF CLIMB.....500 FT/MIN
CLIMB GRADIENT.....4.6%



TAKE-OFF CLIMB GRADIENT – ONE ENGINE INOPERATIVE

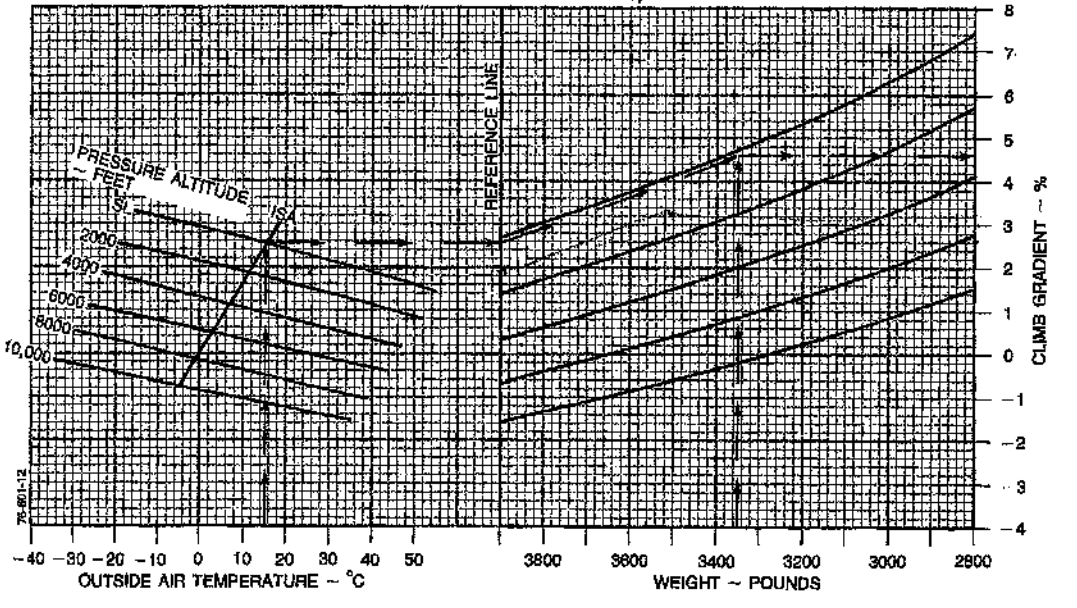
CLIMB SPEED 80 KNOTS (ALL WEIGHTS)

ASSOCIATED CONDITIONS:

POWER	TAKE-OFF AT 2700 RPM
LANDING GEAR	UP
FLAPS	UP
INOPERATIVE PROPELLER	FEATHERED
COWL FLAPS	OPEN
MIXTURE	FULL RICH (ABOVE 5000 FT LEAN TO 75°-100°F ON RICH SIDE OF PEAK EGT)

EXAMPLE:

OAT	15°C
PRESSURE ALTITUDE	SL
WEIGHT	3350 LBS
GRADIENT OF CLIMB	4.6%



TIME, FUEL, AND DISTANCE TO CLIMB

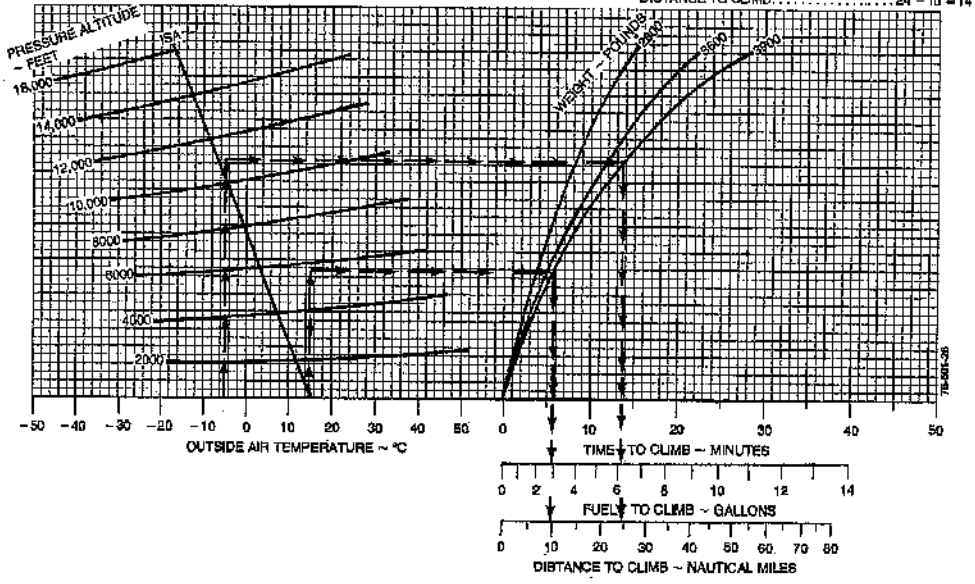
CLIMB SPEED 100 KNOTS

ASSOCIATED CONDITIONS:

POWER	FULL THROTTLE AT 2800 RPM
FUEL DENSITY	6.0 LBS/GAL
COWL FLAPS	OPEN
MIXTURE	FULL RICH (ABOVE 5000 FT LEAN TO 75° - 100°F ON RICH SIDE OF PEAK EGT)

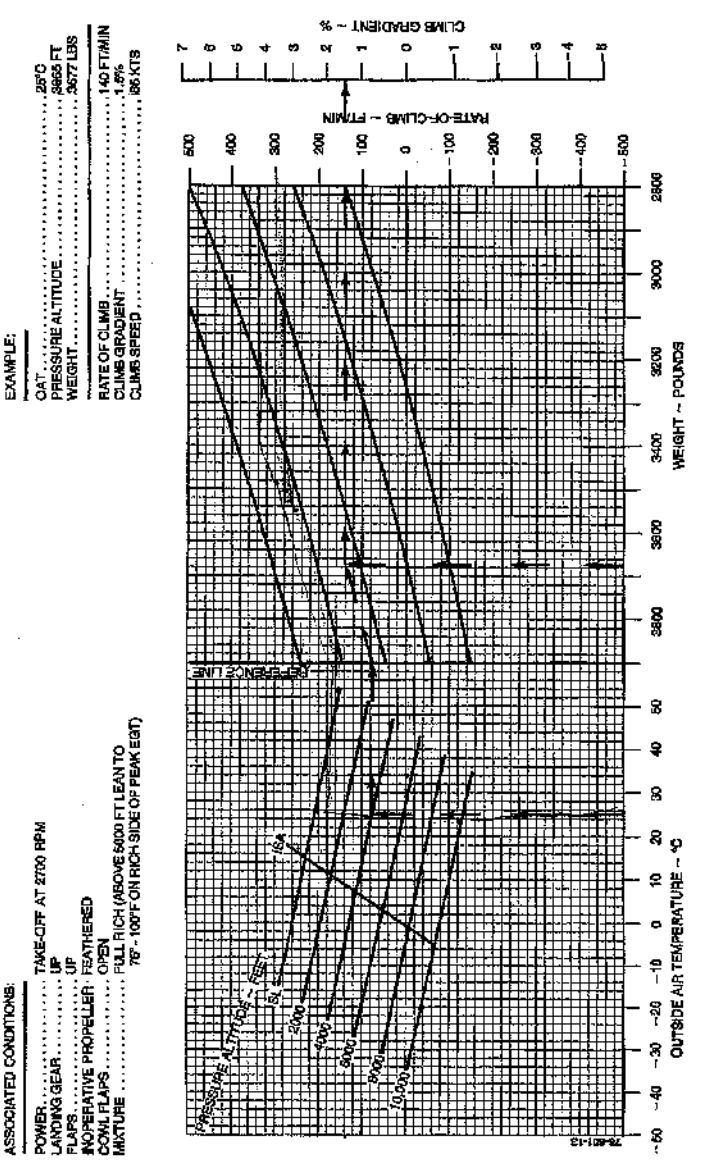
EXAMPLE:

OAT AT TAKE-OFF	15°C
OAT AT CRUISE	−5°C
AIRPORT PRESSURE ALTITUDE	6600 FT
CRUISE PRESSURE ALTITUDE	11,500 FT
INITIAL CLIMB WEIGHT	3900 LBS
TIME TO CLIMB	14 − 8 = 6 MINUTES
FUEL TO CLIMB	8.1 − 2.8 = 5.3 GAL
DISTANCE TO CLIMB	24 − 10 = 14 NM



CLIMB - ONE ENGINE INOPERATIVE

CLIMB SPEED 85 KNOTS (ALL WEIGHTS)



SERVICE CEILING - ONE ENGINE INOPERATIVE

CLIMB SPEED - 85 KNOTS (ALL WEIGHTS)

ASSOCIATED CONDITIONS:

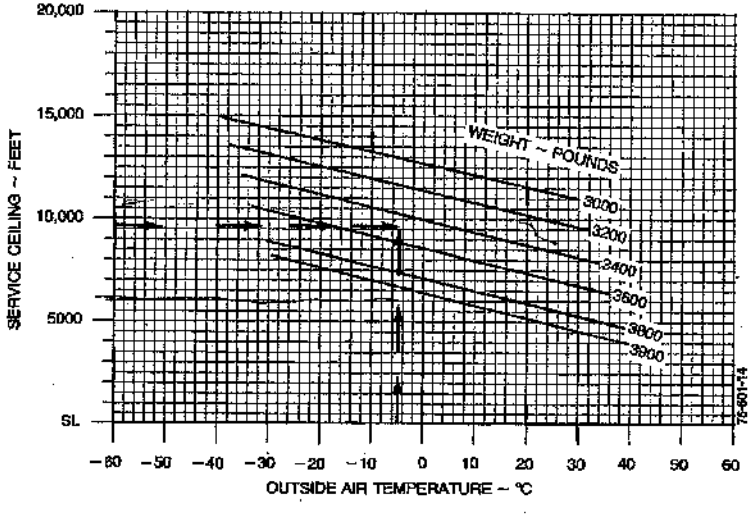
POWER.....MAXIMUM CONTINUOUS AT 2700 RPM
FLAPS.....UP
LANDING GEAR.....UP
INOPERATIVE PROPELLER...FEATHERED

EXAMPLE:

OAT AT MEA.....-5°C
ROUTE SEGMENT MEA.....9700 FT

WEIGHT FOR SERVICE CEILING AT ROUTE SEGMENT MEA.....3480 LBS

NOTE: SERVICE CEILING IS ALTITUDE WHERE AIRPLANE HAS CAPABILITY OF CLIMBING 50 FT/MIN WITH ONE PROPELLER FEATHERED.



Two-Engine Service Ceiling

9,650 ft

CRUISE SPEEDS

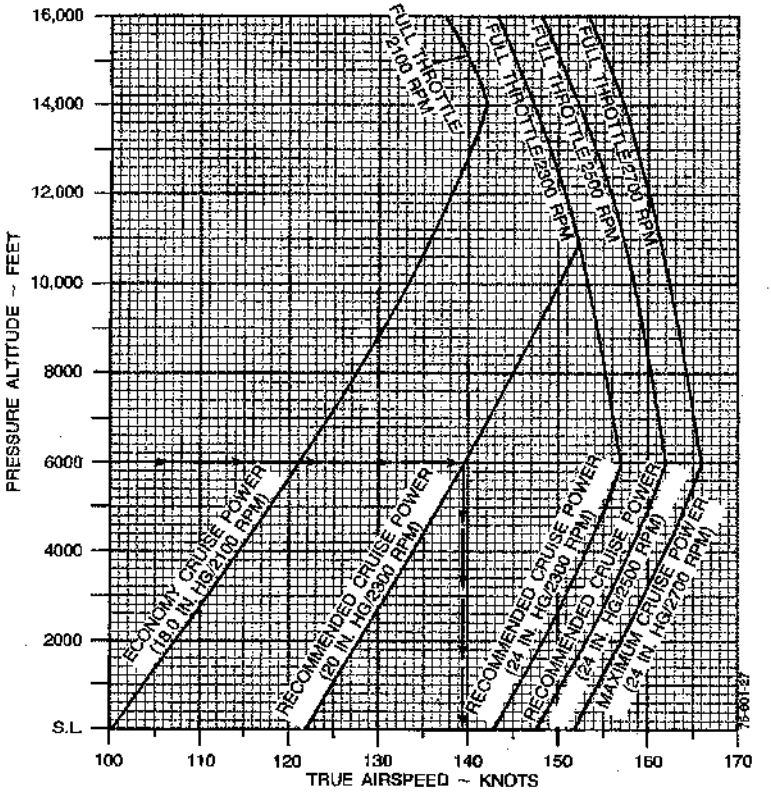
ASSOCIATED CONDITIONS:

AVERAGE CRUISE WEIGHT ..3600 LBS
TEMPERATURE .....STD DAY (ISA)

EXAMPLE:

PRESSURE ALTITUDE ..6000 FT
POWER SETTING .....20 IN.HG/2300 RPM

TRUE AIRSPEED .....139.5 KTS



MAXIMUM CRUISE POWER - 24.0 IN. HG @ 2700 RPM (OR FULL THROTTLE)

PRESS ALT	ISA −20°C (−36°F)						STANDARD DAY (ISA)						ISA +20°C (+36°F)					
	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS
FEET	°C	°F	IN.HG	PPH	GPH	KTS	KTS	°C	°F	IN.HG	PPH	GPH	KTS	KTS	°C	°F	IN.HG	PPH	GPH	KTS	KTS
SL	-3	27	24.0	67	11.1	156	151	17	63	24.0	65	10.8	152	152	37	99	24.0	62	10.3	148	153
1000	-5	23	24.0	68	11.3	156	153	15	59	24.0	65	10.8	152	155	35	95	24.0	63	10.5	148	156
2000	-7	19	24.0	68	11.3	156	155	13	55	24.0	66	11.0	152	157	33	91	24.0	63	10.5	148	158
3000	-9	16	24.0	69	11.5	156	158	11	52	24.0	66	11.0	152	159	31	88	24.0	64	10.7	148	161
4000	-11	12	24.0	69	11.5	157	160	9	48	24.0	67	11.2	153	162	30	86	24.0	65	10.8	149	163
5000	-12	10	24.0	70	11.7	157	163	8	46	24.0	68	11.3	153	164	28	82	24.0	65	10.8	148	165
6000	-14	7	23.5	70	11.7	156	164	6	43	23.5	68	11.3	152	166	26	79	23.5	65	10.8	148	167
7000	-16	3	22.6	68	11.3	153	164	4	39	22.6	65	10.8	149	165	24	75	22.6	63	10.5	145	166
8000	-18	0	21.8	65	10.8	150	163	2	36	21.8	63	10.5	146	164	22	72	21.8	61	10.2	142	165
9000	-20	-4	20.9	63	10.5	147	162	0	32	20.9	61	10.2	146	163	20	68	20.9	59	9.8	139	164
10,000	-22	-8	20.2	61	10.2	144	161	-2	28	20.2	59	9.8	140	162	18	64	20.2	57	9.5	136	163
11,000	-24	-11	19.4	59	9.8	141	160	-4	25	19.4	57	9.5	138	161	16	61	19.4	55	9.2	132	162
12,000	-26	-15	18.6	56	9.5	138	159	-6	21	18.6	54	9.0	136	160	14	57	18.6	53	8.8	129	161
13,000	-28	-18	17.9	54	9.0	134	157	-8	18	17.9	52	8.7	130	158	12	54	17.9	50	8.3	126	159
14,000	-31	-24	17.2	52	8.7	131	156	-10	14	17.2	50	8.3	127	157	10	50	17.2	48	8.0	122	157
15,000	-33	-27	16.6	50	8.3	127	154	-12	10	16.6	48	8.0	123	155	8	46	16.6	47	7.8	119	155
16,000	-35	-31	16.9	48	8.0	124	152	-15	5	16.9	46	7.7	120	153	6	43	15.9	45	7.5	116	153

NOTES: 1. Full throttle manifold pressure settings are approximate.
2. Shaded area represents operation with full throttle.
3. Lean to 25° - 50°F on rich side of peak EGT.
4. Cruise speeds are presented at an average weight of 3600 lbs.

RECOMMENDED CRUISE POWER - 24.0 IN. HG @ 2500 RPM (OR FULL THROTTLE)

PRESS ALT	ISA −20°C (−36°F)							STANDARD DAY (ISA)							ISA +20°C (+36°F)						
	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS
FEET	°C	°F	IN.HG	PPH	GPH	KTS	KTS	°C	°F	IN.HG	PPH	GPH	KTS	KTS	°C	°F	IN.HG	PPH	GPH	KTS	KTS
SL	-3	27	24.0	61	10.2	152	147	17	63	24.0	59	9.8	148	148	37	99	24.0	57	9.5	144	149
1000	-5	23	24.0	62	10.3	152	149	15	59	24.0	60	10.0	148	151	35	95	24.0	58	9.7	144	151
2000	-7	19	24.0	63	10.5	153	152	13	55	24.0	61	10.2	148	153	33	91	24.0	58	9.7	144	154
3000	-9	16	24.0	64	10.7	153	154	11	52	24.0	61	10.2	149	155	31	88	24.0	59	9.8	144	156
4000	-11	12	24.0	64	10.7	153	156	9	48	24.0	62	10.3	149	158	29	84	24.0	60	10.0	144	159
5000	-13	9	24.0	65	10.8	153	159	7	45	24.0	63	10.5	149	160	28	82	24.0	61	10.2	144	161
6000	-15	5	23.6	66	11.0	153	161	5	43	23.6	63	10.5	148	162	26	79	23.6	61	10.2	144	163
7000	-17	1	22.7	62	10.5	150	160	4	39	22.7	61	10.2	146	161	24	76	22.7	59	9.8	141	162
8000	-19	-2	21.9	60	10.2	146	159	2	36	21.9	59	9.8	142	160	22	72	21.9	57	9.5	138	161
9000	-21	-6	21.0	58	9.8	143	158	0	32	21.0	57	9.5	139	159	20	68	21.0	56	9.2	135	160
10,000	-23	-9	20.2	57	9.5	140	157	-3	27	20.2	55	9.2	136	158	18	64	20.2	53	8.9	132	159
11,000	-25	-13	19.4	55	9.2	137	156	-5	23	19.4	53	8.9	133	157	16	61	19.4	51	8.5	129	158
12,000	-27	-17	18.7	53	8.8	134	155	-7	19	18.7	51	8.5	130	156	14	57	18.7	49	8.2	125	156
13,000	-29	-20	18.0	51	8.5	131	153	-9	16	18.0	49	8.2	126	154	13	52	18.0	47	7.8	122	155
14,000	-31	-24	17.3	49	8.2	127	152	-11	12	17.3	47	7.8	123	152	9	48	17.3	45	7.5	118	153
15,000	-33	-27	16.6	47	7.8	124	150	-13	9	16.6	45	7.5	120	151	7	45	16.6	44	7.3	115	151
16,000	-35	-31	16.0	45	7.5	121	148	-15	5	16.0	43	7.2	116	148	5	41	16.0	42	7.0	111	148

NOTES: 1. Full throttle manifold pressure settings are approximate.
2. Shaded area represents operation with full throttle.
3. Lean to 25° - 50°F on rich side of peak EGT.
4. Cruise speeds are presented at an average weight of 3600 lbs.

RECOMMENDED CRUISE POWER - 24.0 IN. HG @ 2300 RPM (OR FULL THROTTLE)

PRESS ALT	ISA −20°C (−36°F)							STANDARD DAY (ISA)							ISA +20°C (+36°F)						
	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS
FEET	°C	°F	IN.HG	PPH	GPH	KTS	KTS	°C	°F	IN.HG	PPH	GPH	KTS	KTS	°C	°F	IN.HG	PPH	GPH	KTS	KTS
SL	-3	27	24.0	55	9.2	147	142	17	63	24.0	53	8.8	143	143	37	99	24.0	51	8.5	139	144
1000	-5	23	24.0	56	9.3	147	144	15	59	24.0	54	9.0	143	145	35	95	24.0	52	8.7	139	146
2000	-7	19	24.0	57	9.5	148	147	13	55	24.0	55	9.2	143	148	33	91	24.0	53	8.8	139	149
3000	-9	16	24.0	58	9.7	148	149	11	52	24.0	56	9.3	144	150	31	88	24.0	54	9.0	139	151
4000	-11	12	24.0	59	9.8	148	152	9	48	24.0	57	9.5	144	153	29	84	24.0	55	9.2	140	153
5000	-13	9	24.0	60	10.0	148	154	7	45	24.0	58	9.7	144	155	27	81	24.0	56	9.3	140	156
6000	-15	5	23.7	61	10.2	148	156	5	41	23.7	59	9.8	144	157	25	77	23.7	57	9.5	140	158
7000	-17	1	22.8	59	9.8	145	155	3	37	22.8	57	9.5	141	156	23	73	22.8	55	9.2	137	157
8000	-19	-2	21.9	57	9.5	142	154	1	34	21.9	56	9.2	138	155	21	70	21.9	53	8.8	134	156
9000	-21	-6	21.1	55	9.2	139	153	-1	30	21.1	53	8.87	135	154	19	66	21.1	51	8.5	131	155
10,000	-23	-9	20.3	53	8.8	136	152	-3	27	20.3	51	8.5	132	153	17	63	20.3	49	8.2	127	154
11,000	-25	-13	19.5	51	8.5	133	151	-5	23	19.8	49	8.2	129	152	15	59	19.5	47	7.8	124	152
12,000	-27	-17	18.8	49	8.2	130	150	-7	19	18.8	47	7.8	126	151	13	55	18.8	45	7.7	121	151
13,000	-29	-20	18.0	47	7.8	127	148	-9	16	18.0	46	7.7	122	149	11	52	18.0	44	7.3	117	149
14,000	-31	-24	17.3	45	7.5	123	147	-11	12	17.3	44	7.5	119	147	9	48	17.3	42	7.0	114	147
15,000	-33	-27	16.7	44	7.3	120	145	-13	9	16.7	42	7.0	115	145	7	45	16.7	41	6.8	110	144
16,000	-35	-31	16.0	42	7.0	116	143	-15	5	16.0	40	6.7	111	143	5	41	16.0	39	6.5	106	142

NOTES: 1. Full throttle manifold pressure settings are approximate.
2. Shaded area represents operation with full throttle.
3. Lean to 25° - 50°F on rich side of peak EGT.
4. Cruise speeds are presented at an average weight of 3600 lbs.

RECOMMENDED CRUISE POWER - 20.0 IN. HG @ 2300 RPM (OR FULL THROTTLE)

PRESS ALT.	ISA −20°C (−36°F)							STANDARD DAY (ISA)							ISA +20°C (+36°F)						
	IOAT		MAN. PRESS.	FUEL FLOW/ ENGINE		IAS	TAS	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS	IOAT		MAN. PRESS	FUEL FLOW/ ENGINE		IAS	TAS
FEET	°C	°F	IN.HG	PPH	GPH	KTS	KTS	°C	°F	IN.HG	PPH	GPH	KTS	KTS	°C	°F	IN.HG	PPH	GPH	KTS	KTS
SL	-4	25	20.0	41	6.8	127	122	16	61	20.0	40	6.7	123	123	36	97	20.0	38	6.3	119	123
1000	-6	21	20.0	42	7.0	128	125	14	57	20.0	41	6.8	124	126	34	93	20.0	39	6.5	120	126
2000	-7	19	20.0	43	7.2	129	128	13	55	20.0	42	7.0	125	129	33	91	20.0	40	6.7	121	129
3000	-9	16	20.0	44	7.3	130	131	11	52	20.0	42	7.0	126	132	31	88	20.0	41	6.8	122	132
4000	-11	12	20.0	45	7.5	131	134	9	48	20.0	43	7.2	127	135	29	84	20.0	42	7.0	122	135
5000	-13	9	20.0	46	7.7	131	136	7	45	20.0	44	7.3	127	137	27	81	20.0	43	7.2	123	137
6000	-15	5	20.0	47	7.8	132	139	5	41	20.0	45	7.5	128	140	25	77	20.0	44	7.3	124	140
7000	-17	1	20.0	48	8.0	133	142	3	37	20.0	46	7.7	128	143	23	73	20.0	45	7.5	124	143
8000	-19	-2	20.0	49	8.2	133	145	1	34	20.0	47	7.8	129	145	21	70	20.0	46	7.7	125	146
9000	-21	-6	20.0	50	8.3	134	147	-1	30	20.0	48	8.0	129	148	19	66	20.0	47	7.8	125	149
10,000	-23	-9	20.0	51	8.5	134	150	-3	27	20.0	49	8.2	130	151	17	63	20.0	48	8.0	125	151
11,000	-25	-13	19.5	51	8.5	133	151	-5	23	19.5	49	8.2	129	152	15	59	19.5	47	7.8	124	152
12,000	-27	-17	18.8	49	8.2	130	150	-7	19	18.8	47	7.8	126	151	13	55	18.8	46	7.7	121	151
13,000	-29	-20	18.0	47	7.8	127	148	-9	16	18.0	46	7.7	122	149	11	52	18.0	44	7.3	117	149
14,000	-31	-24	17.3	45	7.5	123	147	-11	12	17.3	44	7.3	119	147	9	48	17.3	42	7.0	114	147
15,000	-33	-27	16.7	44	7.3	120	145	-13	9	16.7	42	7.0	115	145	7	45	16.7	41	6.8	110	144
16,000	-35	-31	16.0	42	7.0	116	143	-15	5	16.0	40	6.7	111	143	5	41	16.0	39	6.5	106	142

NOTES: 1. Full throttle manifold pressure settings are approximate.
2. Shaded area represents operation with full throttle.
3. Lean to 25° - 50°F on rich side of peak EGT.
4. Cruise speeds are presented at an average weight of 3600 lbs.

ECONOMY CRUISE POWER - 18.0 IN. HG @ 2100 RPM (OR FULL THROTTLE)

PRESS ALT	ISA −20°C (−36°F)							STANDARD DAY (ISA)							ISA +20°C (+36°F)						
	IOAT		MAN. PRESS.	FUEL FLOW/ ENG		IAS	TAS	IOAT		MAN. PRESS.	FUEL FLOW/ ENG		IAS	TAS	IOAT		MAN. PRESS.	FUEL FLOW/ ENG		IAS	TAS
FEET	°C	°F	IN.HG	PPH	GPH	KTS	KTS	°C	°F	IN.HG	PPH	GPH	KTS	KTS	°C	°F	IN.HG	PPH	GPH	KTS	KTS
SL	-4	25	18.0	29	4.8	104	101	16	61	18.0	28	4.7	99	100	36	97	18.0	27	4.5	96	98
1000	-6	21	18.0	30	5.0	106	105	14	57	18.0	29	4.8	101	104	34	93	18.0	28	4.7	95	102
2000	-8	18	18.0	31	5.2	107	108	12	54	18.0	30	5.0	103	107	32	90	18.0	29	4.8	98	106
3000	-10	14	18.0	32	5.3	109	112	10	50	18.0	31	5.2	105	111	30	86	18.0	30	5.0	101	110
4000	-12	11	18.0	34	5.7	111	115	8	47	18.0	32	5.3	107	115	28	83	18.0	31	5.2	103	113
5000	-14	8	18.0	35	5.8	112	119	6	43	18.0	33	5.5	108	118	26	79	18.0	32	5.3	103	117
6000	-16	4	18.0	36	6.0	113	121	5	40	18.0	35	5.8	109	121	25	76	18.0	33	5.5	105	120
7000	-17	1	18.0	37	6.2	115	125	3	37	18.0	36	6.0	110	124	23	73	18.0	34	5.7	106	124
8000	-19	-3	18.0	38	6.3	116	128	1	33	18.0	37	6.2	111	127	21	69	18.0	35	5.8	106	127
9000	-21	-6	18.0	39	6.5	117	131	-1	30	18.0	38	6.3	112	130	19	66	18.0	36	6.0	108	130
10,000	-23	-10	18.0	40	6.7	117	134	-3	26	18.0	39	6.5	113	134	17	62	18.0	37	6.2	108	133
11,000	-25	-13	18.0	41	6.8	117	136	-5	23	18.0	39	6.5	113	136	15	59	18.0	38	6.3	108	135
12,000	-27	-17	18.0	41	6.8	117	138	-7	19	18.0	40	6.7	113	138	13	55	18.0	38	6.3	108	137
13,000	-29	-20	18.0	42	7.0	117	140	-9	16	18.0	41	6.8	113	140	11	52	18.0	39	6.6	108	139
14,000	-31	-24	17.3	40	7.2	117	142	-11	12	17.3	41	6.8	112	142	-9	48	17.3	40	6.7	108	141
15,000	-33	-27	16.5	41	6.8	114	140	-13	-9	16.5	40	6.7	109	140	-7	45	16.5	38	6.3	105	138
16,000	-35	-31	15.8	39	6.5	110	138	-15	-5	15.8	38	6.3	106	137	-5	41	15.8	37	6.2	101	135

NOTES: 1. Full throttle manifold pressure settings are approximate.
2. Shaded area represents operation with full throttle.
3. Lean to 25° - 50°F on rich side of peak EGT.
4. Cruise speeds are presented at an average weight of 3600 lbs.

RANGE PROFILE – 100 GALLONS

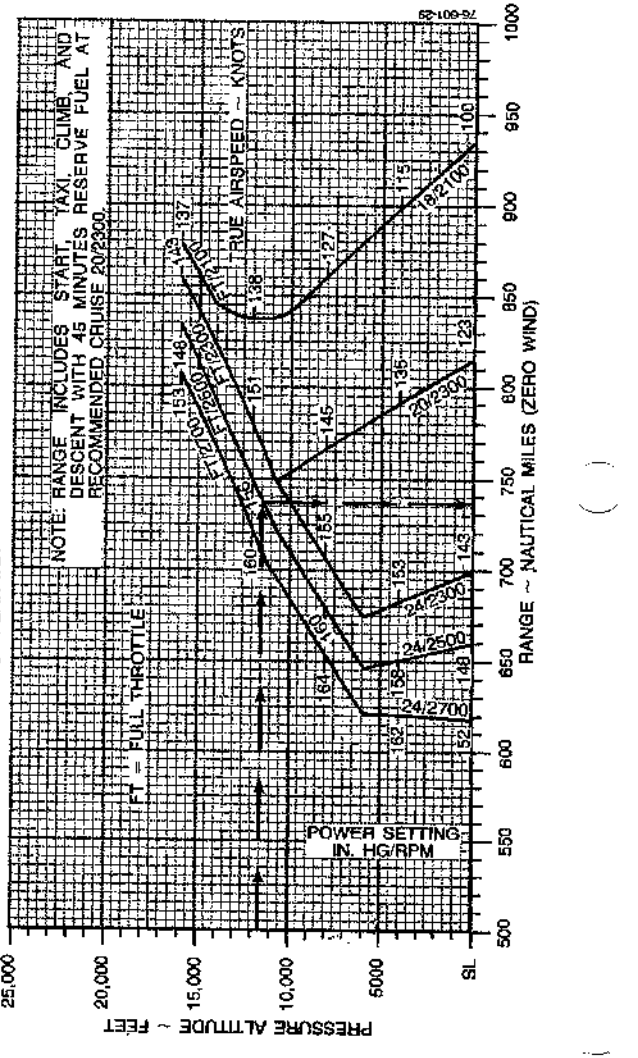
STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

WEIGHT	3916 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	100 US GAL (600 LBS)
COWL FLAPS	CLOSED
MIXTURE	LEANED TO 25°-50°F ON RICH SIDE OF PEAK EGT

EXAMPLE:

PRESSURE ALTITUDE	11,500 FT
POWER SETTING	FT/2500 RPM
RANGE	737 NM



ENDURANCE PROFILE - 100 GALLONS

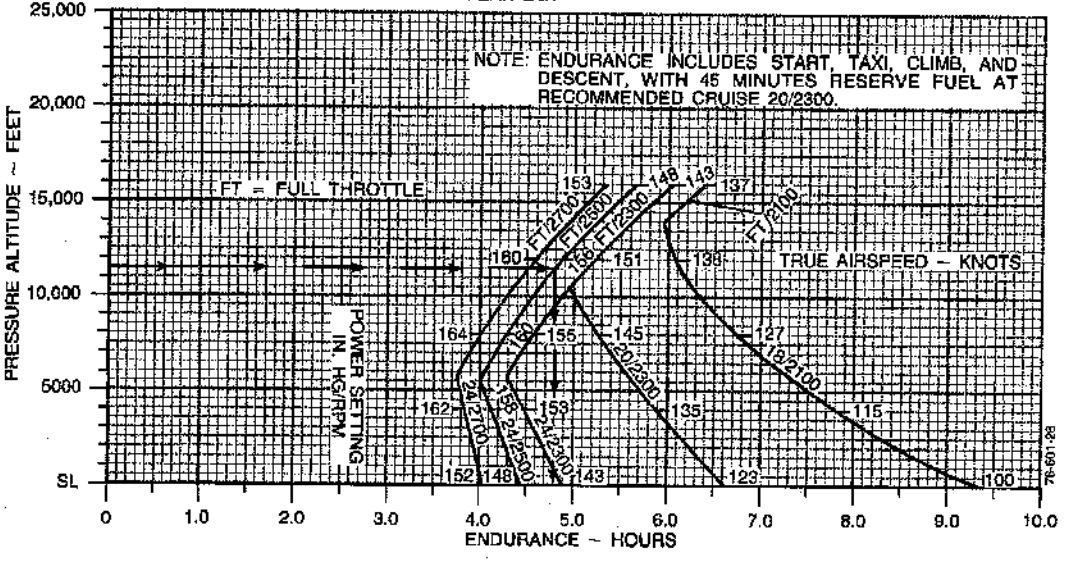
STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

WEIGHT	3916 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	100 US GAL (600 LBS)
COWL FLAPS	CLOSED
MIXTURE	LEANED TO 25°-50°F ON RICH SIDE OF PEAK EGT

EXAMPLE:

PRESSURE ALTITUDE	11,500 FT
POWER SETTING	FT/2500
ENDURANCE	4.8 HRS



HOLDING TIME

APPLICABLE FOR ALL TEMPERATURES

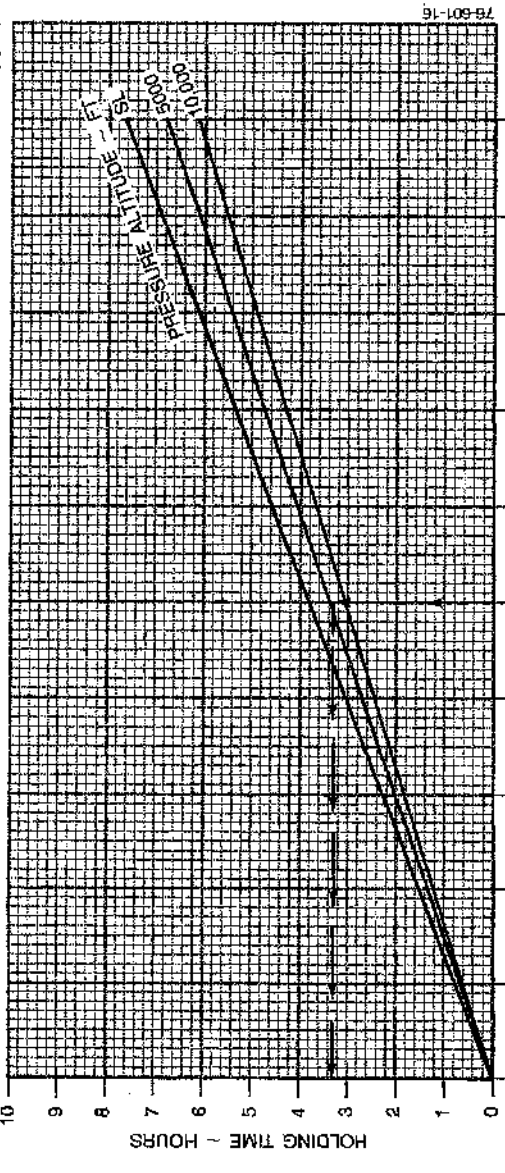
ASSOCIATED CONDITIONS:

POWER SETTING ..... 20 IN. HG OR FULL THROTTLE
2300 RPM
MIXTURE ..... FULL RICH (ABOVE 5000 FT LEAN TO 75° - 100°F ON RICH SIDE OF PEAK EGT)

EXAMPLE:

FUEL AVAILABLE FOR HOLDING ..... 50 GALLONS
PRESSURE ALTITUDE ..... 6000 FEET

HOLDING TIME ..... 3.3 HOURS



TIME, FUEL, AND DISTANCE TO DESCEND

DESCENT SPEED – 170 KNOTS

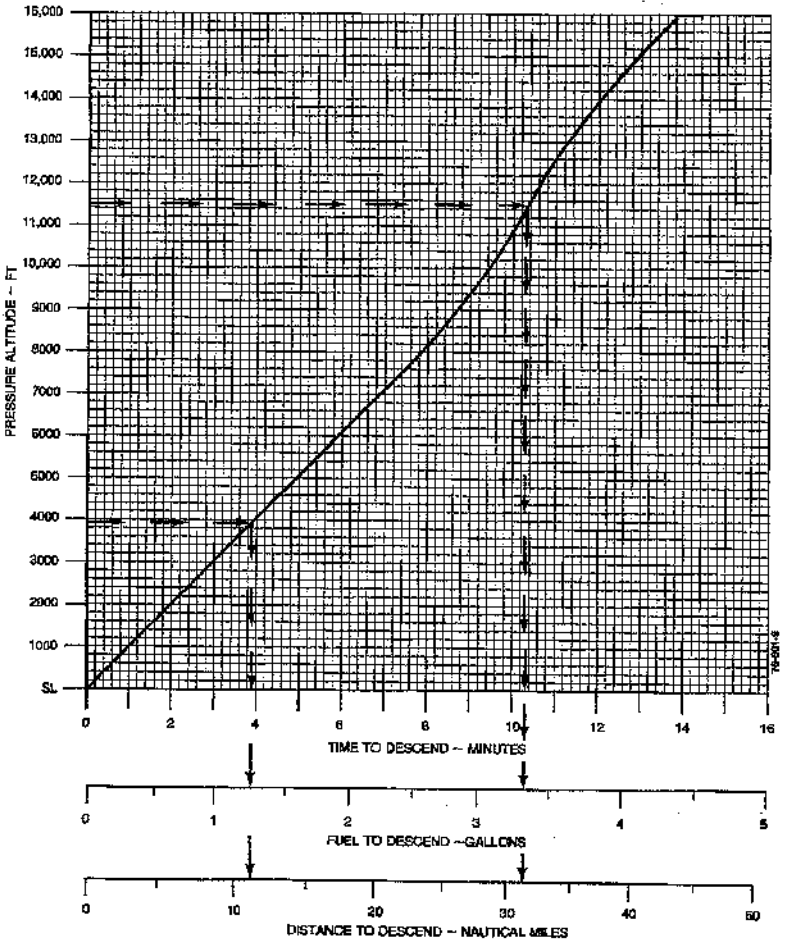
ASSOCIATED CONDITIONS:

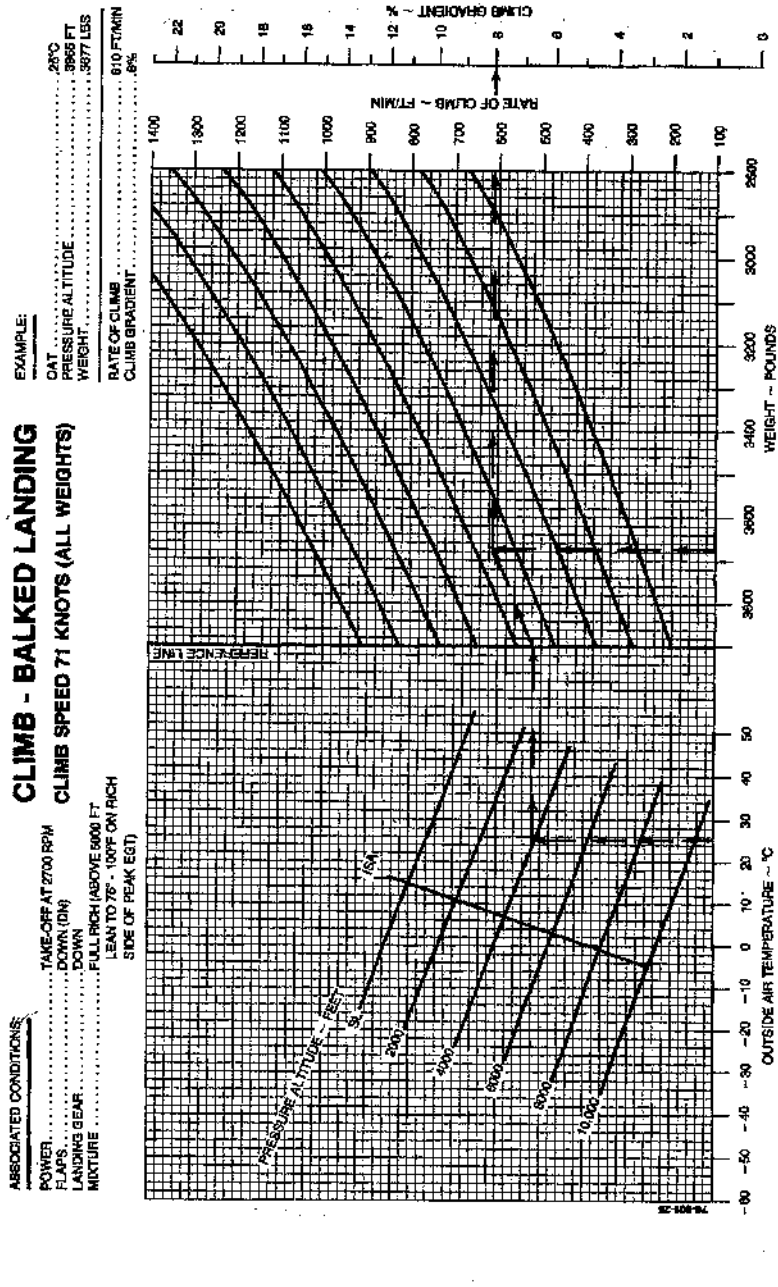
POWER..... AS REQUIRED TO MAINTAIN 1000 FT/MIN RATE OF DESCENT
LANDING GEAR ..., UP
FLAPS..... UP
MIXTURE..... FULL RICH (ABOVE 5000 FT LEAN TO 75° - 100°F ON RICH SIDE OF PEAK EGT)

EXAMPLE:

INITIAL ALTITUDE.....11,500 FT
FINAL ALTITUDE.....3965 FT

TIME TO DESCEND.....10 – 4 = 6 MINUTES
FUEL TO DESCEND .....3.4 – 1.3 = 2.1 GAL
DISTANCE TO DESCEND .... 32 – 11 = 21NM




CLIMB - BALKED LANDING
CLIMB SPEED 71 KNOTS (ALL WEIGHTS)
ASSOCIATED CONDITIONS:
POWER ..... TAKE-OFF AT 2700 RPM
FLAPS ..... DOWN (DN)
LANDING GEAR ..... DOWN
MIXTURE ..... FULL RICH (ABOVE 6000 FT
LEAN TO 75° - 100°F ON RICH
SIDE OF PEAK EGT)
EXAMPLE:
OAT ..... 28°C
PRESSURE ALTITUDE ..... 3966 FT
WEIGHT ..... 3377 LBS
RATE OF CLIMB ..... 610 FT/MIN
CLIMB GRADIENT 8%
REFERENCE LINE
PRESSURE ALTITUDE - FEET
SL
2000
4000
6000
8000
10,000
16A
RATE OF CLIMB - FT/MIN
CLIMB GRADIENT - %
WEIGHT - POUNDS
OUTSIDE AIR TEMPERATURE - °C
76-805-2S

LANDING DISTANCE - FLAPS DOWN (DN)

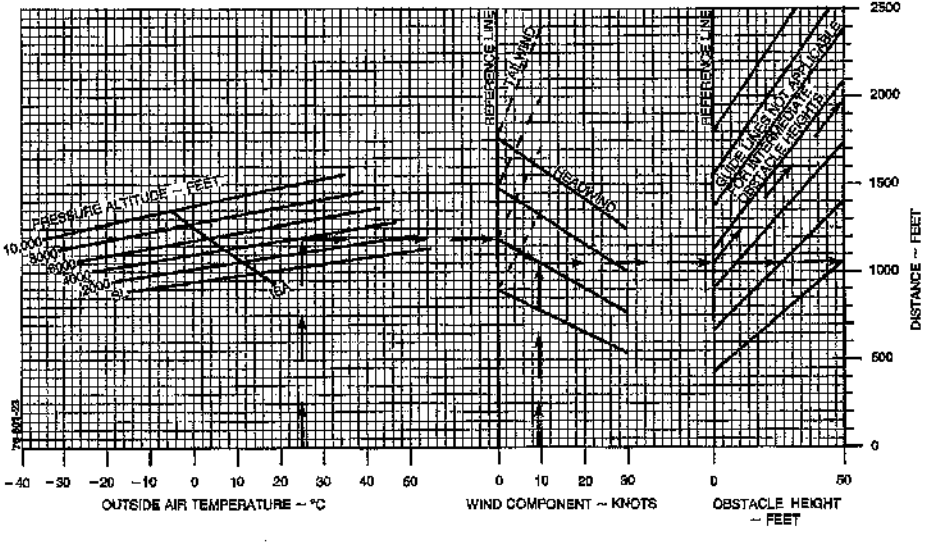
APPROACH SPEED 76 KNOTS (ALL WEIGHTS)

ASSOCIATED CONDITIONS:

POWER	RETARD TO MAINTAIN 600 FT/MIN ON FINAL APPROACH
FLAPS	DOWN (DN)
LANDING GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
APPROACH SPEED	76 KNOTS IAS
BRAKING	MAXIMUM

EXAMPLE:

OAT	25°C
PRESSURE ALTITUDE	3965 FT
HEADWIND COMPONENT	9.6 KTS
GROUND ROLL	1050 FT
TOTAL OVER 50 FT OBSTACLE	1970 FT
APPROACH SPEED	76 KTS



LANDING DISTANCE - FLAPS UP

APPROACH SPEED 87 KNOTS (ALL WEIGHTS)

ASSOCIATED CONDITIONS:

POWER..... RETARD TO MAINTAIN 600 FT/MIN ON FINAL APPROACH
FLAPS..... UP
LANDING GEAR..... DOWN
RUNWAY..... PAVED, LEVEL, DRY SURFACE
APPROACH SPEED ..... 87 KNOTS IAS
BRAKING..... MAXIMUM

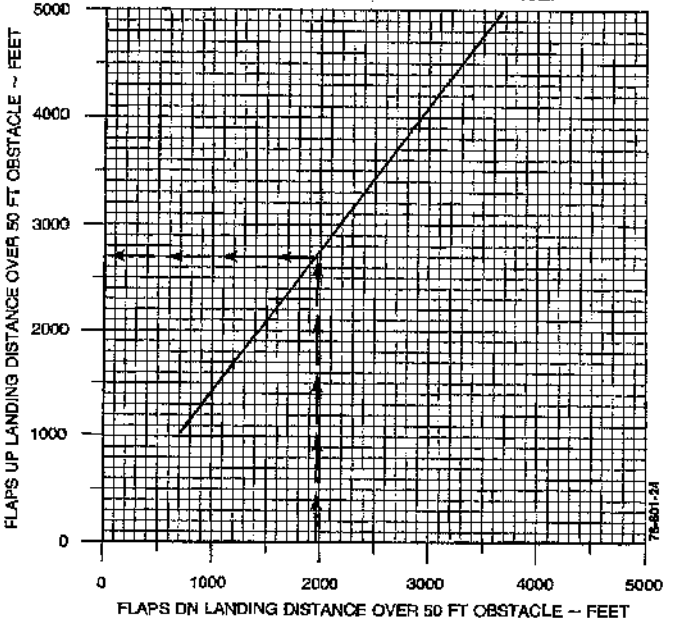
EXAMPLE:

FLAPS DN LANDING DISTANCE OVER 50 FT OBSTACLE ..... 1970 FT

FLAPS UP LANDING DISTANCE OVER 50 FT OBSTACLE..... 2700 FT
APPROACH SPEED ..... 87 KTS

NOTE: 1. LANDING WITH FLAPS FULL DOWN IS NORMAL PROCEDURE. USE THIS GRAPH WHEN IT IS NECESSARY TO LAND WITH FLAPS UP.

2. TO DETERMINE FLAPS UP LANDING DISTANCE, READ FROM THE LANDING DISTANCE - FLAPS DOWN GRAPH, THE LANDING DISTANCE APPROPRIATE TO OAT, ALTITUDE, WIND, AND 50 FT OBSTACLE. ENTER THIS GRAPH WITH DERIVED VALUE AND READ FLAPS UP LANDING DISTANCE.



LANDING DISTANCE - GRASS SURFACE - FLAPS DOWN (DN)

APPROACH SPEED 76 KTS (ALL WEIGHTS)

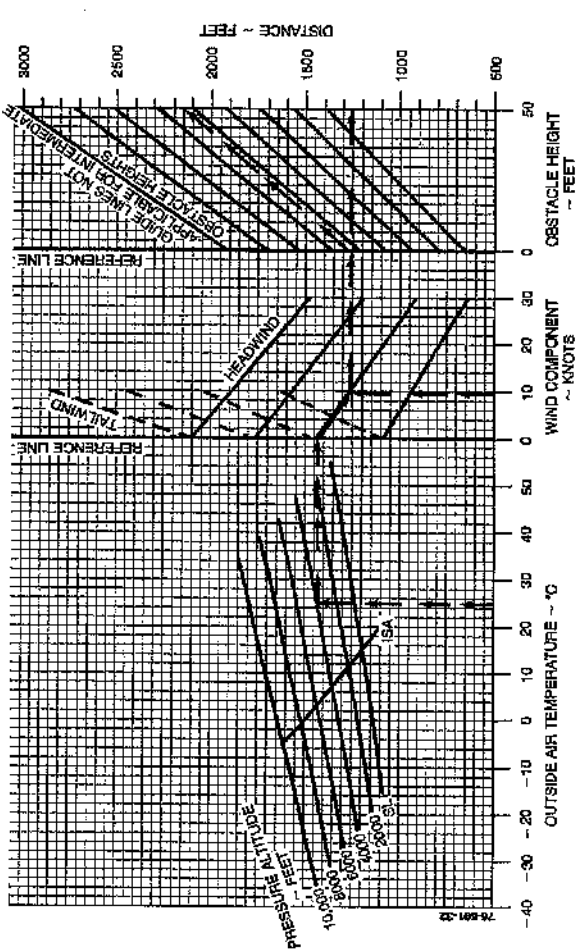
ASSOCIATED CONDITIONS:

POWER.....RETARD TO MAINTAIN 800 FT/MIN ON FINAL APPROACH
FLAPS.....DOWN (DN)
LANDING GEAR...DOWN
RUNWAY.....SHORT, DRY, GRASS
APPROACH SPEED.....76 KTS
BRAKING.....MAXIMUM

EXAMPLE:

OAT.....28°C
PRESSURE ALTITUDE.....3965 FT
HEADWIND COMPONENT.....9.5 KTS

GROUND ROLL.....1250 FT
TOTAL OVER 50 FT OBSTACLE.....2150 FT
APPROACH SPEED.....76 KTS



SECTION VII
SYSTEMS DESCRIPTION

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AIRFRAME

The BEECHCRAFT Duchess 76 is an all-metal, low-wing, twin-engine airplane with retractable tricycle landing gear. The T-tail empennage assembly consists of a vertical stabilizer and a top-mounted horizontal stabilizer.

SEATING ARRANGEMENTS

In the standard configuration the airplane is equipped with two adjustable pilot seats and one rear fixed-bench seat. In the optional configuration, split third and fourth seats are installed to replace the fixed-bench seat. To adjust either of the front seats, pull the release knob located below the left forward seat corner (pull to the right, then up) and slide the seat forward or aft, to the desired position. Each seat should be locked securely in place, after adjustment. The backs of all individual seats can be placed in any of three positions by means of a lever located on the side of each seat. Headrests are available for each of the individual seats. Outboard armrests, for the front seats, are attached to the cabin doors.

FLIGHT CONTROLS

CONTROL SURFACES

The control surfaces are bearing supported and operated through conventional cable systems and push-pull rods terminating in bell cranks.

CONTROL COLUMN

The airplane is equipped with dual control columns for the pilot and copilot. The control wheels are interconnected and provide aileron and elevator control.

RUDDER PEDALS

The standard installation provides a set of rudder pedals for both the pilot and copilot. The main landing gear wheel brakes are operated by applying toe pressure to either set of rudder pedals.

TRIM CONTROLS

Trim tabs on the rudder and elevator are adjustable with the controls that are mounted on the lower center console. The trim tabs and controls are connected through closed cable systems. Mechanical position indicators for each of the trim tabs are integrated with their respective controls. Elevator trim is accomplished through either the electric or manual pitch trim system.

MANUAL ELEVATOR TRIM

The manual elevator trim is actuated by a handwheel located between the pilot seats. An elevator tab position indicator is located adjacent to the trim control handwheel. Forward rotation of wheel trims the airplane nose down, aft rotation trims nose up.

ELECTRIC ELEVATOR TRIM

The electric elevator trim system is controlled by the ON-OFF circuit-breaker-type switch located on the left subpanel and a thumb switch located on the pilot's control wheel. The ON-OFF switch must be in the ON position to operate the system. The thumb switch is depressed and 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.

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

AILERON TRIM

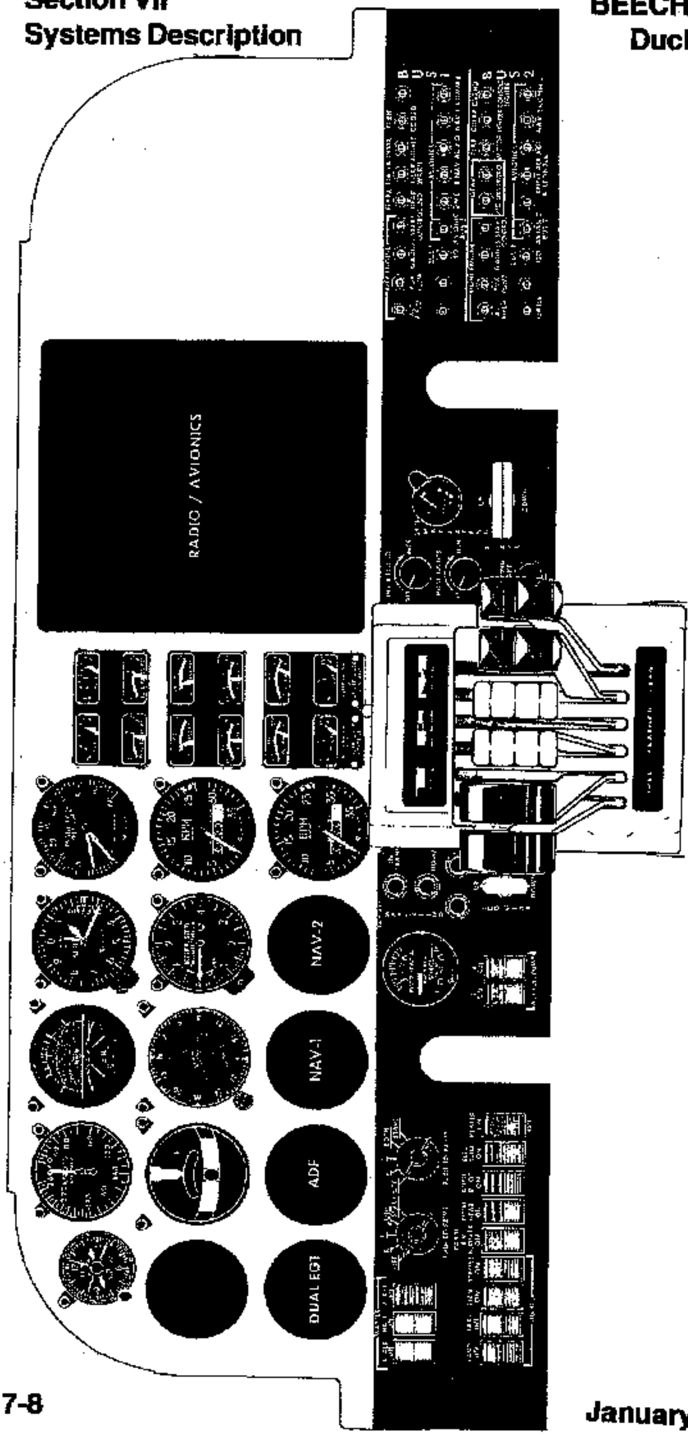
The aileron trim control, located on the lower center console, is provided to displace the ailerons for trimming purposes. Displacement is maintained by cable loads imposed by the trimmer.

INSTRUMENT PANEL

The standard instrument panel consists of flight, navigation, and engine instruments on the left, and an avionics section on the right.

The lower left subpanel contains the switches for control of the battery and alternators, magneto/start and prime, lights, environmental, and optional equipment. Also contained on the left subpanel are the auxiliary fuel pump switches, instrument air gage, landing gear control switch and gear indicator lights.

Located on the lower right subpanel are the rheostat switches for the instrument flood and post lights, parking brake control knob, flap switch, and flap position indicator. All of the circuit breakers, that are associated with the various placarded systems, are also located on the lower right subpanel.



TYPICAL INSTRUMENT PANEL

FLIGHT INSTRUMENTS

The flight instruments are located on the instrument panel directly in front of the pilot's seat. Available flight instrumentation includes attitude and directional gyros, airspeed, altimeter, turn coordinator, vertical speed, and gyro pressure. The magnetic compass is mounted above the instrument panel and the outside air temperature indicator is located in the lower left corner of the windshield (ME-1 through ME-440) or in the center of the windshield above the compass (ME-441 and after). The clock is mounted in the upper left portion of the instrument panel.

ENGINE INSTRUMENTATION

Most of the engine instruments are located in the center of the instrument panel. This group includes left and right instruments for fuel quantity, fuel pressure, oil pressure, oil temperature, cylinder head temperature, and loadmeters. The alternator-out annunciator lights for each alternator and the test switch are located adjacent to the loadmeters. The balance of the engine instruments, located above the left subpanel, include a dual indicating manifold pressure gage, tachometers, and a dual indicating exhaust gas temperature indicator. A dual indicating tachometer (ME-140 and after) is offered as optional equipment in lieu of the two (left and right) standard tachometer indicators.

GROUND CONTROL

The spring-loaded linkage from the nose gear to the rudder pedals allows for nose wheel steering. Smooth turning is accomplished by allowing the airplane to roll while depressing the appropriate rudder pedal. Sharper turns require light brake pedal pressure on the depressed rudder pedal.

The minimum wing-tip turning radius of 27 feet 2 inches is accomplished by using full steering, one brake, and differential power.

WING FLAPS

The wing flaps are controlled by a three-position switch, UP, OFF, and DOWN, located on the subpanel, to the right of the control console. The switch must be pulled out of detent before it can be repositioned. A dial-type indicator, located adjacent to the flap switch, has position markings for UP, 10°, 20°, and DN.

Limit switches automatically interrupt power to the electric motor when the flaps reach the extremes of travel. Intermediate flap positions can be obtained by placing the three-position switch in the OFF position during flap extension or retraction.

Lowering the flaps in flight will produce the following effects:

Attitude - Nose Down
Airspeed - Reduced
Stall Speed - Lowered

When the flaps are extended beyond approximately 16°, the landing gear warning horn will sound (regardless of throttle position) if the landing gear is not down and locked.

LANDING GEAR SYSTEM

The retractable tricycle landing gear is fabricated from magnesium castings and aluminum forgings. Retraction and extension of the gear is accomplished through the use of an electrically driven hydraulic pump and hydraulic system terminating in a hydraulic actuator assembly mounted in each wheel well. The landing gear may be hydraulically extended or retracted, and may be lowered manually.

CONTROL SWITCH

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

POSITION INDICATORS

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 is down and locked. The red light illuminates any time the landing gear is in transit or in any intermediate position. All of the lights will be extinguished when the gear is up.

Pressing the face of each landing gear position indicator light will verify the landing gear lights are functional. The intensity of the lamps can be controlled by turning the lens holder on each lamp.

TIME-DELAY RELAY (ME-183 and after)

Landing gear retraction operation is protected by a time-delay relay which will disengage electrical power to the hydraulic pump motor after 30 seconds of continuous pump operation. If the landing gear in-transit light remains illuminated; it indicates improper response of the landing gear. The time-delay relay can be reset by moving the landing gear switch handle to the down position. The landing gear and retract system should be checked before the next flight.

SAFETY RETRACTION SWITCH

To prevent inadvertent retraction of the landing gear on the ground, a safety pressure switch is installed in the pitot system to deactivate the hydraulic pressure pump circuit when the impact air pressure is below 59 to 63 knots.

WARNING

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

WARNING HORN

If either or both throttles are retarded below an engine setting sufficient to sustain flight and the landing gear is retracted, the landing gear warning horn will sound intermittently. Also, when the flaps are extended beyond approximately 16°, the warning horn will sound, regardless of throttle position, if the landing gear is not down and locked.

WARNING HORN "Q" SWITCH

An optional "Q" switch is available to prevent the gear warning horn from sounding with the throttle(s) retarded and the landing gear retracted. In order for the "Q" switch to interrupt the gear warning horn, the airspeed must be above 99 to 106 KIAS and the flaps must be retracted above approximately 16°.

WARNING HORN SILENCE BUTTON

An optional gear warning horn silence button allows the pilot to manually silence the warning horn with either throttle retarded, the landing gear retracted, and the flaps retracted above approximately 16°. The push-to-silence button is located next to the landing gear control switch and is placarded "GEAR HORN SILENCE". A red light in the button illuminates when the gear horn silence system is activated.

When either throttle is retarded sufficiently to activate the gear warning horn, the horn may be silenced with the button. If the other throttle is then retarded, the warning horn will again sound and cannot be silenced. After a single throttle has been retarded and the resulting warning horn silenced with the button, readvancing the throttle resets the warning horn and it will again sound when either throttle is retarded. The warning horn is also reset when the landing gear are lowered. When the flaps are extended beyond approximately 16°, the button will not silence the warning horn.

CIRCUIT BREAKER

The landing GEAR MOTOR circuit breaker and the landing GEAR CONTROL circuit breaker are located on the right subpanel. The circuit breakers are the pull-and-reset type and will pop out under overload conditions.

EMERGENCY EXTENSION

The landing gear can be manually extended by turning the hydraulic pressure bypass valve 90° counterclockwise. The valve is located under the access door on the floor in front of the pilot's seat. When the system pressure is released, the gear will fall into the down-and-locked position. The emergency extension procedure is 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. The parking brakes push-pull control is located on the right subpanel just left of the flap switch. To set the parking brakes, pull the control out and pump both toe pedals until solid resistance is felt. Push the control in to release the brakes.

The hydraulic brake fluid reservoir is located on the left side of the forward cabin bulkhead and is accessible through the nose compartment. Fluid level is checked with the dipstick attached to the reservoir cap. The brakes require no adjustment, since the pistons move outward to compensate for lining wear.

CAUTION

Install wheel chocks and release the parking brake if the airplane is to be left unattended. Changes in ambient temperatures can cause the brakes to release or exert excessive pressures.

BAGGAGE COMPARTMENT

The aft baggage compartment is accessible through the utility door on the left side of the fuselage. This area extends aft of the rear seats to the rear bulkhead. Loading within the baggage compartment must be in accordance with the data in the WEIGHT AND BALANCE section. All baggage must be secured with the nylon straps, which are provided in the baggage compartment.

The hat shelf, located near the top of the aft cabin enclosure, provides an area for light miscellaneous articles. Both the baggage compartment and the hat shelf are accessible in flight.

WARNING

Do not carry hazardous material anywhere in the airplane.

Do not carry children in the baggage compartment.

SEATS, SEAT BELTS, AND SHOULDER HARNESSES

SEATS

To adjust either of the front seats, pull the release knob located below the left forward seat corner (pull to the right, then up) and slide the seat forward or aft to the desired position. Make certain each seat is locked securely in place after adjustment. The backs of all individual seats can be placed in any of three positions by means of a release lever located on the side of each seat. Headrests are available for each of the individual seats. Outboard armrests for the front seats are attached to the cabin doors.

SEAT BELTS

All seats are provided with seat belts having a lever-action, quick-release, metal buckle. The seat belt length can be shortened or lengthened by allowing the excess belt to pull through the end of the buckle. Holding the buckle at a right angle to the belt releases the binding action, allowing the belt to slip.

SHOULDER HARNESSES

The shoulder harness is a standard installation for all seats and 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 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 to the seat belt buckle. The inertia reels for the front and middle seats are attached to the lower cabin sidewall structure at the aft edge of the respective seat. The inertia reel is covered with an escutcheon, and the strap runs up from the reel to a looped fitting attached to the window frame just aft of the seat. For stowing these shoulder harness straps, stowage attach points are provided adjacent to the inertia reel on the cabin sidewall.

WARNING

The seat belt is independent of the shoulder harness; however, the shoulder harness may be used only when the seat belt is fastened.

Occupants shorter than 4'7" are not to use shoulder harness.

DOORS AND EXITS

FORWARD CABIN DOORS

The airplane has a conventional cabin door on each side of the fuselage adjacent to the forward seats. When closed, the outside cabin door handle is spring-loaded to fit into a recess

in the door. The door can 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, grasp the armrest attached to the door and firmly pull the door closed. Opening the storm window will alleviate pressure inside the cabin as the door is being closed. Press firmly outward at the upper aft edge 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, grasp the door release handle and pull until door latch releases.

AFT UTILITY DOOR

The aft utility door on the left side of the fuselage is provided for loading baggage into the aft cabin area. This door can be opened from outside the airplane or from the inside. To open the door from the outside, lift the handle from its recess and pull until the door opens. To open the door from the inside, pull out on the locking pin adjacent to the door handle, then rotate the handle counterclockwise (approximately ¼ turn) until the door opens. The door handle is equipped with a keyhole and can be locked, as desired.

EMERGENCY EXITS

An emergency exit can be accomplished through either of the forward cabin doors, or the aft utility door.

CONTROL LOCK

A control lock is provided with the loose tools. When installed on ME-1 thru ME-338 it prevents movement of the control column and impairs access to the magneto/start

switches. On Serials ME-339 and after, and airplanes prior to ME-339 complying with BEECHCRAFT Service Instructions No. 1136, the control lock prevents movement of the control column, impairs access to the magneto/switches, and also prevents movement of the throttles and rudder pedals.

To Install the Control Lock (Serials ME-1 thru ME-338):

1. Rotate control wheel and move control column so the holes in the control column hanger and the control column will align to accept the pin.
2. Push the control column lock pin through the hole provided in the control column hanger and into the hole in the underside of the control column tube assembly.
3. Ensure positive retention of the lock pin by positioning the hook over the control column.

WARNING

Before starting the engines, remove the control lock by reversing the above procedure.

To Install the Control Lock (ME-339 and after, and airplanes prior to ME-339 complying with BEECHCRAFT Service Instructions No. 1136):

1. Install throttle control lock on the engine control quadrant.
2. Install rudder lock by inserting the upright tabs of the rudder lock between the bottom of the rudder pedals and the rudder bars.
3. Rotate the control wheel and move control column so the holes in the control column hanger and the control column will align to accept the pin. Push the control column lock pin through the hole provided in the control column hanger and into the hole in the

underside of the control column tube assembly. Ensure positive retention of the lock pin by positioning the hook over the control column.

NOTE

Tension on the cable between the rudder lock and the control column lock holds the rudder lock in place.

WARNING

Before starting the engines, remove the control lock by reversing the above procedure.

ENGINES

Two direct-drive, four-cylinder, horizontally opposed, Avco Lycoming engines are installed. An O-360-A1G6D (clockwise rotating as viewed from the pilot's seat) engine is mounted on the left wing, and an LO-360-A1G6D (counterclockwise rotating) engine is mounted on the right wing. Each engine is rated at 180 horsepower at 2700 rpm.

ENGINE CONTROLS

THROTTLE, PROPELLER, AND MIXTURE

The control levers are grouped along the upper portion of the control console. Pushing forward on a control lever increases its appropriate function, pulling back decreases it. The knobs

on the levers are shaped to standard government configuration so they can be identified by touch. The controls are centrally located for ease of operation from either the pilot's or the copilot's seat. A controllable friction knob, located to the right of the control levers, is provided to prevent creeping of the control levers.

ENGINE INSTRUMENTATION

Most of the engine instruments are located in the center of the instrument panel. This group includes left and right instruments for fuel quantity, fuel pressure, oil pressure, oil temperature, cylinder head temperature, and loadmeters. The alternator-out annunciator lights for each alternator, and the test switch for the lights, are located adjacent to the loadmeters. The balance of the engine instruments, located above the left subpanel, include a dual-indicating manifold pressure gage, tachometers, and a dual-indicating exhaust gas temperature indicator.

MANIFOLD PRESSURE GAGE

The dual-indicating manifold pressure gage indicates the pressure of the fuel/air mixture entering the engine cylinders of each engine, and is calibrated in inches of mercury.

EXHAUST GAS TEMPERATURE INDICATOR (EGT)

This installation provides for a sensitive and rapid indication of exhaust gas temperature to assist in adjusting the fuel/air mixtures during cruise. Procedures pertaining to leaning the mixture using the EGT indicator are contained in the NORMAL PROCEDURES section.

ENGINE BREAK-IN INFORMATION

New engines have been carefully run-in by the engine manufacturer. However, the engines should be operated on straight mineral oil for a minimum of 50 hours or until oil consumption stabilizes. After the first 25 hours of operation, drain and replace the mineral oil. A change to an approved engine oil should be made after the break-in period. Refer to Lycoming Engine Operator's Manual.

NOTE

In order to promote proper ring seating, cruise power settings of 65% to 75% should be used until a total of 50 hours has accumulated or until oil consumption has stabilized. This recommendation is applicable to in-service engines following cylinder replacement or top-overhaul of one or more cylinders, as well as to new engines.

ENGINE LUBRICATION

The engines are equipped with a wet-sump, pressure-type oil system. Each engine sump has a capacity of 8 quarts. The oil level may be checked through the access door in each 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.

Oil operating temperatures are controlled by an automatic thermostat bypass control. The bypass control will limit the 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.

ENGINE ICE PROTECTION

The possibility of induction system icing is reduced by the carburetor air heat system.

CARBURETOR HEAT

The carburetor heat control levers are located just below the control console on the pedestal. The levers have two placarded positions: OFF - ON. When the levers are in the OFF (up) position, cold and filtered air enters the induction system. Placing the levers in the ON (down) position allows heated and unfiltered air to enter the induction system to alleviate the possibility of carburetor ice. Carburetor air heat should be used in accordance with the recommendations in the NORMAL PROCEDURES section.

INDUCTION AIR

Induction air is available from filtered ram air or unfiltered carburetor heat air. Filtered ram air enters from above the engine inside the nacelle area.

COWL FLAPS

The manual cowl flaps are controlled by separate levers located just below the carburetor heat controls on the pedestal. Each control lever has three placarded positions: CLOSE (up) - HALF - OPEN (down). The control levers allow the cowl flaps to be positioned so that the desired cylinder head temperatures can be maintained.

STARTERS

The magneto/start switches are located on the subpanel to the left of the pilot's control column and incorporate R (right), L (left), and BOTH magneto positions in addition to the OFF and START positions. After activation of the starter, the spring-loaded switch returns to the BOTH position when released. Also, the switches include a PUSH TO PRIME position that activates the electric fuel priming function for the purpose of supplying additional fuel to the engine during starting.

The warning light placarded STARTER ENGAGED (ME-

333, ME-346 and after) is located between the Left Magneto/Start and Right Magneto/Start switches on the pilot's left subpanel. The starter engaged warning light will illuminate whenever electrical power is being supplied to the starter. If the light remains illuminated after starting, the starter relay has remained engaged and loss of electrical power may result.

PROPELLERS

The airplane is equipped with two Hartzell, 76-inch diameter, constant-speed, full-feathering, two-blade propellers. Propeller rpm is controlled by the engine-driven propeller governor which regulates hydraulic oil pressure to the hub. The propeller controls, on the control console, allow the pilot to select the governor's rpm range. Springs and dome air pressure, aided by counterweights, move the blades to high pitch. Engine oil under governor-boosted pressure moves the blades to the high rpm (low pitch) position.

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.

FUEL SYSTEM

The airplane is designed for operation on grade 100 (green) or 100LL (blue) aviation gasoline. The fuel system is an ON - CROSSFEED - OFF arrangement. The fuel selector panel, located on the lower portion of the center pedestal, contains the fuel selector levers for each engine.

The fuel is drawn from the respective tank through the fuel strainer and to the fuel selector valve, located aft of the firewall in each nacelle. From the fuel selector valve, the fuel passes through a check valve and then through the engine-driven fuel pump and delivered to the carburetor. The cabin heater, located in the nose compartment, uses fuel (approximately 2/3 gallon per hour) from the right wing tank fuel system only.

FUEL TANKS

The fuel system consists of a bonded leading-edge fuel tank located outboard of the nacelle in each wing. The fuel tank in each wing has a capacity of 51.5 gallons for a total fuel capacity of 103 gallons (100 gallons usable). Each wing is serviced through a single filler located in the outboard portion of each wing. The filler neck of each tank contains a visual measuring tab which facilitates partial filling of the fuel system. When the fuel level reaches the bottom of the tab, it indicates 30 (28.5 usable) gallons of fuel in that tank. The center mark on the tab indicates 40 (38.5 usable) gallons of fuel and the mark at the top indicates a full tank of 51.5 (50 usable) gallons of fuel.

FUEL SELECTOR VALVES

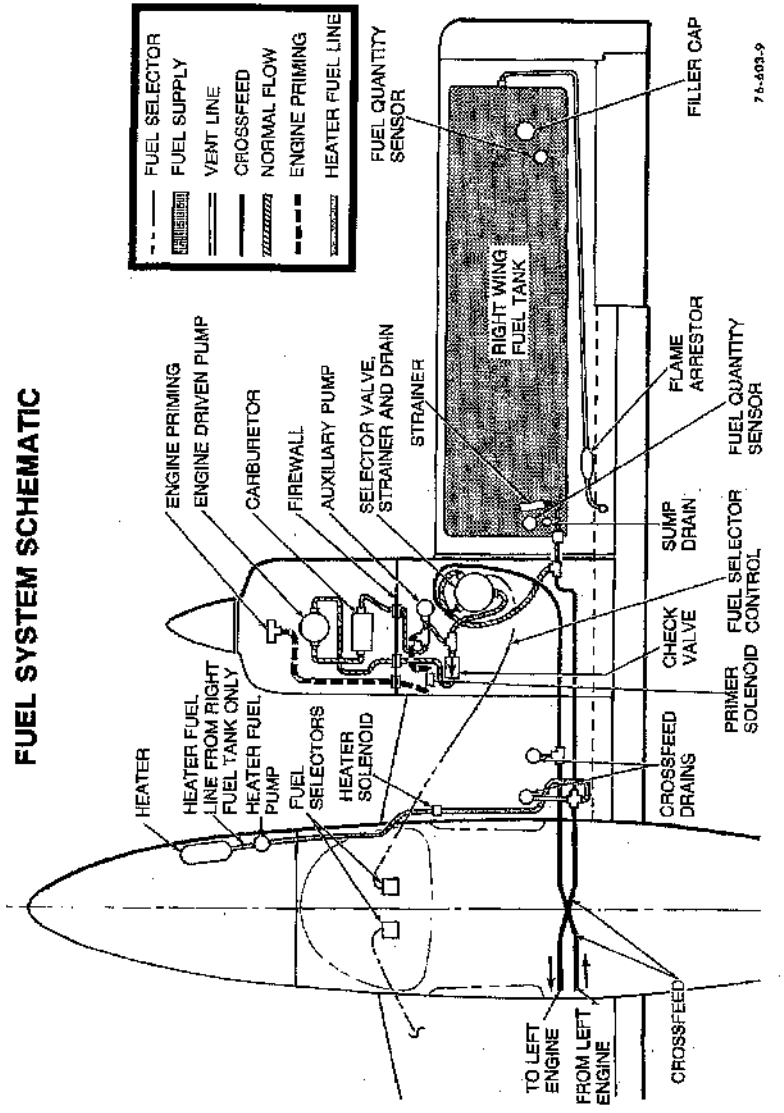
The fuel selector valves are located in each nacelle on the outboard side just forward of the wing leading edge. The valve is of the rotary type and is operated by push-pull cable from the floor console between the front seats. The valve has three positions, ON - CROSSFEED - OFF, which are determined by detents in the valve. The floor console has a slot for each selector valve lever, with notches which correspond to the valve detents.

NOTE

During operation, make certain fuel selector valves are in detent in the ON position. This can be determined by moving the levers slightly within the detent notch. Operation with the valve slightly out of detent could result in fuel transferring from one wing tank to the other.

The fuel selector valves also function as a preflight drain point and firewall fuel shutoff. The lower portion of the valve serves as a sediment bowl and contains the fuel strainer screen.

FUEL SYSTEM SCHEMATIC



FUEL DRAINS

The fuel system is drained at eight locations, four on each wing. A flush sump drain valve is located outboard of each nacelle on the underside of each wing tank. A drain is also provided for the fuel selector valve, located in the outboard underside of each nacelle aft of the firewall. Two flush drains are located inboard of each main gear wheel well for draining the crossfeed fuel lines.

The fuel selector valve drains are actuated manually by pushing up, approximately one-quarter inch, on the lower portion of the drain valve. All other fuel drains are flush-type valves and are actuated by using the combination fuel drain/emergency landing gear tool provided with the loose tools and equipment. Flush-type fuel drains are actuated by pushing in on the valve and then releasing when the desired amount of fuel has been drained. These drain valves can be locked open for the purpose of fuel off-loading or for totally draining the fuel system. Pushing in and turning counterclockwise will lock the drains in the open position. To close, turn clockwise and release.

FUEL QUANTITY INDICATORS

Fuel quantity is measured by two float-operated sensors located in each wing tank system. The sensors transmit electrical signals to the individual indicators, located on the instrument panel, which indicate the amount of fuel remaining in each tank.

AUXILIARY FUEL PUMPS

The electric auxiliary fuel pumps, one for each engine, are located in the nacelle just aft of the firewall. They are controlled by separate rocker-type ON-OFF switches, placarded AUX FUEL PUMP - L ON - R ON, located on the pilot's subpanel. The auxiliary fuel pumps provide pressure for

priming, starting, taxiing, takeoff, and landing. Also, the auxiliary fuel pump provides sufficient pressure for continued engine operation in case the engine-driven fuel pump becomes inoperative.

ENGINE PRIMING

Each engine is equipped with a three-point (no. 1, 2, and 4 cylinders) fuel priming system. The magneto/start switches incorporate a PUSH TO PRIME function to aid in engine starting. The BATTERY MASTER and the AUX FUEL PUMP (L or R) switches must be turned on prior to activating the fuel priming system. The PUSH TO PRIME switch may be actuated in either the BOTH or START position. Pushing in on the magneto/start switch activates a solenoid, located behind the firewall in each nacelle, and supplies fuel directly into the no. 1, 2, and 4 cylinders for engine priming. Engine priming should be used in accordance with the recommendations in the NORMAL PROCEDURES section.

FUEL CROSSFEED

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 all the available fuel from the opposite side.

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

FUEL REQUIRED FOR FLIGHT

Flight planning and fuel loading are 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 each flight. A minimum of 9 gallons of fuel is required in each wing system before takeoff.

ELECTRICAL SYSTEM

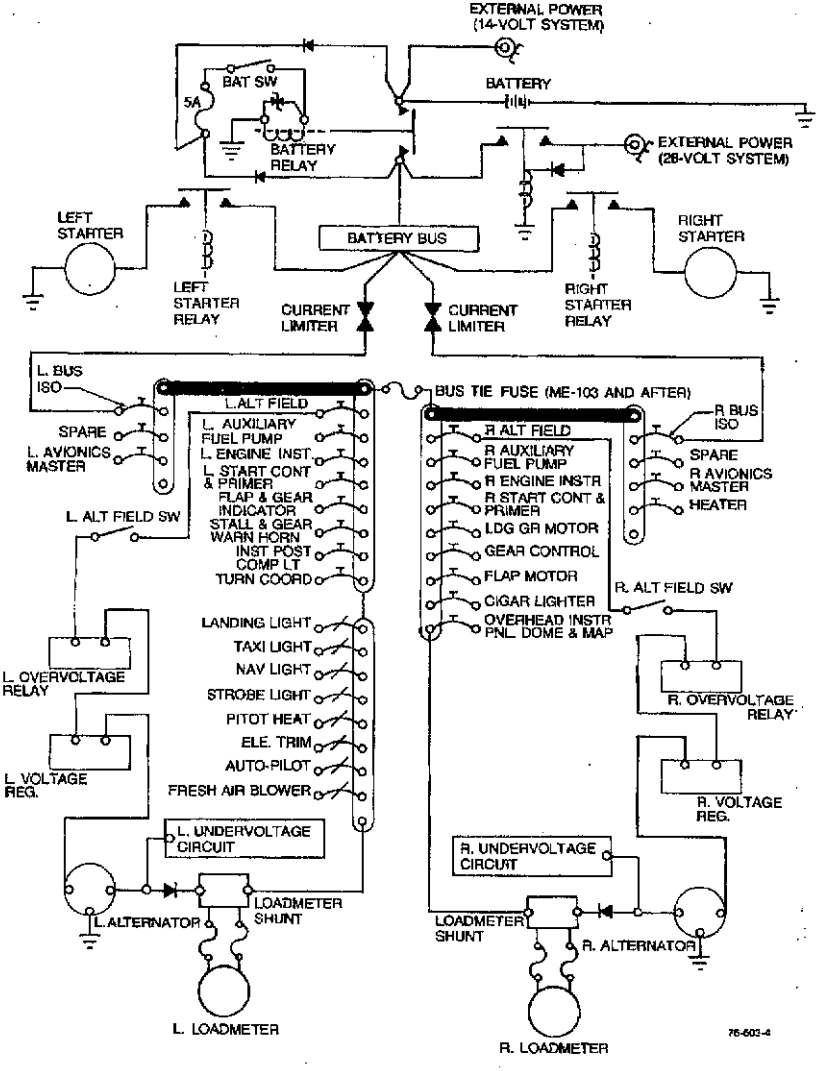
The system circuitry is the single-wire, ground-return type, with the airplane structure used as the ground return. The alternator switches, battery switch, magneto/start/prime switches, and auxiliary fuel pump switches are located on the pilot's subpanel. This panel contains most of the electrical system switches and switch-type circuit breakers. Each is placarded as to its function. The right subpanel contains the protective circuit breakers for the various electrical systems, and all avionics circuit breakers.

BATTERY

One 24-volt, 15.5-ampere-hour, lead-acid battery *(ME-183 and after)* or one 12-volt, 35-ampere-hour, lead-acid battery *(ME-1 thru ME-182)* is installed in a battery box in the aft fuselage compartment. An optional installation *(ME-183 and after)* provides two 12-volt, 25-ampere-hour, lead-acid batteries, electrically connected in series and installed in the battery box. Battery servicing procedures are described in the HANDLING, SERVICING, and MAINTENANCE section.

The battery box is fitted with a lid for access to the battery or batteries. The lid is held in place with two lift-to-release latches.

Battery fumes and gases are vented to the outside through two vents in the lower fuselage skin below the battery box. The vents are so designed that there is a flow of air from the vent to the top of the box and out through the vent at the bottom of the box.



POWER DISTRIBUTION SCHEMATIC

ALTERNATORS

Two 55-ampere, 28-volt, belt-driven alternators *(ME-183 and after)* or two 60-ampere, 14-volt, belt-driven alternators *(ME-1 thru ME-182)* are installed in the airplane.

The output of each alternator is controlled by a separate voltage regulator. The alternator systems are completely separate, except for the BUS TIE FUSE (on airplanes ME-103 and after), the mutual tie to the battery bus through two bus isolation circuit breakers, and the paralleling circuit between the regulators. The bus-isolation circuit breakers are used to isolate Bus 1 and Bus 2 from the battery bus circuit. The regulators automatically maintain the bus voltage at a set value for all loads up to the alternator rating. The voltage regulators also maintain approximately equal load sharing between the two alternators.

The self-excitation load capability of the alternators is directly related to engine RPM. The self-excitation feature will not come on until approximately 1200 to 1400 RPM, with a load capability of approximately 50%. However, it will remain on as engine speed is reduced to approximately 850 to 1000 RPM. A maximum load capability of approximately 80% should be obtainable at approximately 2300 RPM engine speed.

CAUTION

During an in-flight emergency, under no condition, shall more load be applied than is absolutely necessary for safe flight condition. Initiation of any flight using the self-excitation feature is strictly prohibited.

Individual alternator output is indicated by the two loadmeters (as opposed to the charge/discharge-type ammeter) located on the instrument panel. The loadmeters give a percentage reading of the load on the system.

There are two pairs of alternator-out warning lights, each pair placarded ALTERNATOR OUT - UNDER/OVER VOLTAGE. Each pair is adjacent to its corresponding loadmeter, located on the instrument panel. Anytime either alternator voltage is 4 ± .1 volts (28-volt system) or 2 ± .1 volts (14-volt system) below the bus voltage, the corresponding undervoltage alternator-out light will illuminate. When the battery is turned on with both alternators off, both alternator-out undervoltage lights will illuminate. The alternator-out overvoltage light (one for each alternator) will illuminate when the corresponding overvoltage relay is actuated. The overvoltage relay opens the affected alternator field, and the affected alternator voltage will drop to zero. The alternator-out lamps can be tested by pressing the TEST switch located adjacent to the lamps.

STARTERS

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

STARTER ENGAGED WARNING LIGHT (ME-333, ME-346 AND AFTER)

The warning light placarded STARTER ENGAGED will illuminate whenever electrical power is being supplied to the starter. If the light remains illuminated after starting, the starter relay has remained engaged and loss of electrical power may result. The battery and alternator switches should be turned off if the light remains illuminated after starting. If the light does not illuminate during starting, the indicator system is inoperative and the loadmeters should be monitored to ensure that the starter does not remain energized after starting.

EXTERNAL POWER

The external power receptacle is located either on the right (ME-1 through ME-440) or on the left (ME-441 and after) side of the fuselage, just aft of the cabin area. A negatively grounded external power source may be used for engine starting or for ground electrical system checks. Airplanes equipped with 14-volt systems (ME-1 through ME-182) require a power unit setting of 14 volts, ± .2 volts. Airplanes equipped with 28-volt system (ME-183 and after) require a power unit setting of 28 volts, ± .2 volts.

CAUTION

On 14-volt airplanes, the power pin for external power is connected directly to the battery and continually energized. Turn off alternator switches, all electrical and avionics switches, and turn on battery switch before connecting the auxiliary power unit plug. Assure correct polarity (negative ground) before connecting auxiliary power unit.

CAUTION

On 28-volt airplanes, a reverse polarity diode protection system is between the external power receptacle and the main bus. With external power applied, the bus is powered. Turn on the battery switch only with all other switches including avionics switches off before connecting the auxiliary power unit. Assure correct polarity before connecting external power.

When auxiliary power is desired, connect the clamps of the power cable to the remote power source, ensuring proper polarity. Turn OFF the ALT switches and ensure that all avionics equipment is OFF, and then turn ON the BATT switch. Insert the power cable plug into the receptacle, turn on auxiliary power unit, and start engine using the normal starting procedures.

LIGHTING SYSTEMS

INTERIOR LIGHTING

Lighting for the instrument panel is controlled by two rheostat switches located on the copilot's subpanel to the right of the control console. One switch, placarded INSTR FLOOD, controls the intensity of the overhead instrument flood light and the overhead map light. The other switch, placarded POST LIGHTS, adjusts the intensity of all post lights installed, magnetic compass light, and the internally lit engine instruments. The cabin dome light is controlled by the switch located adjacent to the light.

EXTERIOR LIGHTING

The switches for all exterior lights are located on the lower portion of the pilot's subpanel. Each circuit is protected by a circuit-breaker-type switch.

The exterior lights consist of a landing light on the outboard leading-edge portion of the left wing, a taxi light on the outboard leading-edge portion of each wing, navigation lights on the wing tips and empennage, and a strobe light located on each wing tip. For longer battery and lamp life, use the landing light and the taxi lights sparingly; avoid prolonged operation which could cause overheating during ground maneuvering.

NOTE

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

ENVIRONMENTAL SYSTEMS

CABIN HEATING

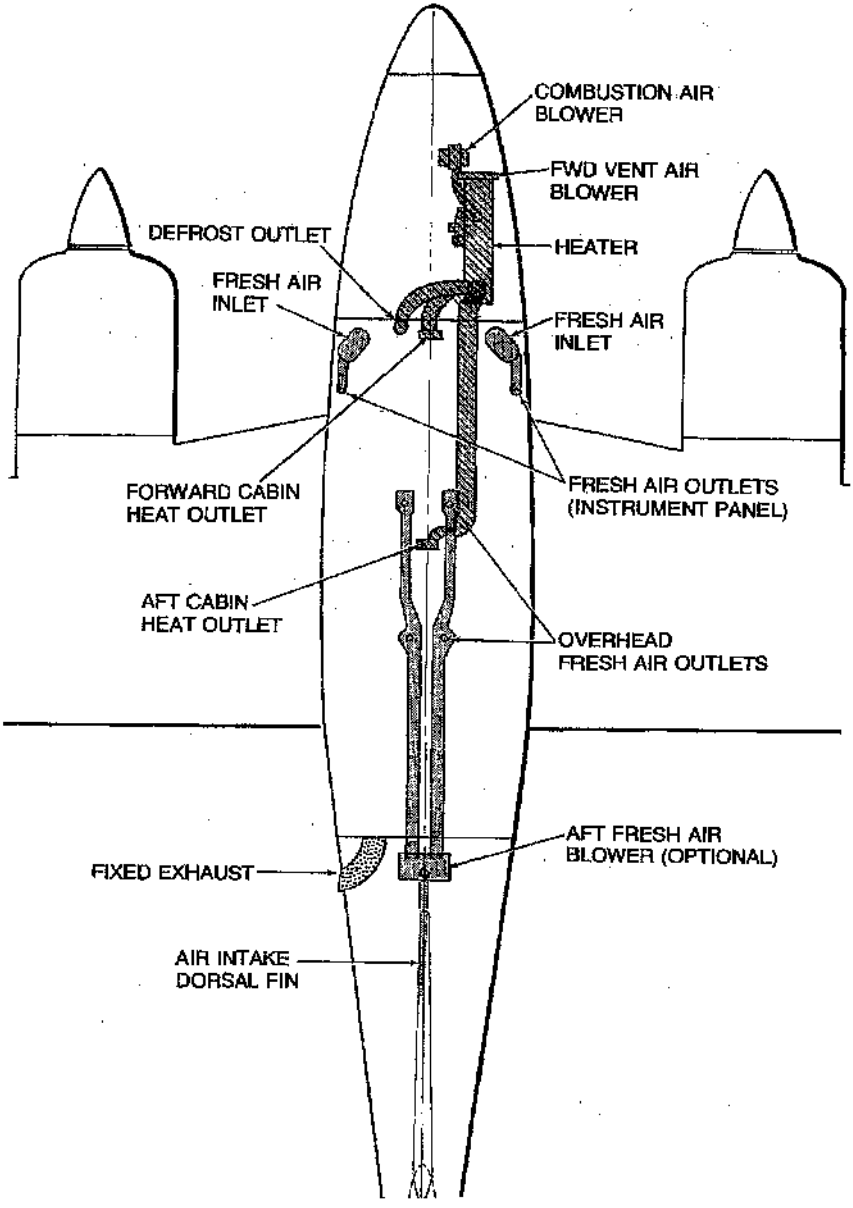
A 45,000 Btu-per-hour combustion air heater, located on the right side in the nose compartment, provides heated air for cabin warming and windshield defrosting. The heater system consists of a combustion air heater, three-position control switch, three push-pull control knobs, heater circuit breaker, manual reset limit (overheat) switch, combustion air blower, ventilation air blower, and a duct thermostat.

Fuel for the combustion heater is routed from the right wing fuel system, through a solenoid valve, to the heater fuel pump located under the heater, and into the combustion chamber of the heater. Fuel consumption of the heater is approximately ⅔ gallons per hour and should be considered during flight planning.

NOTE

The fuel solenoid is energized only if the duct thermostat, which controls the heater, requires a higher temperature.

Three outlets are located in the cabin to distribute the heated air into the cabin. One outlet is located on the lower forward cabin bulkhead and provides heated air for the pilot and copilot compartment. The second outlet is located between the pilot and copilot seats and faces aft, to provide heated air to the aft cabin area. The defrost duct is routed from the heater to the windshield outlet for windshield defrosting.



ENVIRONMENTAL SCHEMATIC

The manual reset limit (overheat) switch (inaccessible during flight), located on the heater, shuts off the heat system in case the discharge temperature reaches 300° F.

CAUTION

The entire system should be inspected and the malfunction determined and corrected before re-setting the overheat switch.

HEATER OPERATION

1. The three-position switch on the pilot's subpanel, placarded HEATER - ON, BLOWER ONLY, OFF, must be in the ON position to place the heating system in operation.

2. The push-pull knob on the left sidewall, placarded DE-FROST - PULL ON, controls the amount of air required for windshield defrosting.

3. The push-pull knob, located below the defrost knob, placarded CABIN AIR - PULL OFF, controls the amount of air entering the cabin from the heater. Pulling the knob more than approximately one-half closed deactivates the heater in order to prevent heater overtemp.

NOTE

For maximum heat, the CABIN AIR control can be pulled partially out to reduce the volume of incoming cold air and permitting 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.

4. The push-pull knob, located below the cabin air control, placarded CABIN TEMP - PULL TO INCREASE, controls the temperature of the air entering the cabin. Pulling aft on the knob increases the temperature at which the duct thermostat switch opens (controlling the heater).

CABIN VENTILATION

In flight, to provide unheated air through the same outlets used for heating, push the CABIN AIR and CABIN TEMP controls forward. The air intake for this system is located on the right side of the nose compartment.

For ventilation through these same outlets during ground operation, push the CABIN AIR control forward and place the three-position switch, on the pilot's subpanel, in the BLOWER ONLY position. The BLOWER ONLY position is for ground operation only and will shut off the blower when the landing gear is retracted.

Fresh ram air is also provided through an outlet located on each side of the instrument panel. Fresh air for these outlets enters the two vents located immediately forward of the windshield. Rotation of the outlets controls the flow of air.

OVERHEAD FRESH AIR OUTLETS

Fresh air from the intake on the left side of the dorsal fin is ducted to the individual outlets located above each seat. 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. An optional fresh air blower for this system is located in the aft fuselage. The blower is controlled by the

circuit breaker switch on the pilot's subpanel placarded CABIN AIR BLOWER. The blower is designed for ground operation and climb-out and should be turned off during cruise.

EXHAUST VENT

A fixed cabin exhaust vent is located on the left side of the aft fuselage and provides for flow-through ventilation.

PITOT AND STATIC SYSTEMS

The pitot and static systems provide a source of impact and static air for the operation of the flight instruments.

PITOT SYSTEM

A standard pitot tube for the pilot's flight instruments is located on the outboard portion of the left wing leading edge. The optional pitot tube (ME-44 and after) for the copilot's flight instruments is located on the outboard portion of the right wing leading edge.

PITOT HEAT

A heating element is installed in the pitot mast and is controlled by the rocker-type switch located on the pilot's subpanel. The switch is placarded PITOT HEAT - ON, and should remain off during ground operations except for testing or for short intervals of time to remove ice or snow from the mast. One switch controls the heating elements in both pitot masts.

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 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 ALTERNATE. When it is desired or required to use this alternate source of static air, select the ON ALTERNATE position. To recognize the need and procedures for the use of alternate static air, refer to the EMERGENCY PROCEDURES section. Airspeed Calibration and Altimeter Correction graphs are in the PERFORMANCE section.

The static air plumbing is drained by placing the lever in the ON ALTERNATE position momentarily and then returning it to the OFF NORMAL position.

PRESSURE SYSTEM

Pressure for the flight instruments 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 pilot's subpanel 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 a central filter which protects the instruments. This disposable filter is installed in the nose compartment and must be replaced in accordance with the recommendations in the SERVICING section.

STALL WARNING

The stall warning system consists of a sensing vane installed on the leading edge of each wing, a circuit breaker located on the right subpanel placarded STALL & GEAR WARN, and a stall warning horn in the overhead speaker console. The stall warning horn will sound a warning signal while there is time for the pilot to correct the attitude. The horn is triggered by the sensing vane on the left wing anytime the flaps are above approximately 16°. When the flaps are extended beyond approximately 16°, the vane on the right wing will activate the warning horn.

NOTE

With the BATT and ALT switches in the OFF position, the stall warning horn is inoperative.

SECTION VI

WEIGHT AND BALANCE/ EQUIPMENT LIST

TABLE OF CONTENTS

Airplane Papers (furnished with individual airplane)

AIRPLANE WEIGHING PROCEDURE

Periodic weighing of the airplane may be required to keep the basic empty weight current. Frequency of weighing is to be determined by the operator. All changes to the airplane affecting weight and/or balance are the responsibility of the airplane operator.

1. The airplane may be weighed on wheels or on weighing points. Two weighing points are provided on the wing main spar at F.S. 129.37, and one on the lower aft fuselage tail skid aft attach point at F.S. 278.61.

2. Fuel is normally drained preparatory to a weighing from the regular drain ports while the airplane is in static ground attitude. When tanks are drained, 1.6 pounds of undrainable fuel remain in the airplane at F.S. 124.8. The remainder of the unusable fuel to be added to a drained system is 18.0 pounds at F.S. 123.0. If the airplane is weighed with fuel tanks topped off full, the fuel specific weight (pounds/gallon) should be determined by using a hydrometer. Compute total fuel weight by multiplying measured specific weight by 100 gallons. Fuel moment is determined by interpolation from fuel table.

3. Engine oil is to be at the full level as indicated by the dipstick. Total engine oil aboard when engines and systems are full is 37 pounds at F.S. 75.4

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

5. The airplane weighing is performed with landing gear down, control surfaces in neutral position and doors closed.

6. The airplane is placed on the scales in level attitude. Leveling is accomplished with a spirit level on the aft baggage compartment floor. Leveling while on weighing points may require the nose gear shock strut to be secured in the static position to prevent its extension. Wheel weighings can be leveled by deflating the nose gear shock strut and/or tire.

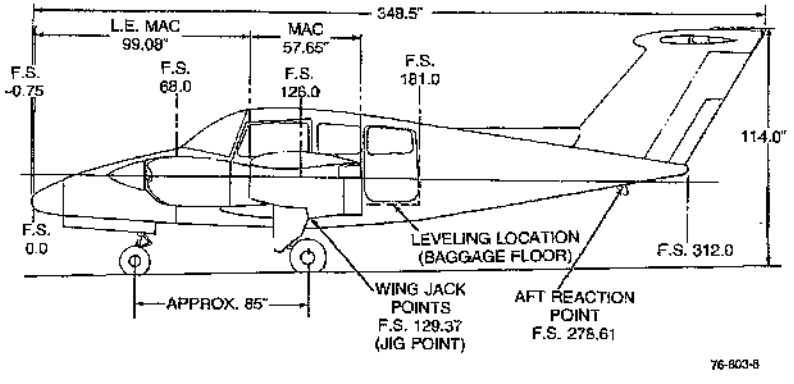
7. Measurement of the reaction arms for a wheel weighing is made using the wing jack point at F.S. 129.37 for a jig point. While the airplane is level on the scales, linear measurements are taken from the reference (a plumb bob hanging from the center of either wing jack point) to the axle centerline of the main gear and then from the main wheel axle centerline to the nose gear axle centerline. The main wheel axle centerline is best located by stretching a string from one wheel to the other. All measurements are to be taken with the tape level with the floor and parallel to fuselage water lines. The location of the wheel reactions will be approximately at F.S. 132 for the main wheels and F.S. 47 for the nose wheel.

8. The wing and fuselage weighing points are used by placing scales on the points as specified in Step 1. Since the center of gravity of the airplane will be forward of the weighing points at F.S. 129.37, the tail reaction of the rear weighing point at F.S. 278.61 will be in an up direction. This can be measured on regular scales by placing ballast of approximately 400 pounds on the scale to which the rear weighing point adapter is attached by cable or adjustable chain (may be used for leveling). The up reaction will be the total ballast weight minus the scale reading and is entered in the weighing form as a negative quantity.

9. The basic empty weight and moment are determined on the basic empty weight and balance form. Items weighed

which are not part of the basic empty weight are subtracted, i.e. usable fuel. Engine oil and unusable fuel are added if not already in the airplane.

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



AIRCRAFT BASIC EMPTY WEIGHT AND BALANCE

DUCHESS 76 SER. NO. _____ REG. NO. _____ DATE _____

STRUT POSITION	NOSE	MAIN	JACK POINT LOCATION		PREPARED BY
EXTENDED	46.4	126.8	*FORWARD*	129.37	*Company* _____
COMPRESSED	47.9	133.5	*AFT*	278.61	*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					
ENGINE OIL			37	75.4	2790
UNUSABLE FUEL			20	123.2	2464
BASIC EMPTY WEIGHT			2691	109.6	294977

NOTE

Each new airplane is delivered with a completed sample loading, basic 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 basic empty weight and c.g. is a suitable means for meeting both requirements.

The current equipment list and basic 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 basic empty weight and c.g. and that an inventory of installed equipment be conducted to create a new equipment list.

It is recommended that duplicate copies of the Basic Empty Weight and Balance sheet and the Equipment List be made and kept in an alternate location in the event the original handbook is misplaced.

LOADING INSTRUCTIONS

It is the responsibility of the airplane operator to assure 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.

WEIGHT AND BALANCE RECORD

SERIAL NO. _____ REGISTRATION NO. _____ PAGE NO. _____

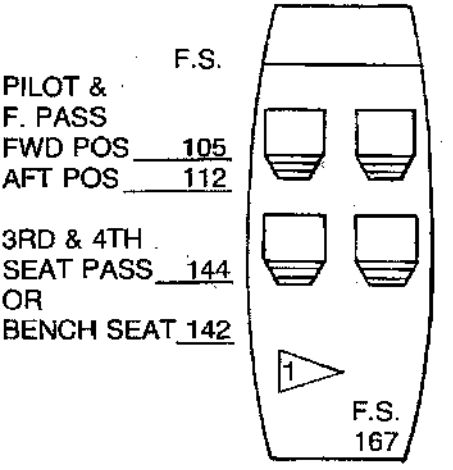
DATE	ITEM NO.		DESCRIPTION OF ARTICLE OR CHANGE	WEIGHT CHANGE ADDED (+) OR REMOVED (-)			RUNNING BASIC EMPTY WEIGHT	
	IN	OUT		WT (LBS)	ARM (IN.)	MOM / 100	WT (LBS)	MOM / 100

WEIGHT AND BALANCE RECORD

SERIAL NO. _____ REGISTRATION NO. _____ PAGE NO. _____

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

The basic empty weight and moment of the airplane at the time of delivery are shown on the airplane Basic Empty Weight and Balance form. Useful load items which may be loaded into the airplane are shown on the Useful Load Weight and Moment tables. The minimum and maximum moments are shown on the Moment Limits vs Weight graph or 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.



NOTE

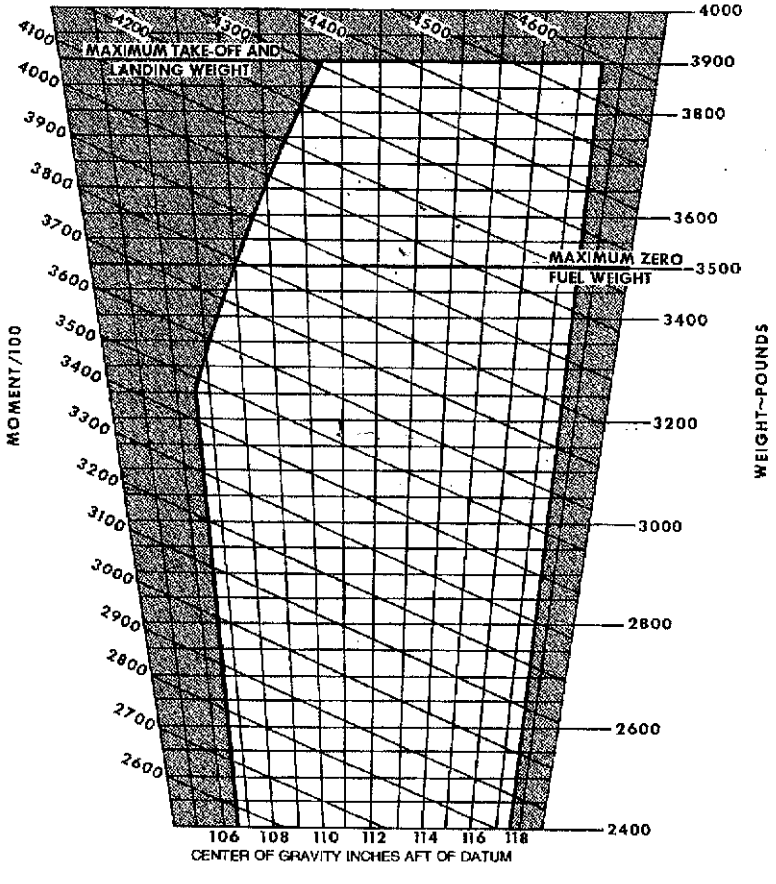
THE FLOOR STRUCTURE LOAD LIMIT IS 100 POUNDS PER SQUARE FOOT.

ALL BAGGAGE/CARGO MUST BE SECURED.

1 MAXIMUM WEIGHT 200 POUNDS INCLUDING EQUIPMENT AND BAGGAGE

76-603-8

MOMENT LIMITS VS WEIGHT



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

WEIGHT CONDITION	FWD C. G. LIMIT	AFT C. G. LIMIT
3900 POUNDS (MAX. TAKE-OFF/LANDING)	110.6	117.5
3250 POUNDS OR LESS	106.6	117.5

76-601-6

MOMENT LIMITS vs WEIGHT

WEIGHT POUNDS	MOMENT/100		WEIGHT POUNDS	MOMENT/100	
	FWD LIMIT	AFT LIMIT		FWD LIMIT	AFT LIMIT
2300	2452	2703	3125	3331	3672
2325	2479	2732	3150	3358	3701
2350	2505	2761	3175	3385	3731
2375	2532	2791	3200	3411	3760
2400	2558	2820			
2425	2585	2849	3225	3438	3789
2450	2612	2879	3250	3465	3819
2475	2638	2908	3275	3496	3848
2500	2665	2938	3300	3528	3878
2525	2692	2967	3325	3560	3907
2550	2718	2996	3350	3592	3936
2575	2745	3026	3375	3624	3966
2600	2772	3055	3400	3656	3995
2625	2798	3084	3425	3688	4024
2650	2825	3114	3450	3720	4054
2675	2852	3143	3475	3753	4083
2700	2878	3173	3500	3785	4113
2725	2905	3202	3525	3817	4142
2750	2932	3231	3550	3850	4171
2775	2958	3261	3575	3882	4201
2800	2985	3290	3600	3915	4230
2825	3012	3319	3625	3948	4259
2850	3038	3349	3650	3981	4289
2875	3065	3378	3675	4014	4318
2900	3091	3408	3700	4047	4348
2925	3118	3437	3725	4080	4377
2950	3145	3466	3750	4113	4406
2975	3171	3496	3775	4146	4436
3000	3198	3525	3800	4179	4465
3025	3225	3554	3825	4213	4494
3050	3251	3584	3850	4246	4524
3075	3278	3613	3875	4280	4553
3100	3305	3643	3900	4313	4583

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-TOTALS are the ZERO FUEL CONDITION.

4. Determine the weight and corresponding moment for the total fuel loading to be used. Add the Total Fuel Loading Condition 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 DESTINATION from the take-off weight and moment. (Determine the weight and moment of this fuel by subtracting the amount on board at landing from the amount on board at takeoff.) The Zero Fuel Condition, the Take-off Condition and the Landing Condition moment must all be within the minimum and maximum moments shown on the Moment Limits vs Weight graph or 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

MODEL *DUCHESS 76* DATE *0/0/00*
SERIAL NO. *ME-00* REG. NO. *NXXXXX*

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION	*2543*	*2775*
2. FRONT SEAT OCCUPANTS	*340*	*380*
3. 3rd & 4th SEAT OCCUPANTS OR BENCH SEAT OCCUPANTS	*340*	*490*
4.	—	—
5. AFT BAGGAGE	*93*	*155*
6. **SUB TOTAL** ZERO FUEL CONDITION (3500 LBS MAX.)	*3316*	*3800*
7. FUEL LOADING (100 gal.)	*600*	*702*
8. **SUB TOTAL** RAMP CONDITION	*3916*	*4502*
9. *LESS FUEL FOR START, TAXI, AND TAKEOFF	*—16*	*—19*
10. **SUB TOTAL** TAKE-OFF CONDITION	*3900*	*4483*
11. LESS FUEL TO DESTINATION (80 gal.)	*—480*	*—562*
12. **LANDING CONDITION**	*3420*	*3921*

*Fuel for start, taxi, and takeoff is normally 16 lbs at an average mom/100 of 19.

WEIGHT AND BALANCE LOADING FORM

MODEL *DUCHESS 76* DATE _____
SERIAL NO. _____ REG. NO. _____

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION		
2. FRONT SEAT OCCUPANTS		
3. 3rd & 4th SEAT OCCUPANTS OR BENCH SEAT OCCUPANTS		
4.		
5. AFT BAGGAGE		
6. **SUB TOTAL** ZERO FUEL CONDITION (3500 LBS MAX.)		
7. FUEL LOADING (gal.)		
8. **SUB TOTAL** RAMP CONDITION		
9. *LESS FUEL FOR START, TAXI, AND TAKEOFF		
10. **SUB TOTAL** TAKE-OFF CONDITION		
11. LESS FUEL TO DESTINATION		
12. **LANDING CONDITION**		

*Fuel for start, taxi, and takeoff is normally 16 lbs at an average mom/100 of 19.

USEFUL LOAD WEIGHTS AND MOMENTS

OCCUPANTS

WEIGHT	FRONT SEATS			3RD AND 4TH SEATS	
	*FWD POS.		*AFT POS.	STD. BENCH	OPTIONAL
	††ARM **104	†ARM **105	ARM **112	ARM **142	ARM **144
	MOMENT/100				
120	125	126	134	170	173
130	135	137	146	185	187
140	146	147	157	199	202
150	156	158	168	213	216
160	166	168	179	227	230
170	177	179	190	241	245
180	187	189	202	256	259
190	198	200	213	270	274
200	208	210	224	284	288
210	218	220	235	298	302
220	228	231	246	312	317
230	239	241	258	327	331
240	250	252	269	341	346
250	260	262	280	355	360

† Effective ME-1 thru ME-20

†† Effective ME-21 and after

* Reclining seat with back in full-up position

** Values computed from a C.G. criterion based on a 170 pound male. Differences in physical characteristics can cause variation in center of gravity location.

USEFUL LOAD WEIGHTS AND MOMENTS

BAGGAGE
ARM 167

WEIGHT	MOMENT / 100
10	17
20	33
30	50
40	67
50	84
60	100
70	117
80	134
90	150
100	167
110	184
120	200
130	217
140	234
150	251
160	267
170	284
180	301
190	317
200	334

USEFUL LOAD WEIGHTS AND MOMENTS
USABLE FUEL
ARM 117.0

GALLONS	WEIGHT LBS	MOMENT 100
10	60	70
20	120	140
30	180	211
40	240	281
50	300	351
60	360	421
70	420	491
80	480	562
90	540	632
100	600	702