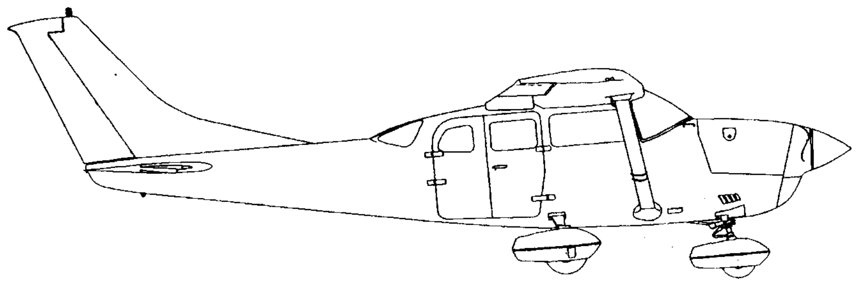
Cessna
A Textron Company

Pilot's Operating Handbook
and
FAA Approved Airplane Flight Manual



THIS DOCUMENT MUST BE CARRIED IN THE AIRPLANE AT ALL TIMES.

The Cessna Aircraft Company

Model T206H

Serial No. T206 08307

Registration No. N3516P

This publication includes the material required to be furnished to the pilot by FAR Part 23 and constitutes the FAA Approved Airplane Flight Manual.

FAA APPROVAL

FAA APPROVED UNDER FAR 21 SUBPART J
The Cessna Aircraft Co
Delegation Option Manufacturer CE-1
Executive Engineer
Date: 19 December 1998

Member of GAMA

Original Issue - 9 November 1998

NOTICE

Recently Cessna Aircraft Company has modified the way the Pilot's Checklist revisions are identified.

Beginning with Revision 5, dates will no longer be in the footer of each page. Each footer will now contain the revision level for that page. Dates may be cross referenced with the Log of Effective Pages.

Over time all dates in the footer will be replaced by a revision level.

THIS MANUAL WAS PROVIDED FOR THE AIRPLANE IDENTIFIED ON THE TITLE PAGE ON ______________.
SUBSEQUENT REVISIONS SUPPLIED BY CESSNA AIRCRAFT COMPANY MUST BE PROPERLY INSERTED.

____

Cessna Aircraft Company, Aircraft Division

REVISION

MODEL T206H

PILOT'S OPERATING HANDBOOK
AND FAA APPROVED
AIRPLANE FLIGHT MANUAL

REVISION 5
13 MAY 2002

T206HPHUS05

INSERT THE FOLLOWING PAGES INTO THE PILOT'S OPERATING HANDBOOK

Pilot's Operating Handbook

and

FAA Approved Airplane Flight Manual

Model T206H Serials T20608001 and On

Original Issue - 9 November 1998

Revision 6 - 12 January 2004

PART NUMBER: T206HPHUS06

Pilot's Operating Handbook

and

FAA Approved Airplane Flight Manual

Model T206H Serials T20608001 and On

Original Issue - 9 November 1998

Revision 5 - 13 May 2002

PART NUMBER: T206HPHUS05

CONGRATULATIONS . . . .

Congratulations on your purchase and welcome to Cessna ownership! Your Cessna has been designed and constructed to give you the most in performance, value and comfort.

This Pilot's Operating Handbook has been prepared as a guide to help you get the most utility from your airplane. It contains information about your airplane's equipment, operating procedures, performance and suggested service and care. Please study it carefully and use it as a reference.

The worldwide Cessna Organization and Cessna Customer Service are prepared to serve you. The following services are offered by each Cessna Service Station:

- THE CESSNA AIRPLANE WARRANTIES, which provide coverage for parts and labor, are upheld through Cessna Service Stations worldwide. Warranty provisions and other important information are contained in the Customer Care Program Handbook supplied with your airplane. The Customer Care Card assigned to you at delivery will establish your eligibility under warranty and should be presented to your local Cessna Service Station at the time of warranty service.
- FACTORY TRAINED PERSONNEL to provide you with courteous, expert service.
- FACTORY APPROVED SERVICE EQUIPMENT to provide you efficient and accurate workmanship.
- A STOCK OF GENUINE CESSNA SERVICE PARTS are available when you need them.
- THE LATEST AUTHORITATIVE INFORMATION FOR SERVICING CESSNA AIRPLANES. Cessna Service Stations have all of the current Maintenance Manuals, Illustrated Parts Catalogs and various other support publications produced by Cessna Aircraft Company.

A current Cessna Service Station Directory accompanies your new airplane. The Directory is revised frequently, and a current copy can be obtained from your nearest Cessna Service Station.

We urge all Cessna owners/operators to utilize the benefits available within the Cessna Organization.

PERFORMANCE - SPECIFICATIONS

* SPEED

Maximum at 17,000 Ft.	178 KNOTS
Cruise, 75% Power at 20,000 Ft.	164 KNOTS
Cruise, 75% Power at 10,000 Ft.	150 KNOTS

CRUISE: Recommended lean mixture with fuel allowance for engine start, taxi, takeoff, climb and 45 minutes reserve.

Serials T20608001 thru T20608361:

75% Power at 20,000 Ft.	Range	568 NM
88 Gallons Usable Fuel	Time	3.7 HRS
75% Power at 10,000 Ft.	Range	541 NM
88 Gallons Usable Fuel	Time	3.7 HRS
Maximum Range at 20,000 Ft.	Range	692 NM
88 Gallons Usable Fuel	Time	6.1 HRS
Maximum Range at 10,000 Ft.	Range	713 NM
88 Gallons Usable Fuel	Time	6.4 HRS

Serials T20608362 and on:

75% Power at 20,000 Ft.	Range	559 NM
87 Gallons Usable Fuel	Time	3.6 HRS
75% Power at 10,000 Ft.	Range	533 NM
87 Gallons Usable Fuel	Time	3.6 HRS
Maximum Range at 20,000 Ft.	Range	682 NM
87 Gallons Usable Fuel	Time	6.0 HRS
Maximum Range at 10,000 Ft.	Range	703 NM
87 Gallons Usable Fuel	Time	6.3 HRS

RATE OF CLIMB AT SEA LEVEL .... 1050 FPM

SERVICE CEILING .... 27,000 FT

PERFORMANCE-SPECIFICATIONS

(Continued)

TAKEOFF PERFORMANCE:

Ground Roll	910 FT
Total Distance Over 50 Ft. Obstacle	1740 FT

LANDING PERFORMANCE:

Ground Roll	735 FT
Total Distance Over 50 Ft. Obstacle	1395 FT

STALL SPEED (KCAS):

Flaps Up, Power Off	62 KCAS
Flaps Down, Power Off	54 KCAS

MAXIMUM WEIGHT:

Ramp	3617 LBS
Takeoff or Landing	3600 LBS

STANDARD EMPTY WEIGHT:

Serials T20608001 thru T20608361	**2304 LBS**
Serials T20608362 and on	**2299 LBS**

MAXIMUM USEFUL LOAD:

Serials T20608001 thru T20608361	**1313 LBS**
Serials T20608362 and on	**1318 LBS**

BAGGAGE ALLOWANCE .... 180 LBS

WING LOADING: Lbs./Sq. Ft. 20.7

POWER LOADING Lbs./HP 11.6

COVERAGE

The Pilot's Operating Handbook located in the airplane at the time of delivery from Cessna Aircraft Company contains information applicable to the Model T206H airplane by serial number and registration number shown on the Title Page. This handbook is applicable to airplane serial number T20608001 and On. All information is based on data available at the time of publication.

This handbook is comprised of nine sections that cover all operational aspects of a standard-equipped airplane. Following Section 8 are the Supplements, Section 9, which provide expanded operational procedures for the avionics equipment (both standard and optional), and provides information on special operations.

Supplements are individual documents, and may be issued or revised without regard to revision dates which apply to the POH itself. These supplements contain a Log of Effective Pages, which should be used to determine the status of each supplement.

ORIGINAL ISSUE AND REVISIONS

This Pilot's Operating Handbook and FAA Approved Airplane Flight Manual is comprised of the original issue and any subsequent revisions. To ensure that information in this manual is current, the revisions must be incorporated as they are issued. This manual was originally issued on November 9, 1998. As revisions are issued, they will be noted in the Log of Effective Pages table.

The part number of this manual has also been designed to further aid the owner/operator in determining the revision level of any POH. Refer to the example below for a breakdown:

T206H PHUS 00

- 00 — Revision Level (Revision 0, Original Issue)
- PHUS — Manual (Pilot's Operating Handbook, U.S.)
- T206H — Airplane Model (T206H)

(Continued Next Page)

PERFORMANCE-SPECIFICATIONS

(Continued)

FUEL CAPACITY .... 92 GAL

OIL CAPACITY .... 11 QTS

ENGINE: Textron Lycoming TIO-540-AJ1A
310 BHP at 2500 RPM
PROPELLER: Diameter .... 79 IN.

The above performance figures are based on the indicated weights, standard atmospheric conditions, level, hard-surface dry runways and no wind. They are calculated values derived from flight tests conducted by Cessna Aircraft Company under carefully documented conditions and will vary with individual airplanes and numerous factors affecting flight performance.

* Speed performance and range are shown for an airplane equipped with the standard wheel and brake fairings. These fairings increase the speeds approximately 3 knots over an airplane without the fairings. Heavy duty wheels, tires and brakes are available and when installed with the appropriate wheel and brake fairings result in no significant change in performance.

IDENTIFYING REVISED MATERIAL

Additions or revisions to the text in an existing section will be identified by a vertical line (revision bar) adjacent to the applicable revised area on the outer margin of the page.

When technical changes cause unchanged text to appear on a different page, a revision bar will be placed in the outer lower margin of the page, opposite the page number and date/revision level of the page. These pages will display the current date/revision level as found in the Original Issue and Revisions paragraph of this section.

When extensive technical changes are made to text in an existing section that requires extensive revision, revision bars will appear the full length of text.

New or existing art that is revised or added to an existing section will be identified by a single pointing hand indicator adjacent to the figure title and figure number. Some existing art which was previously revised will have pointing hand(s) adjacent to the portion of the art which has changed.

WARNINGS, CAUTIONS AND NOTES

Throughout the text, warnings, cautions and notes pertaining to airplane handling and operations are utilized. These adjuncts to the text are used to highlight or emphasize important points.

WARNING - Calls attention to use of methods, procedures or limits which must be followed precisely to avoid injury or death to persons.

CAUTION - Calls attention to methods, procedures or limits which must be followed to avoid damage to equipment.

NOTE - Calls attention to additional procedures or information pertaining to the text.

ORIGINAL ISSUE AND REVISIONS
(Continued)

It is the responsibility of the owner to maintain this handbook in a current status when it is being used for operational purposes. Owners should contact their Cessna Service Station whenever the revision status of their handbook is in question.

Revisions are distributed to owners of U.S. Registered aircraft according to FAA records at the time of revision issuance, and to Internationally Registered aircraft according to Cessna Owner Advisory records at the time of issuance. Revisions should be read carefully upon receipt and incorporated in this POH.

REVISION FILING INSTRUCTIONS

REGULAR REVISIONS

Pages to be removed or inserted in the Pilots' Operating Handbook and FAA Approved Airplane Flight Manual are determined by the Log of Effective Pages located in this section. This log contains the page number and date of issue/revision level for each page within the POH. At original issue, all pages will contain the same date. As revisions to the POH occur, these dates/revision levels will change on effected pages. When two pages display the same page number, the page with the latest date/revision level shall be inserted into the POH. The date/revision level on the Log of Effective Pages shall also agree with the latest date/revision level of the page in question.

TEMPORARY REVISIONS

Under limited circumstances, temporary revisions to the POH may be issued. These temporary revisions are to be filed in the applicable section in accordance with filing instructions appearing on the first page of the temporary revision.

The recession of a temporary revision is accomplished by incorporation into the POH at revision time or by a superseding temporary revision. In order to accurately track the status of temporary revisions as they pertain to a POH, a Temporary Revision List will be located previous to this section when required. This list will indicate the date the temporary revision was incorporated into the POH, thus authorizing the recession of the temporary revision.

LOG OF EFFECTIVE PAGES

The following Log of Effective Pages provides the date of issue for original and revised pages, as well as a listing of all pages in the POH. Pages which are affected by the current revision will carry the date of that revision.

Revision	Date	Revision	Date
0 (Original Issue)	9 November 1998	4	18 January 2002
1	12 April 2000	5	13 May 2002
2	30 December 2000	6	12 January 2004
3	30 May 2001		

Page	Date/Revision	Page	Date/Revision
Title	Nov 9/98	1-19	Nov 9/98
Assignment Record	May 30/01	1-20	May 30/01
i/ii	Revision 6	1-21	May 30/01
iii	Nov 9/98	1-22	May 30/01
iv	Revision 5	1-23	May 30/01
v	Revision 5	1-24	Nov 9/98
vi	Revision 5	1-25	May 30/01
vii	Revision 5	1-26	May 30/01
viii	Revision 5	2-1/2-2	Revision 5
ix/x	Revision 5	2-3	May 30/01
xi	Revision 6	2-4	Nov 9/98
xii	Revision 6	2-5	Nov 9/98
xiii	Revision 6	2-6	Jan 18/02
xiv	Revision 6	2-7	Nov 9/98
xv/xvi	Revision 5	2-8	Revision 5
1-1	Revision 5	2-9	Revision 5
1-2	May 30/01	2-10	Nov 9/98
1-3	May 30/01	2-11	Revision 5
1-4	Revision 5	2-12	Revision 5
1-5	Revision 5	2-13	Revision 5
1-6	Jan 18/02	2-14	Revision 6
1-7	Revision 5	2-15/2-16	Revision 6
1-8	Nov 9/98	3-1	Nov 9/98
1-9	Nov 9/98	3-2	Jan 18/02
1-10	Nov 9/98	3-3	Jan 18/02
1-11	Nov 9/98	3-4	May 30/01
1-12	Nov 9/98	3-5	Jan 18/02
1-13	May 30/01	3-6	Jan 18/02
1-14	Nov 9/98	3-7	Jan 18/02
1-15	Nov 9/98	3-8	Jan 18/02
1-16	Nov 9/98	3-9	Revision 5
1-17	Nov 9/98	3-10	Revision 5
1-18	Nov 9/98	3-11	Nov 9/98
		3-12	May 30/01

LOG OF EFFECTIVE PAGES
(Continued)

PAGE	DATE	PAGE	DATE
5-37	Revision 5	7-3/7-4	Revision 5
5-38	Revision 5	7-5	May 30/01
5-39	Revision 5	7-6	Nov 9/98
5-40	Revision 5	7-7	Nov 9/98
5-41	Revision 5	7-8	Nov 9/98
5-42	Revision 5	7-9	May 30/01
5-43	Revision 5	7-10	Jan 18/02
5-44	Revision 5	7-11	Jan 18/02
5-45/5-46	Revision 5	7-12	Jan 18/02
6-1	Revision 5	7-13	Nov 9/98
6-3	Revision 5	7-14	Jan 18/02
6-4	Revision 5	7-15	May 30/01
6-5	Revision 5	7-16	May 30/01
6-6	Revision 5	7-17	May 30/01
6-7	Revision 5	7-18	Revision 6
6-8	Revision 5	7-18A/7-18B	Revision 6
6-9	Revision 5	7-19	Revision 6
6-10	Revision 5	7-20	Revision 6
6-11	Revision 5	7-21	Revision 6
6-12	Revision 5	7-22	May 30/01
6-13	Revision 5	7-23	May 30/01
6-14	Revision 5	7-24	May 30/01
6-15	Revision 5	7-25	May 30/01
6-16	Revision 5	7-26	May 30/01
6-17	Revision 5	7-27	May 30/01
6-18	Revision 5	7-28	May 30/01
6-19	Revision 5	7-29	May 30/01
6-20	Revision 5	7-30	May 30/01
6-21	Revision 5	7-31	May 30/01
6-22	Revision 5	7-32	May 30/01
6-23	Revision 5	7-33	Revision 5
6-24	Revision 5	7-34	Revision 5
6-25	Revision 5	7-35	Revision 5
6-26	Revision 5	7-36	Revision 5
6-27	Revision 5	7-37	Revision 5
6-28	Revision 5	7-38	Revision 5
6-29	Revision 5	7-39	Revision 5
6-30	Revision 5	7-40	Revision 5
6-31	Revision 5	7-41	Revision 5
6-32	Revision 5	7-42	Revision 5
6-33	Revision 5	7-43	Revision 5
6-34	Revision 5	7-44	Revision 5
7-1	May 30/01		
7-2	Revision 5		

LOG OF EFFECTIVE PAGES
(Continued)

PAGE	DATE	PAGE	DATE
3-13	Jan 18/02	4-30	Apr 12/00
3-14	Jan 18/02	4-31	May 30/01
3-15	May 30/01	4-32	May 30/01
3-16	Nov 9/98	4-33	Apr 12/00
3-17	Nov 9/98	4-34	Apr 12/00
3-18	May 30/01	4-35	Apr 12/00
3-19	May 30/01	4-36	Jan 18/02
3-20	Nov 9/98	4-37	Revision 5
3-21	Jan 18/02	4-38	Revision 5
3-22	Jan 18/02	5-1/5-2	Revision 5
3-23	Jan 18/02	5-3	Revision 5
3-24	Jan 18/02	5-4	Revision 5
3-25	Jan 18/02	5-5	Revision 5
3-26	Jan 18/02	5-6	Revision 5
3-27	Nov 9/98	5-7	Revision 5
3-28 (Blank)	Nov 9/98	5-8	Revision 5
4-1	Apr 12/00	5-9	Revision 5
4-2	Jan 18/02	5-10	Revision 5
4-3	Jan 18/02	5-11	Revision 5
4-4 (Blank)	Nov 9/98	5-12	Revision 5
4-5	May 30/01	5-13	Revision 5
4-6	May 30/01	5-14	Revision 5
4-7	Revision 6	5-15	Revision 5
4-8	Revision 6	5-16	Revision 5
4-9	May 30/01	5-17	Revision 5
4-10	May 30/01	5-18	Revision 5
4-11	Jan 18/02	5-19	Revision 5
4-12	Jan 18/02	5-20	Revision 5
4-13	Jan 18/02	5-21	Revision 5
4-14	Revision 6	5-22	Revision 5
4-15	Revision 6	5-23	Revision 5
4-16	Jan 18/02	5-24	Revision 5
4-17	Revision 5	5-25	Revision 5
4-18	Revision 5	5-26	Revision 5
4-19	Revision 6	5-27	Revision 5
4-20	Nov 9/98	5-28	Revision 5
4-21	Jan 18/02	5-29	Revision 5
4-22	May 30/01	5-30	Revision 5
4-23	May 30/01	5-31	Revision 5
4-24	May 30/01	5-32	Revision 5
4-25	Nov 9/98	5-33	Revision 5
4-26	Nov 9/98	5-34	Revision 5
4-27	Jan 18/02	5-35	Revision 5
4-28	Nov 9/98	5-36	Revision 5
4-29	May 30/01		

LOG OF EFFECTIVE PAGES
(Continued)

PAGE	DATE	PAGE	DATE
7-45	Revision 5	8-1	Nov 9/98
7-46	Revision 5	8-2	Nov 9/98
7-47	Revision 5	8-3	May 30/01
7-48	Revision 5	8-4	May 30/01
7-49	Revision 5	8-5	Jan 18/02
7-50	Revision 5	8-6	May 30/01
7-51	Revision 5	8-7	May 30/01
7-52	Revision 5	8-8	May 30/01
7-53	Revision 5	8-9	May 30/01
7-54	Revision 5	8-10	May 30/01
7-55	Revision 5	8-11	Jan 18/02
7-56	Revision 5	8-12	Jan 18/02
7-57	Revision 5	8-13	Jan 18/02
7-58	Revision 5	8-14	Jan 18/02
7-59	Revision 5	8-15	Nov 9/98
7-60	Revision 5	8-16	May 30/01
7-61	Revision 5	8-17	Nov 9/98
7-62	Revision 5	8-18	Nov 9/98
7-63	Revision 5	8-19	May 30/01
7-64	Revision 5	8-20	Nov 9/98
7-65	Revision 5	8-21	Nov 9/98
7-66	Revision 5	8-22	May 30/01
7-67	Revision 5	8-23	Nov 9/98
7-68	Revision 5	8-24	Nov 9/98
7-69	Revision 5	8-25	May 30/01
7-70	Revision 5	8-26 (Blank)	Nov 9/98
7-71	Revision 5	9-1	Jan 18/02
7-72	Revision 5	9-2 (Blank)	Nov 9/98
7-73	Revision 5		
7-74	Revision 5		

APPROVED BY

FAA APPROVED UNDER FAR 21 SUBPART J
The Cessna Aircraft Co.
Delegation Option Authorization DOA-100129-CE
Executive Engineer

DATE OF APPROVAL 01-12-04

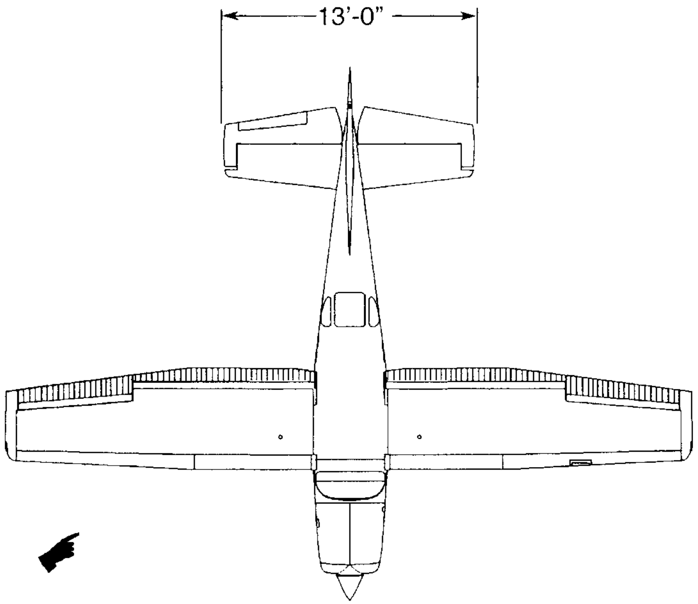
TABLE OF CONTENTS

	SECTION
GENERAL	1
LIMITATIONS	2
EMERGENCY PROCEDURES	3
NORMAL PROCEDURES	4
PERFORMANCE	5
WEIGHT & BALANCE/EQUIPMENT LIST	6
AIRPLANE & SYSTEMS DESCRIPTION	7
HANDLING, SERVICE & MAINTENANCE	8
SUPPLEMENTS	9

SECTION 1
GENERAL

TABLE OF CONTENTS

	Page
Three View - Normal Ground Attitude	1-2
Introduction	1-4
Descriptive Data	1-4
Engine	1-4
Propeller	1-4
Fuel	1-4
Oil	1-6
Maximum Certificated Weights	1-7
Standard Airplane Weights	1-7
Cabin and Entry Dimensions	1-7
Baggage Space and Entry Dimensions	1-7
Specific Loadings	1-7
Symbols, Abbreviations and Terminology	1-8
General Airspeed Terminology and Symbols	1-8
Meteorological Terminology	1-9
Engine Power Terminology	1-9
Airplane Performance and Flight Planning Terminology	1-10
Weight and Balance Terminology	1-11
Metric/Imperial/U.S. Conversion Charts	1-13
Weight Conversions	1-14
Length Conversions	1-16
Distance Conversions	1-20
Volume Conversions	1-21
Temperature Conversions	1-24
Volume to Weight Conversions	1-25
Quick Conversions	1-26



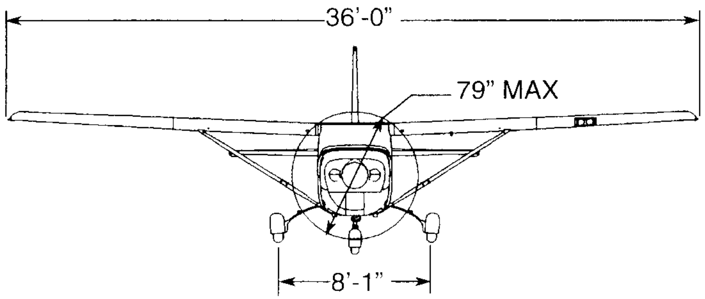


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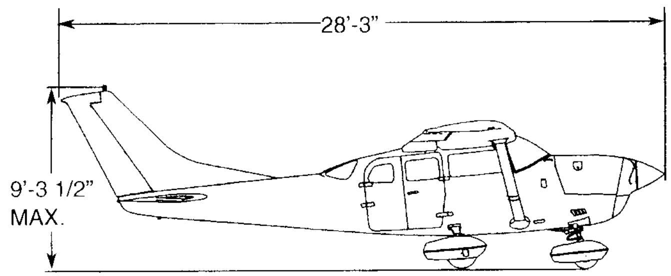
Figure 1-1. Three View - Normal Ground Attitude (Sheet 1 of 2)



NOTE 1: WING SPAN SHOWN WITH STROBE LIGHTS INSTALLED.

NOTE 2: WHEEL BASE LENGTH IS 69 1/4".

NOTE 3: PROPELLER GROUND CLEARANCE IS 12".

NOTE 4: WING AREA IS 174 SQUARE FEET.

NOTE 5: MINIMUM TURNING RADIUS (* PIVOT POINT TO OUTBOARD WING TIP) IS 26'-3".

NOTE 6: NORMAL GROUND ATTITUDE IS SHOWN WITH NOSE STRUT SHOWING APPROXIMATELY 2" OF STRUT, AND WINGS LEVEL.

1210T1015

Figure 1-1. Three View - Normal Ground Attitude (Sheet 2 of 2)

INTRODUCTION

This handbook contains 9 sections, and includes the material required to be furnished to the pilot by FAR Part 23. It also contains supplemental data supplied by Cessna Aircraft Company.

Section 1 provides basic data and information of general interest. It also contains definitions or explanations of symbols, abbreviations, and terminology commonly used.

DESCRIPTIVE DATA

ENGINE

Number of Engines: 1.
Engine Manufacturer: Textron Lycoming.
Engine Model Number: TIO-540-AJ1A.
Engine Type: Turbo charged, direct drive, air-cooled, horizontally opposed, fuel injected, six cylinder engine with 541.5 cu. in. displacement.
Horsepower Rating and
Engine Speed: 310 rated BHP at 39 inches Hg. and 2500 RPM.

PROPELLER

Propeller Manufacturer: McCauley Propeller Systems.
Propeller Model Number: B3D36C432/80VSA-1.
Number of Blades: 3.
Propeller Diameter: 79 inches.
Propeller Type: Constant speed and hydraulically actuated, with a low pitch setting of 16.9° and a high pitch setting of 33.8° (30 inch station).

FUEL

WARNING

USE OF UNAPPROVED FUELS MAY RESULT IN DAMAGE TO THE ENGINE AND FUEL SYSTEM COMPONENTS, RESULTING IN POSSIBLE ENGINE FAILURE.

(Continued Next Page)

DESCRIPTIVE DATA (Continued)

FUEL (Continued)

Approved Fuel Grades (and Colors):
100LL Grade Aviation Fuel (Blue).
100 Grade Aviation Fuel (Green).

NOTE

Isopropyl alcohol or diethylene glycol monomethyl ether (DiEGME) may be added to the fuel supply. Additive concentrations shall not exceed 1% for isopropyl alcohol or 0.10% to 0.15% for DiEGME. Refer to Section 8 for additional information.

Fuel Capacity

Serials 20608001 thru 20608361:

Total Capacity:	92.0 U.S. gallons.
Total Usable:	88.0 U.S. gallons.
Total Capacity Each Tank:	46.0 U.S. gallons.
Total Usable Each Tank:	44.0 U.S. gallons.

Serials 20608362 and on:

Total Capacity:	92.0 U.S. gallons.
Total Usable:	87.0 U.S. gallons.
Total Capacity Each Tank:	46.0 U.S. gallons.
Total Usable Each Tank:	43.5 U.S. gallons.

NOTE

To ensure maximum fuel capacity and minimize cross-feeding when refueling, always park the airplane in a wings-level, normal ground attitude and place the fuel selector in the Left or Right position. Refer to Figure 1-1 for normal ground attitude dimensions.

(Continued Next Page)

OIL

Oil Specification:

MIL-L-22851 or SAE J1899 Aviation Grade Ashless Dispersant Oil: Oil conforming to Textron Lycoming Service Instruction No. 1014, and all revisions and supplements thereto, must be used.

Recommended Viscosity for Temperature Range:

Temperature	MIL-L-22851 or SAE J1899 Ashless Dispersant Oil SAE Grade
Above 27°C (80°F)	60
Above 16°C (60°F)	40 or 50
-1°C (30°F) to 32°C (90°F)	40
-18°C (0°F) to 21°C (70°F)	30, 40 or 20W-40
Below -12°C (10°F)	30 or 20W-30
-18°C (0°F) to 32°C (90°F)	20W-50 OR 15W-50
All Temperatures	15W-50 or 20W-50

NOTE

When operating temperatures overlap, use the lighter grade oil.

Oil Capacity:
Sump: 11 U.S. Quarts
Total: 12 U.S. Quarts

DESCRIPTIVE DATA (Continued)

MAXIMUM CERTIFICATED WEIGHTS

Ramp Weight : 3617 lbs.
Takeoff Weight: 3600 lbs.
Landing Weight: 3600 lbs.

Weight in Baggage Compartment (Station 109 to 145): 180 lbs. maximum.

NOTE

Refer to Section 6 of this handbook for loading arrangements with one or more seats removed for cargo accommodations.

STANDARD AIRPLANE WEIGHTS

Serials T20608001 thru T20608361:
Standard Empty Weight: 2304 lbs.
Maximum Useful Load, Normal Category: 1313 lbs.

Serials T20608362 and on:
Standard Empty Weight: 2299 lbs.
Maximum Useful Load, Normal Category: 1318 lbs

CABIN AND ENTRY DIMENSIONS

Detailed dimensions of the cabin interior and entry door openings are illustrated in Section 6.

BAGGAGE SPACE AND ENTRY DIMENSIONS

Dimensions of the baggage/cargo area and cargo door opening are illustrated in detail in Section 6.

SPECIFIC LOADINGS

Wing Loading: 20.7 lbs./sq. ft.
Power Loading: 11.6 lbs./hp.

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

KCAS — **Knots Calibrated Airspeed** is indicated airspeed corrected for position and instrument error and expressed in knots. Knots calibrated airspeed is equal to KTAS in standard atmosphere at sea level.

KIAS — **Knots Indicated Airspeed** is the speed shown on the airspeed indicator and expressed in knots.

KTAS — **Knots True Airspeed** is the airspeed expressed in knots relative to undisturbed air which is KCAS corrected for altitude and temperature.

V_A — **Maneuvering Speed** is the maximum speed at which full or abrupt control movements may be used.

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

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

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

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

V_{SO} — **Stalling Speed or the minimum steady flight speed** is the minimum speed at which the airplane is controllable in the landing configuration at the most forward center of gravity.

V_X — **Best Angle-of-Climb Speed** is the speed which results in the greatest gain of altitude in a given horizontal distance.

V_Y — **Best Rate-of-Climb Speed** is the speed which results in the greatest gain in altitude in a given time.

METEOROLOGICAL TERMINOLOGY

OAT — **Outside Air Temperature** is the free air static temperature. It may be expressed in either degrees Celsius or degrees Fahrenheit.

Standard Temperature — **Standard Temperature** is 15°C at sea level pressure altitude and decreases by 2°C for each 1000 feet of altitude.

Pressure Altitude — **Pressure Altitude** is the altitude read from an altimeter when the altimeter's barometric scale has been set to 29.92 inches of mercury (1013 mb).

ENGINE POWER TERMINOLOGY

BHP — **Brake Horsepower** is the power developed by the engine.

RPM — **Revolutions Per Minute** is engine speed.

Static RPM — **Static RPM** is engine speed attained during a full throttle engine runup when the airplane is on the ground and stationary.

MP — **Manifold Pressure** is a pressure measured in the engine's induction system and is expressed in inches of mercury (in Hg).

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Demonstrated Crosswind Velocity	**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 considered to be limiting.
Usable Fuel	**Usable Fuel** is the fuel available for flight planning.
Unusable Fuel	**Unusable Fuel** is the quantity of fuel that can not be safely used in flight.
GPH	**Gallons Per Hour** is the amount of fuel consumed per hour.
NMPG	**Nautical Miles Per Gallon** is the distance which can be expected per gallon of fuel consumed at a specific engine power setting and/or flight configuration.
g	**g** is acceleration due to gravity.
Course Datum	**Course Datum** is the compass reference used by the autopilot, along with course deviation, to provide lateral control when tracking a navigation signal.

WEIGHT AND BALANCE TERMINOLOGY

Reference Datum	**Reference Datum** is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	**Station** is a location along the airplane fuselage given in terms of the distance from the reference datum.
Arm	**Arm** is the horizontal distance from the reference datum to the center of gravity (C.G.) of an item.
Moment	**Moment** is the product of the weight of an item multiplied by its arm. (Moment divided by the constant 1000 is used in this handbook to simplify balance calculations by reducing the number of digits.)
Center of Gravity (C.G.)	**Center of Gravity** is the point at which an airplane, or equipment, would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.
C.G. Arm	**Center of Gravity Arm** is the arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.
C.G. Limits	**Center of Gravity Limits** are the extreme center of gravity locations within which the airplane must be operated at a given weight.
Standard Empty Weight	**Standard Empty Weight** is the weight of a standard airplane, including unusable fuel, full operating fluids and full engine oil.
Basic Empty Weight	**Basic Empty Weight** is the standard empty weight plus the weight of optional equipment.
Useful Load	**Useful Load** is the difference between ramp weight and the basic empty weight.
MAC	**MAC (Mean Aerodynamic Chord)** is the chord of an imaginary rectangular airfoil having the same pitching moments throughout the flight range as that of the actual wing.

Maximum Ramp Weight	**Maximum Ramp Weight** is the maximum weight approved for ground maneuver, and includes the weight of fuel used for start, taxi and runup.
Maximum Takeoff Weight	**Maximum Takeoff Weight** is the maximum weight approved for the start of the takeoff roll.
Maximum Landing Weight	**Maximum Landing Weight** is the maximum weight approved for the landing touchdown.
Tare	**Tare** is the weight of chocks, blocks, stands, etc. used when weighing an airplane, and is included in the scale readings. Tare is deducted from the scale reading to obtain the actual (net) airplane weight.

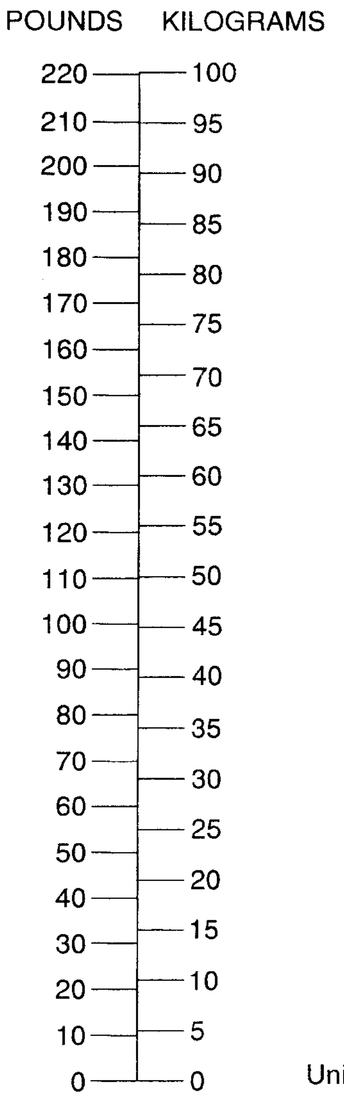
METRIC / IMPERIAL / U.S. CONVERSION CHARTS

The following charts have been provided to help international operators convert U.S. measurement supplied with the Pilot's Operating Handbook into metric and imperial measurements.

The standard followed for measurement units shown, is the National Institute of Standards Technology (NIST), Publication 811, "Guide for the Use of the International System of Units (SI)."

Please refer to the following pages for these charts.

(Kilograms × 2.205 = Pounds)   (Pounds × .454 = Kilograms)



Units × 10, 100, etc.

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Figure 1-2 . Weight Conversions (Sheet 2 of 2)

(Kilograms × 2.205 = Pounds)   (Pounds × .454 = Kilograms)

KILOGRAMS TO POUNDS
KILOGRAMMES EN LIVRES

kg	0	1	2	3	4	5	6	7	8	9
	lb.	lb.	lb.	lb.	lb	lb.	lb.	lb.	lb.	lb.
0		2.205	4.409	6.614	8 819	11.023	13.228	15.432	17.637	19.842
10	22.046	24.251	26.456	28.660	30.865	33.069	35.274	37.479	39.683	41.888
20	44.093	46.297	48.502	50.706	52 911	55.116	57.320	59.525	61.729	63.934
30	66.139	68.343	70.548	72.753	74.957	77.162	79.366	81.571	83.776	85.980
40	88.185	90.390	92.594	94.799	97.003	99.208	101.41	103.62	105.82	108.03
50	110.23	112.44	114.64	116.85	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.10	143.30	145.51	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.76	171.96	174.17
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.42	200.62	202.83	205.03	207.24	209.44	211.64	213.85	216.05	218.26
100	220.46	222.67	224.87	227.08	229.28	231.49	233.69	235.90	238.10	240.30

POUNDS TO KILOGRAMS
LIVRES EN KILOGRAMMES

lb.	0	1	2	3	4	5	6	7	8	9
	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
0		0.454	0.907	1.361	1.814	2.268	2.722	3.175	3.629	4.082
10	4.536	4.990	5.443	5.897	6.350	6.804	7.257	7.711	8.165	8.618
20	9.072	9.525	9.979	10.433	10.886	11.340	11.793	12.247	12.701	13.154
30	13.608	14.061	14.515	14.969	15.422	15.876	16.329	16.783	17.237	17.690
40	18.144	18.597	19.051	19.504	19.958	20.412	20.865	21.319	21.772	22.226
50	22.680	23.133	23.587	24.040	24.494	24.948	25.401	25.855	26.303	26.762
60	27.216	27.669	28.123	28.576	29.030	29.484	29.937	30.391	30.844	31.298
70	31.752	32.205	32.659	33.112	33.566	34.019	34.473	34.927	35.380	35.834
80	36.287	36.741	37.195	37.648	38.102	38.555	39.009	39.463	39.916	40.370
90	40.823	41.277	41.731	42.184	42.638	43.091	43.545	43.999	44.452	44.906
100	45.359	45.813	46.266	46.720	47.174	47.627	48.081	48.534	48.988	49.442

Figure 1-2. Weight Conversions (Sheet 1 of 2)

(Meters × 3.281 = Feet) (Feet × .305 = Meters)

METERS TO FEET
METRES EN PIEDS

m	0	1	2	3	4	5	6	7	8	9
	feet	feet	feet	feet	feet	feet	feet	feet	feet	feet
0	- - -	3.281	6.562	9.842	13.123	16.404	19.685	22.956	26.247	29.528
10	32.808	36.089	39.370	42.651	45.932	49.212	52.493	55.774	59.055	62.336
20	65.617	68.897	72.178	75.459	78.740	82.021	85.302	88.582	91.863	95.144
30	98.425	101.71	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.79	141.08	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.86	177.16	180.45	183.73	187.01	190.29	193.57
60	195.85	200.13	203.41	206.69	209.97	213.25	216.53	219.82	223.10	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.19
80	262.47	265.75	269.03	272.31	275.59	278.87	282.15	285.43	288.71	291.58
90	295.27	298.56	301.84	305.12	308.40	311.68	314.96	318.24	321.52	324.80
100	328.08	331.36	334.64	337.93	341.21	344.49	347.77	351.05	354.33	357.61

FEET TO METERS
PIEDS EN METRES

ft	0	1	2	3	4	5	6	7	8	9
	m	m	m	m	m	m	m	m	m	m
0	- - -	0.305	0.610	0.914	1.219	1.524	1.829	2.134	2.438	2.743
10	3.048	3.353	3.658	3.962	4.267	4.572	4.877	5.182	5.486	5.791
20	6.096	6.401	6.706	7.010	7.315	7.620	7.925	8.230	8.534	8.839
30	9.144	9.449	9.754	10.058	10.363	10.668	10.973	11.278	11.582	11.887
40	12.192	12.497	12.802	13.106	13.411	13.716	14.021	14.326	14.630	14.935
50	15.240	15.545	15.850	16.154	16.459	16.754	17.069	17.374	17.678	17.983
60	18.288	18.593	18.898	19.202	19.507	19.812	20.117	20.422	20.726	21.031
70	21.336	21.641	21.946	22.250	22.555	22.860	23.165	23.470	23.774	24.079
80	24.384	24.689	24.994	25.298	25.603	25.908	26.213	26.518	26.822	27.127
90	27.432	27.737	28.042	28.346	28.651	28.956	29.261	29.566	29.870	30.175
100	30.480	30.785	31.090	31.394	31.699	32.004	32.309	32.614	32.918	33.223

Figure 1-3. Length Conversions (Sheet 1 of 2)

(Meters × 3.281 = Feet) (Feet × .305 = Meters)

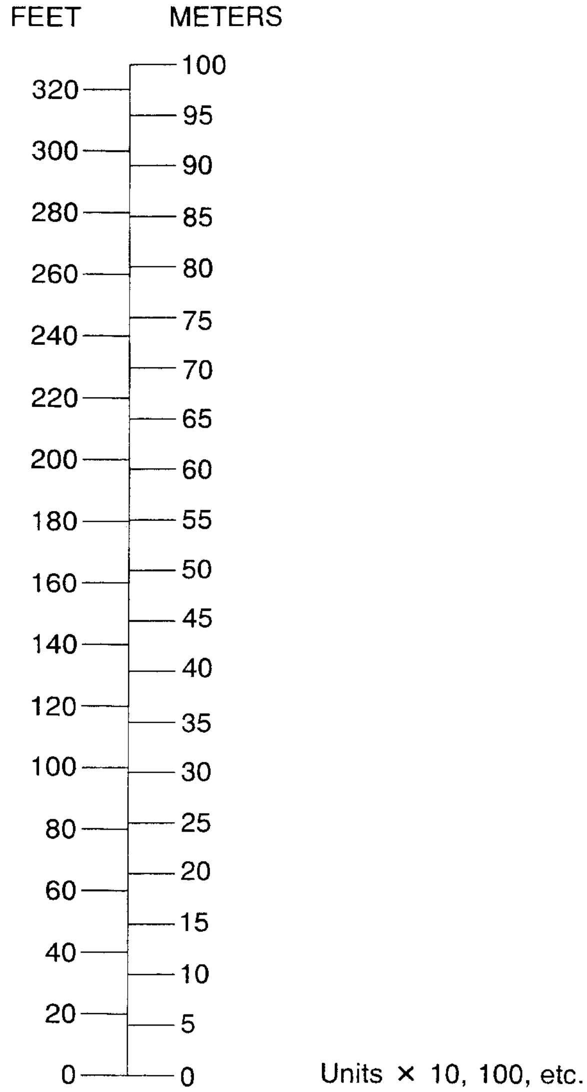


Figure 1-3 . Length Conversions (Sheet 2 of 2)

(Centimeters × .394 = Inches) (Inches × 2.54 = Centimeters)

CENTIMETERS TO INCHES
CENTIMETRES EN POUCES

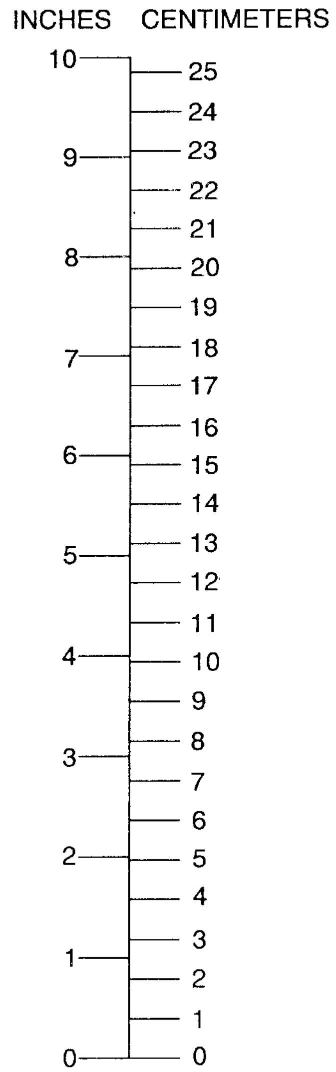
cm	0	1	2	3	4	5	6	7	8	9
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
0	- - -	0.394	0.787	1.181	1.575	1.969	2.362	2.756	3.150	3.543
10	3.937	4.331	4.724	5.118	5.512	5.906	6.299	6.693	7.087	7.480
20	7.874	8.268	8.661	9.055	9.449	9.843	10.236	10.630	11.024	11.417
30	11.811	12.205	12.598	12.992	13.386	13.780	14.173	14.567	14.961	15.354
40	15.748	16.142	16.535	16.929	17.323	17.717	18.110	18.504	18.898	19.291
50	19.685	20.079	20.472	20.866	21.260	21.654	22.047	22.441	22.835	23.228
60	23.622	24.016	24.409	24.803	25.197	25.591	25.984	26.378	26.772	27.164
70	27.559	27.953	28.346	28.740	29.134	29.528	29.921	30.315	30.709	31.102
80	31.496	31.890	32.283	32.677	33.071	33.465	33.858	34.252	34.646	35.039
90	35.433	35.827	36.220	36.614	37.008	37.402	37.795	38.189	38.583	38.976
100	39.370	39.764	40.157	40.551	40.945	41.339	41.732	42.126	42.520	42.913

INCHES TO CENTIMETERS
POUCES EN CENTIMETRES

in.	0	1	2	3	4	5	6	7	8	9
	cm	cm	cm	cm	cm	cm	cm	cm	cm	cm
0	- - -	2.54	5.08	7.62	10.16	12.70	15.24	17.78	20.32	22.96
10	25.40	27.94	30.48	33.02	35.56	38.10	40.64	43.18	45.72	48.26
20	50.80	53.34	55.88	58.42	60.96	63.50	66.04	68.58	71.12	73.66
30	76.20	78.74	81.28	83.82	86.36	88.90	91.44	93.98	96.52	99.06
40	101.60	104.14	106.68	109.22	111.76	114.30	116.84	119.38	121.92	124.46
50	127.00	129.54	132.08	134.62	137.16	139.70	142.24	144.78	147.32	149.86
60	152.40	154.94	157.48	160.02	162.56	165.10	167.64	170.18	172.72	175.26
70	177.80	180.34	182.88	185.42	187.96	190.50	193.04	195.58	198.12	200.66
80	203.20	205.74	208.28	210.82	213.36	215.90	218.44	220.98	223.52	226.06
90	228.60	231.14	233.68	236.22	238.76	241.30	243.84	246.38	248.92	251.46
100	254.00	256.54	259.08	261.62	264.16	266.70	269.24	271.78	274.32	276.86

Figure 1-4. Length Conversions (Sheet 1 of 2)

(Centimeters × .394 = Inches) (Inches × 2.54 = Centimeters)



Units × 10, 100, etc.

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Figure 1-4. Length Conversions (Sheet 2 of 2)

(Statute Miles ×1.609=Kilometers) (Kilometers ×.622=Statute Miles)
(Statute Miles ×.869=Nautical Miles) (Nautical Miles ×1.15=Statute Miles)
(Nautical Miles ×1.852=Kilometers) (Kilometers ×.54=Nautical Miles)

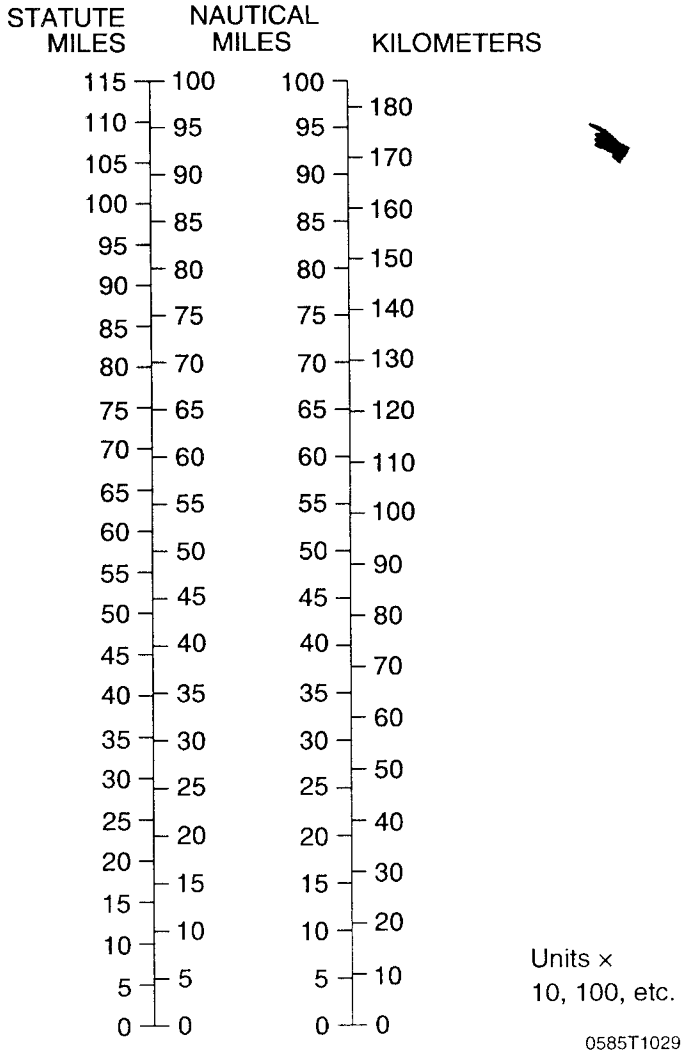


Figure 1-5. Distance Conversions

(Imperial Gallons × 4.546 = Liters)
(Liters × .22 = Imperial Gallons)

LITERS TO IMPERIAL GALLONS
LITERS EN GALLONS IMPERIAL

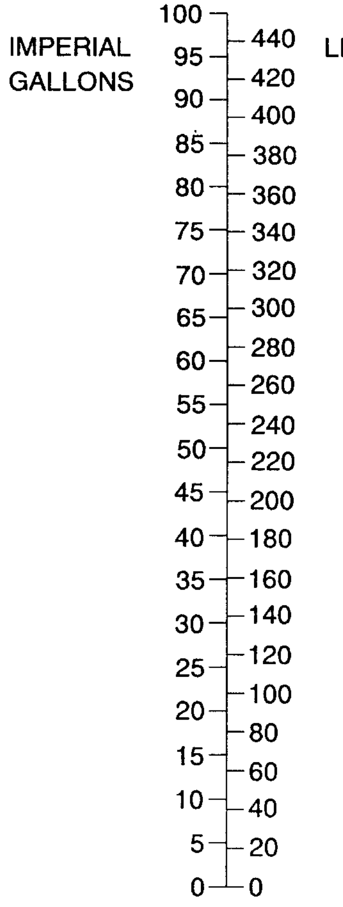
Lt	0	1	2	3	4	5	6	7	8	9
	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG
0	- - -	0.220	0.440	0.660	0.880	1.100	1.320	1.540	1.760	1.980
10	2.200	2.420	2.640	2.860	3.080	3.300	3.520	3.740	3.960	4.180
20	4.400	4.620	4.840	5.059	5.279	5.499	5.719	5.939	6.159	6.379
30	6.599	6.819	7.039	7.259	7.479	7.699	7.919	8.139	8.359	8.579
40	8.799	9.019	9.239	9.459	9.679	9.899	10.119	10.339	10.559	10.779
50	10.999	11.219	11.439	11.659	11.879	12.099	12.319	12.539	12.759	12.979
60	13.199	13.419	13.639	13.859	14.078	14.298	14.518	14.738	14.958	15.178
70	15.398	15.618	15.838	16.058	16.278	16.498	16.718	16.938	17.158	17.378
80	17.598	17.818	18.038	18.258	18.478	18.698	18.918	19.138	19.358	19.578
90	19.798	20.018	20.238	20.458	20.678	20.898	21.118	21.338	21.558	21.778
100	21.998	22.218	22.438	22.658	22.878	23.098	23.318	23.537	23.757	23.977

IMPERIAL GALLONS TO LITERS
GALLONS IMPERIAL EN LITERS

IG	0	1	2	3	4	5	6	7	8	9
	Lt	Lt	Lt	Lt	Lt	Lt	Lt	Lt	Lt	Lt
0	- - -	4.546	9.092	13.638	18.184	22.730	27.276	31.822	36.368	40.914
10	45.460	50.006	54.552	59.097	63.643	68.189	72.735	77.281	81.827	86.373
20	90.919	95.465	100.01	104.56	109.10	113.65	118.20	122.74	127.29	131.83
30	136.38	140.93	145.47	150.02	154.56	159.11	163.66	168.20	172.75	177.29
40	181.84	186.38	190.93	195.48	200.02	204.57	209.11	213.66	218.21	222.75
50	227.30	231.84	236.39	240.94	245.48	250.03	254.57	259.12	263.67	268.21
60	272.76	277.30	281.85	286.40	290.94	295.49	300.03	304.58	309.13	313.67
70	318.22	322.76	327.31	331.86	336.40	340.95	345.49	350.04	354.59	359.13
80	363.68	368.22	372.77	377.32	381.86	386.41	390.95	395.50	400.04	404.59
90	409.14	413.68	418.23	422.77	427.32	431.87	436.41	440.96	445.50	450.05
100	454.60	459.14	463.69	468.23	472.78	477.33	481.87	486.42	490.96	495.51

Figure 1-6. Volume Conversions (Sheet 1 of 3)

(Imperial Gallons × 4.4546 = Liters)
(Liters × .22 = Imperial Gallons)



Units × 10, 100, etc.

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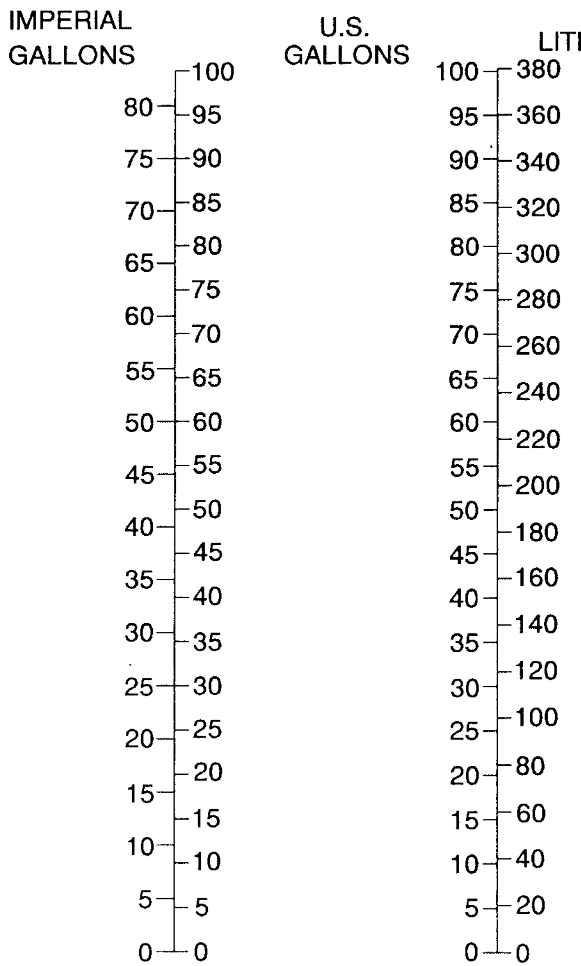
Figure 1-6. Volume Conversions (Sheet 2 of 3)

(Imperial Gallons × 1.2 = U.S. Gallons)
(U.S. Gallons × .833 = Imperial Gallons)
(U.S. Gallons × 3.785 = Liters)
(Liters × .264 = U.S. Gallons)



Units × 10, 100, etc.

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Figure 1-6. Volume Conversions (Sheet 3 of 3)

TEMPERATURE CONVERSIONS

(°F-32) × 5/9 = °C   °C × 9/5 + 32 = °F

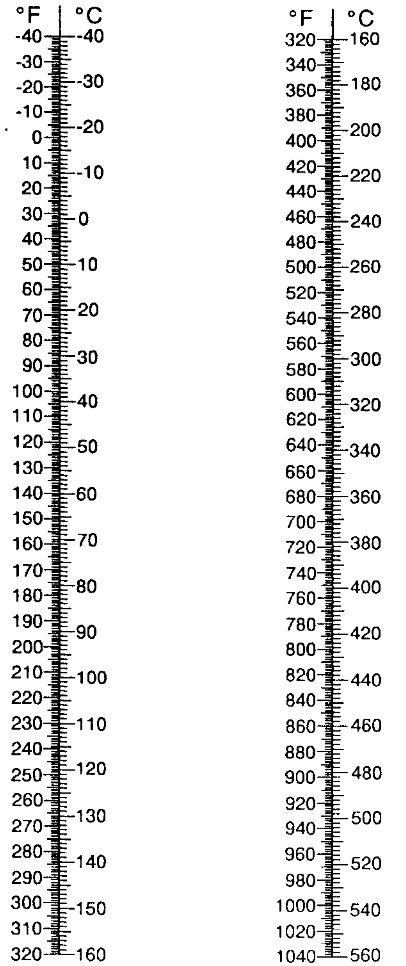

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Figure 1-7. Temperature Conversions

AVGAS Specific Gravity = .72

(Liters × 1.58 = Pounds) (Pounds × .633 = Liters)
(Liters × .72 = Kilograms) (Kilograms × 1.389 = Liters)

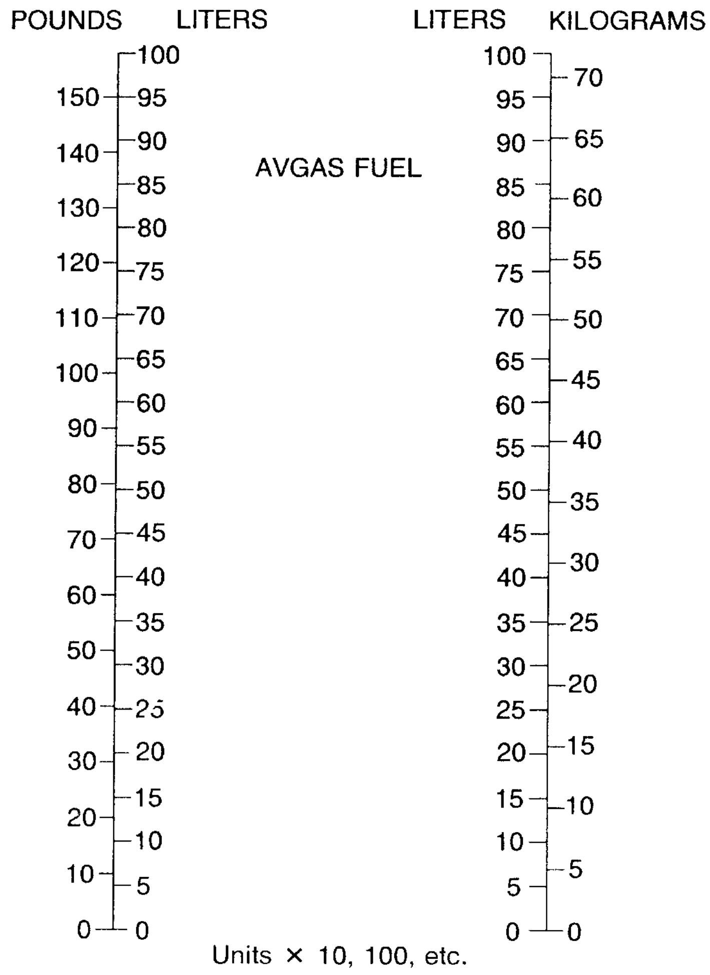

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Figure 1-8. Volume to Weight Conversion

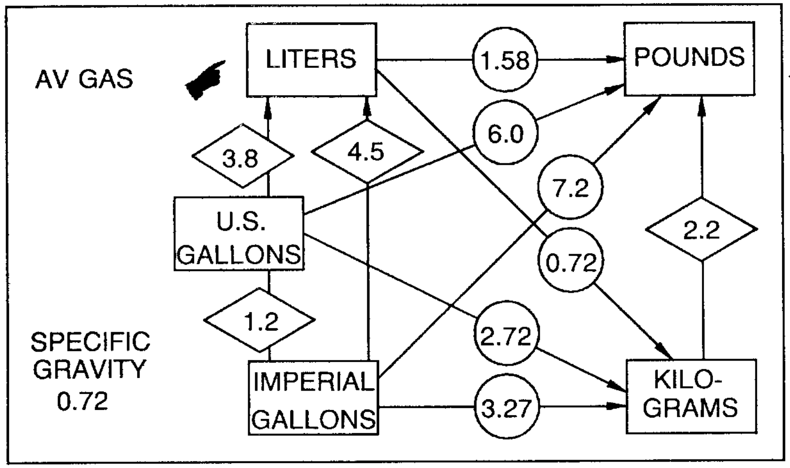

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Figure 1-9. Quick Conversions

SECTION 2
LIMITATIONS

TABLE OF CONTENTS

Page

Introduction 2-3
Airspeed Limitations 2-4
Airspeed Indicator Markings 2-5
Powerplant Limitations 2-5
Powerplant Instrument Markings 2-6
Weight Limits 2-7
Center of Gravity Limits 2-7
Maneuver Limits 2-8
Flight Load Factor Limits 2-8
Kinds of Operation Limits 2-8
Fuel Limitations 2-8
Other Limitations 2-9
    Flap Limitations 2-9
Placards 2-10

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in Figure 2-1.

SYMBOL	SPEED	KCAS	KIAS	REMARKS
V_{NE}	Never Exceed Speed	180	182	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	147	149	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering Speed: 3600 Pounds 2900 Pounds 2200 Pounds	 123 110 97	 125 112 98	Do not make full or abrupt control movements above this speed.
V_{FE}	Maximum Flap Extended Speed: UP to 10° Flaps 10° to FULL Flaps	 138 100	 140 100	Do not exceed this speed with flaps down.
-----	Maximum Window Open Speed	180	182	Do not exceed this speed with windows open.

Figure 2-1. Airspeed Limitations (Sheet 1 of 2)
Serials 20608001 thru 20608173.

AIRSPEED LIMITATIONS (Continued)

Airspeed limitations and their operational significance are shown)Figure 2-1.

SYMBOL	SPEED	KCAS	KIAS	REMARKS
V_{NE}	Never Exceed Speed	180	182	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	147	149	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering Speed: 3600 Pounds 2900 Pounds 2200 Pounds	 123 110 97	 125 112 98	Do not make full or abrupt control movements above this speed.
V_{FE}	Maximum Flap Extended Speed: UP to 10° Flaps 10° to 20° Flaps 20° to FULL Flaps	 138 118 100	 140 120 100	Do not exceed this speed with flaps down.
-----	Maximum Window Open Speed	180	182	Do not exceed this speed with windows open.

Figure 2-1. Airspeed Limitations (Sheet 2)
Serials 20608174 and On.

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in Figure 2-1.

SYMBOL	SPEED	KCAS	KIAS	REMARKS
V_{NE}	Never Exceed Speed	180	182	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	147	149	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering Speed: 3600 Pounds 2900 Pounds 2200 Pounds	 123 110 97	 125 112 98	Do not make full or abrupt control movements above this speed.
V_{FE}	Maximum Flap Extended Speed: UP to 10° Flaps 10° to FULL Flaps	 138 100	 140 100	Do not exceed this speed with flaps down.
-----	Maximum Window Open Speed	180	182	Do not exceed this speed with windows open.

Figure 2-1. Airspeed Limitations (Sheet 1 of 2)
Serials 20608001 thru 20608173.

AIRSPEED LIMITATIONS (Continued)

Airspeed limitations and their operational significance are shown Figure 2-1.

SYMBOL	SPEED	KCAS	KIAS	REMARKS
V_{NE}	Never Exceed Speed	180	182	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	147	149	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering Speed: 3600 Pounds 2900 Pounds 2200 Pounds	 123 110 97	 125 112 98	Do not make full or abrupt control movements above this speed.
V_{FE}	Maximum Flap Extended Speed: UP to 10° Flaps 10° to 20° Flaps 20° to FULL Flaps	 138 118 100	 140 120 100	Do not exceed this speed with flaps down.
-----	Maximum Window Open Speed	180	182	Do not exceed this speed with windows open.

Figure 2-1. Airspeed Limitations (Sheet 2)
Serials 20608174 and On.

AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their color code significance are shown in Figure 2-2.

MARKING	KIAS VALUE OR RANGE	SIGNIFICANCE
White Arc	44 - 100	Full Flap Operating Range. Lower limit is maximum weight VSO in landing configuration. Upper limit is maximum speed permissible with flaps extended.
Green Arc	54 - 149	Normal Operating Range. Lower limit is maximum weight VS at most forward C.G. with flaps retracted. Upper limit is maximum structural cruising speed.
Yellow Arc	149 - 182	Operations must be conducted with caution and only in smooth air.
Red Line	182	Maximum speed for all operations.

Figure 2-2. Airspeed Indicator Markings

POWERPLANT LIMITATIONS

Engine Manufacturer: Textron Lycoming.
Engine Model Number: IO-540-AC1A5.
Maximum Power: 300 BHP rating.
Engine Operating Limits for Takeoff and Continuous Operations:
Maximum Continuous Power: 300 rated BHP and 2700 RPM.
Maximum Cylinder Head Temperature: 480°F (249°C).
Maximum Oil Temperature: 245°F (118°C).
Oil Pressure: Minimum: 20 PSI.
Maximum: 115 PSI.
Fuel Grade: See Fuel Limitations.
Oil Grade (Specification):
MIL-L-6082 or SAE J1966 Aviation Grade Straight Mineral Oil or MIL-L-22851 or SAE J1899 Ashless Dispersant Oil: Oil conforming to Textron Lycoming Service Instruction 1014, and all revisions and supplements thereto, must be used.

(Continued Next Page)

POWERPLANT LIMITATIONS (Continued)

Propeller Manufacturer: McCauley Propeller Systems
Propeller Model Number: B3D36C432/80VSA-1.
Propeller Diameter Maximum: 79.0 inches.
Minimum: 77.5 inches.
Propeller Blade Angle at 30 Inch Station:
Low: 12.6°
High: 30.0°

POWERPLANT INSTRUMENT MARKINGS

Powerplant instrument markings and their color code significance are shown in Figure 2-3.

Serials 20608001 thru 20608173:

INSTRUMENT	RED LINE (MINIMUM)	GREEN ARC (NORMAL OPERATING)	RED LINE (MAX)
Tachometer:	----	2100 - 2500 RPM	2700
Manifold Pressure	----	15 - 25 in.Hg.	----
Cylinder Head Temperature	----	200 - 480°F	480°F
Oil Temperature	----	100 - 245°F	245°F
Oil Pressure	20 PSI	50 - 90 PSI	115 PSI
Fuel Quantity	0 (2 Gal. Unusable Each Tank)	----	----
Fuel Flow	----	0 - 20 GPH	----
Vacuum	----	4.5 - 5.5 in.Hg.	----

Figure 2-3. Powerplant Instrument Markings (Sheet 1 of 2)

POWERPLANT INSTRUMENT MARKINGS (Continued)

Powerplant instrument markings and their color code significance are shown in Figure 2-3.

Serials 20608174 and On:

INSTRUMENT	RED LINE (MINIMUM)	GREEN ARC (NORMAL OPERATING)	RED LINE (MAX)
Tachometer:	----	2100 - 2500 RPM	2700
Manifold Pressure	----	15 - 25 in.Hg.	----
Cylinder Head Temperature	----	200 - 480°F	480°F
Oil Temperature	----	100 - 245°F	245°F
Oil Pressure	20 PSI	50 - 90 PSI	115 PSI
Fuel Quantity	0 (2.5 Gal. Unusable Each Tank)	----	----
Fuel Flow	----	0 - 20 GPH	----
Vacuum	----	4.5 - 5.5 in.Hg.	----

Figure 2-3. Powerplant Instrument Markings (Sheet 2)

WEIGHT LIMITS

Maximum Ramp Weight: 3614 lbs.
Maximum Takeoff Weight: 3600 lbs.
Maximum Landing Weight: 3600 lbs.
Maximum Weight in Baggage Compartment (Station 109 to 145): [illegible]0 lbs.

(Continued Next Page)

WEIGHT LIMITS (Continued)

NOTE

Refer to Section 6 of this handbook for loading arrangements with one or more seats removed for cargo accommodations.

CENTER OF GRAVITY LIMITS

Center of Gravity Range:

Forward: 33.0 inches aft of datum at 2500 lbs. or less, with straight line variation to 42.5 inches aft of datum at 3600 lbs.

Aft: 49.7 inches aft of datum at all weights.

Reference Datum: Front face of lower firewall.

MANEUVER LIMITS

This airplane is certificated in the normal category. The normal category is applicable to aircraft intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and turns in which the angle of bank is not more than 60°.

Aerobatic maneuvers, including spins, are not approved.

FLIGHT LOAD FACTOR LIMITS

Flight Load Factors :
Flaps Up * . . . . +3.8g, -1.52g
Flaps Down * . . . . +2.0g

* The design load factors are 150% of the above, and in all cases, the structure meets or exceeds design loads.

WEIGHT LIMITS

Maximum Ramp Weight: 3617 lbs.
Maximum Takeoff Weight: 3600 lbs.
Maximum Landing Weight: 3600 lbs.
Maximum Weight in Baggage Compartment - Station 109 to 145: 180 lbs. See note below.

NOTE

Refer to Section 6 of this handbook for loading arrangements with one or more seats removed for cargo accommodation.

CENTER OF GRAVITY LIMITS

Center of Gravity Range:

Forward: 33.0 inches aft of datum at 2500 lbs. or less, with straight line variation to 42.5 inches aft of datum at 3600 lbs.

Aft: 49.7 inches aft of datum at all weights.

Reference Datum: Front face of lower firewall.

MANEUVER LIMITS

This airplane is certificated in the normal category. The normal category is applicable to aircraft intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and steep turns in which the angle of bank is not more than 60°.

Aerobatic maneuvers, including spins, are not approved.

FLIGHT LOAD FACTOR LIMITS

Flight Load Factors:
*Flaps Up .... +3.8g, -1.52g
*Flaps Down .... +2.0g

*The design load factors are 150% of the above, and in all cases, the structure meets or exceeds design loads.

KINDS OF OPERATION LIMITS

The airplane as delivered is equipped for day, night, VFR and IFR operations. FAR Part 91 establishes the minimum required instrumentation and equipment for these operations. The reference to types of flight operations on the operating limitations placard reflects equipment installed at the time of Airworthiness Certificate issuance.

Flight into known icing conditions is prohibited.

FUEL LIMITATIONS

Serials T20608001 thru T20608361:

Total Fuel: 92 U.S. Gallons (46.0 Gallons each tank).

Usable Fuel: 88.0 U.S. Gallons.

Unusable Fuel: 4.0 U.S. Gallons (2.0 Gallons each tank).

(Continued Next Page)

FUEL LIMITATIONS (Continued)

Serials T20608362 and on:

Total Fuel: 92 U.S. Gallons (46.0 Gallons each tank).

Usable Fuel: 87.0 U.S. Gallons.

Unusable Fuel: 5.0 U.S. Gallons (2.5 Gallons each tank).

NOTE

To ensure maximum fuel capacity and minimize cross-feeding when refueling, always park the airplane in a wings-level, normal ground attitude and place the fuel selector in the LEFT or RIGHT position. Refer to Figure 1-1 for normal ground attitude definition.

Takeoff and land with the fuel selector valve handle in the BOTH position.

Operation on either LEFT or RIGHT tank limited to level flight only.

With 1/4 tank or less, prolonged uncoordinated flight is prohibited when operating on either left or right tank.

When switching from dry tank, turn auxiliary fuel pump on momentarily.

Approved Fuel Grades (and Colors):

100LL Grade Aviation Fuel (Blue).
100 Grade Aviation Fuel (Green).

OTHER LIMITATIONS

FLAP LIMITATIONS

Approved Takeoff Range: .... 0° to 20°
Approved Landing Range: .... 0° to 40°

PLACARDS

The following information must be displayed in the form of composite or individual placards.

1. In full view of the pilot: (The "DAY-NIGHT-VFR-IFR" entry, shown on the example below, will vary as the airplane is equipped).

The markings and placards installed in this airplane contain operating limitations which must be complied with when operating this airplane in the Normal Category. Other operating limitations which must be complied with when operating this airplane in this category are contained in the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. No acrobatic maneuvers, including spins, approved. Flight into known icing conditions prohibited. This airplane is certified for the following flight operations as of date of original airworthiness certificate: DAY-NIGHT-VFR-IFR

2. On control lock flag:

CAUTION CONTROL LOCK REMOVE BEFORE STARTING ENGINE

3. On aft baggage wall:

EMERGENCY LOCATOR TRANSMITTER INSTALLED AFT OF THIS PARTITION. MUST BE SERVICED IN ACCORDANCE WITH FAR PART 91.207

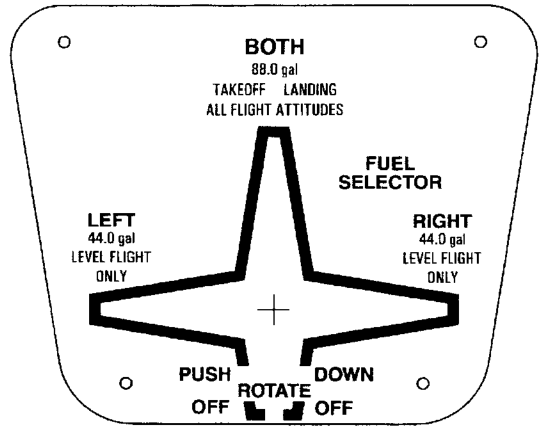
(Continued Next Page)

PLACARDS (Continued)

4. On the fuel selector valve:

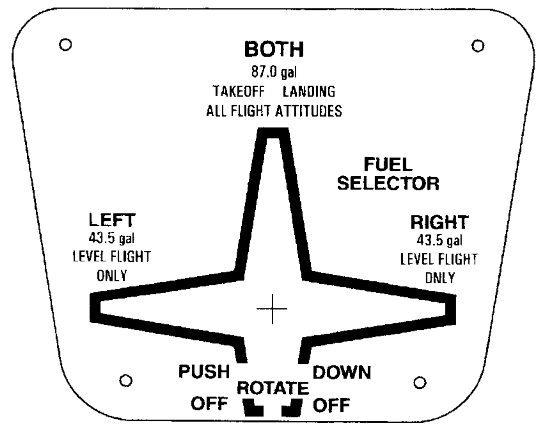
Serials T20608001 thru T20608361:

B3585



Serials T20608362 and on:

B3586



(Continued Next Page)

PLACARDS (Continued)

5. At the fuel filler ports:

Serials T20608001 thru T20608361:

B3587

FUEL
100LL / 100 MIN. GRADE AVIATION GASOLINE
CAP. 44.0 U.S. GAL. USABLE
CAP. 32.5 U.S. GAL. USABLE TO BOTTOM
OF FILLER INDICATOR TAB.
0705071-9

Serials T20608362 and on:

B3588

FUEL
100LL / 100 MIN. GRADE AVIATION GASOLINE
CAP. 43.5 U.S. GAL. (164 LITERS) USABLE
CAP. 32.0 U.S. GAL. (121 LITERS) USABLE TO BOTTOM
OF FILLER INDICATOR TAB.
0705071-23

6. Near manifold pressure/fuel flow indicator:

MINIMUM FUEL FLOWS
MAXIMUM CONTINUOUS POWER 2500 RPM

ALT (FT.)	MP (IN. Hg.)	FF (GPH)
SL-17,000	39	34.0
18,000	37	30.5
20,000	35	28.5
22,000	33	26.5
24,000	31	24.5
26,000	29	23.0
28,000	27	21.0
30,000	25	19.0

AVOID CONTINUOUS OPERATION
AT OR BELOW 2000 RPM ABOVE 28 In. Hg. OF
MANIFOLD PRESSURE

(Continued Next Page)

PLACARDS (Continued)

7. On flap control indicator:

Serials T20608001 thru T20608361:

0° to 10°	140 KIAS	(Partial flap range with blue color code; also mechanical detent of 10°)
10° to 20 to 40°	100 KIAS	(White color code; indices as noted; also mechanical detent at 20°)

Serials T20608362 and On:

0° to 10°	140 KIAS	(Initial flap range with Dark Blue color code; mechanical detent at 10° position)
10° to 20°	120 KIAS	(Intermediate flap range with Light Blue color code; mechanical detent at 20° position)
20° to FULL	100 KIAS	(Full flap range with White color code; mechanical stop at FULL position (40°)

8. On aft cargo door:

BAGGAGE NET 180 LBS. MAXIMUM CAPACITY
REFER TO WEIGHT AND BALANCE DATA
FOR BAGGAGE AND CARGO LOADING

(Continued Next Page)

PLACARDS (Continued)

9. In RED on forward cargo door:

Serials T20608001 thru T20608437:

> **EMERGENCY EXIT OPERATION**
>
> 1. ROTATE FORWARD CARGO DOOR HANDLE FULL FORWARD THEN FULL AFT.
> 2. OPEN FORWARD CARGO DOOR AS FAR AS POSSIBLE.
> 3. ROTATE RED LEVER IN REAR CARGO DOOR FORWARD.
> 4. FORCE REAR CARGO DOOR FULL OPEN.

Serials T20608438 and On:

> **REAR CARGO DOOR EMERGENCY EXIT**
>
> 1. OPEN FRONT CARGO DOOR AS FAR AS IT WILL GO
> 2. PUSH REAR DOOR HANDLE FORWARD AND FORCE DOOR OPEN.

10. A calibration card must be provided to indicate the accuracy of the magnetic compass.

11. On the oil filler cap:

> OIL
> 11 QTS

12. Near airspeed indicator:

> MANEUVERING SPEED - 125 KIAS

13. On the pedestal cover near the fuel selector handle:

> WHEN SWITCHING FROM DRY TANK TURN
> AUX FUEL PUMP "ON" MOMENTARILY

(Continued Next Page)

PLACARDS (Continued)

14. On the upper right instrument panel:

> SMOKING PROHIBITED

15. Near the auxiliary electrical power supply plug:

> CAUTION 24 VOLTS D.C.
> THIS AIRCRAFT IS EQUIPPED WITH ALTERNATOR AND A NEGATIVE GROUND SYSTEM. OBSERVE PROPER POLARITY. REVERSE POLARITY WILL DAMAGE ELECTRICAL COMPONENTS.

SECTION 3
EMERGENCY PROCEDURES

TABLE OF CONTENTS

Page

Introduction 3-4

AIRSPEEDS

Airspeeds For Emergency Operation 3-4

EMERGENCY PROCEDURES CHECKLIST

Engine Failures 3-5
- Engine Failure During Takeoff Roll 3-5
- Engine Failure Immediately After Takeoff 3-5
- Engine Failure During Flight (Restart Procedures) 3-5

Forced Landings 3-6
- Emergency Landing Without Engine Power 3-6
- Precautionary Landing With Engine Power 3-6
- Ditching 3-7

Fires 3-8
- During Start On Ground 3-8
- Engine Fire In Flight 3-9
- Electrical Fire In Flight 3-9
- Cabin Fire 3-10
- Wing Fire 3-10

Icing 3-10
- Inadvertent Icing Encounter 3-10
- Static Source Blockage 3-12

Excessive Fuel Vapor 3-12
- Fuel Flow Stabilization Procedures 3-12

TABLE OF CONTENTS (Continued)

Page
Landing With A Flat Main Tire 3-12
Landing With A Flat Nose Tire 3-13
Electrical Power Supply System Malfunctions 3-13
Ammeter Shows Excessive Rate of Charge (Full Scale Deflection) 3-13
Low Voltage Annunciator (VOLTS) Illuminates During Flight (Ammeter Indicates Discharge) 3-13
Emergency Descent Procedures 3-14
Smooth Air 3-14
Rough Air 3-14
Vacuum System Failure 3-15

AMPLIFIED EMERGENCY PROCEDURES

Engine Failure 3-16
Forced Landings 3-18
Landing Without Elevator Control 3-18
Fires 3-19
Emergency Operation In Clouds (Vacuum System Failure) 3-19
Executing A 180° Turn In Clouds 3-20
Emergency Descent Through Clouds 3-20
Recovery From Spiral Dive In The Clouds 3-21
Inadvertent Flight Into Icing Conditions 3-21
Static Source Blocked 3-21
Spins 3-22
Rough Engine Operation Or Loss Of Power 3-22
Spark Plug Fouling 3-22
Magneto Malfunction 3-23
Engine Driven Fuel Pump Failure 3-23
Excessive Fuel Vapor Indications 3-23
Low Oil Pressure 3-24

TABLE OF CONTENTS (Continued)

Page
Electrical Power Supply System Malfunctions 3-24
Excessive Rate of Charge 3-25
Insufficient Rate Of Charge 3-25
Cargo Door Emergency Exit 3-26
Other Emergencies 3-26
Windshield Damage 3-26

INTRODUCTION

Section 3 provides checklist and amplified procedures for coping with emergencies that may occur. Emergencies caused by airplane or engine malfunctions are extremely rare if proper preflight inspections and maintenance are practiced. Enroute weather emergencies can be minimized or eliminated by careful flight planning and good judgment when unexpected weather is encountered. However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem. Emergency procedures associated with ELT, standard avionics and any other optional systems can be found in the Supplements, Section 9.

AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure After Takeoff:	
Wing Flaps Up	85 KIAS
Wing Flaps Down	75 KIAS
Maneuvering Speed:	
3600 Lbs	125 KIAS
2950 Lbs	120 KIAS
2300 Lbs	106 KIAS
Maximum Glide:	
3600 Lbs	80 KIAS
3200 Lbs	75 KIAS
2800 Lbs	70 KIAS
Precautionary Landing With Engine Power	75 KIAS
Landing Without Engine Power:	
Wing Flaps Up	85 KIAS
Wing Flaps Down	75 KIAS
Emergency Descent:	
Smooth Air	182 KIAS
Rough Air:	
3600 Lbs:	125 KIAS
2950 Lbs:	120 KIAS
2300 Lbs:	106 KIAS

EMERGENCY PROCEDURES CHECKLIST

Procedures in the Emergency Procedures Checklist portion of this section shown in **bold faced** type are immediate action items which should be committed to memory.

ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF ROLL

1. **Throttle -- IDLE.**
2. **Brakes -- APPLY.**
3. Wing Flaps -- RETRACT.
4. Mixture -- IDLE CUT OFF.
5. Ignition Switch -- OFF.
6. Master Switch -- OFF.

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. **Airspeed -- 85 KIAS (flaps UP).**
   75 KIAS (flaps DOWN).
2. Mixture -- IDLE CUT OFF.
3. Fuel Selector Valve -- PUSH DOWN and ROTATE to OFF.
4. Ignition Switch -- OFF.
5. Wing Flaps -- AS REQUIRED (40° recommended).
6. Master Switch -- OFF.
7. Cabin Door -- UNLATCH.
8. Land -- STRAIGHT AHEAD.

ENGINE FAILURE DURING FLIGHT (Restart Procedures)

1. **Airspeed -- 80 KIAS.**
2. **Fuel Selector Valve -- BOTH.**
3. **Auxiliary Fuel Pump Switch -- ON.**
4. Engine Power -- RESTORED.
5. Mixture -- RICH (if restart does not occur).

6. Ignition Switch -- CHECK BOTH (or START if propeller is stopped).

NOTE

If propeller is windmilling, engine will restart automatically within a few seconds. If propeller has stopped (possible at low speeds), turn ignition switch to START, advance throttle slowly from idle, and lean the mixture from full rich as required to obtain smooth operation.

7. Auxiliary Fuel Pump Switch -- OFF.

NOTE

If the fuel flow indication immediately drops to zero, signifying an engine-driven fuel pump failure, return the auxiliary fuel pump switch to ON.

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

1. Passenger Seats -- AS FAR FORWARD AS PRACTICAL.
2. Passenger Seat Backs -- MOST UPRIGHT POSITION.
3. Seats and Seat Belts -- SECURE.
4. Airspeed -- 85 KIAS (flaps UP).
   75 KIAS (flaps DOWN).
5. Mixture -- IDLE CUT OFF.
6. Fuel Selector Valve -- PUSH DOWN and ROTATE to OFF.
7. Ignition Switch -- OFF.
8. Wing Flaps -- AS REQUIRED (40° recommended).
9. Master Switch -- OFF when landing is assured.
10. Doors -- UNLATCH PRIOR TO TOUCHDOWN.
11. Touchdown -- SLIGHTLY TAIL LOW.
12. Brakes -- APPLY HEAVILY.

PRECAUTIONARY LANDING WITH ENGINE POWER

1. Passenger Seats -- AS FAR FORWARD AS PRACTICAL.
2. Passenger Seat Backs -- MOST UPRIGHT POSITION.

3. Seats and Seat Belts -- SECURE.
4. Airspeed -- 85 KIAS.
5. Wing Flaps -- 20°.
6. Selected Field -- FLY OVER, noting terrain and obstructions, then retract flaps upon reaching a safe altitude and airspeed.
7. Avionics Master Switch and Electrical Switches -- OFF.
8. Wing Flaps -- 40° (on final approach).
9. Airspeed -- 75 KIAS.
10. Master Switch -- OFF.
11. Doors -- UNLATCH PRIOR TO TOUCHDOWN.
12. Touchdown -- SLIGHTLY TAIL LOW.
13. Ignition Switch -- OFF.
14. Mixture -- IDLE CUT OFF.
15. Brakes -- APPLY HEAVILY.

DITCHING

1. Radio -- TRANSMIT MAYDAY on 121.5 MHz, giving location and intentions and SQUAWK 7700.
2. Heavy Objects (in baggage area) -- SECURE OR JETTISON (if possible).
3. Passenger Seats -- AS FAR FORWARD AS PRACTICAL.
4. Passenger Seat Backs -- MOST UPRIGHT POSITION.
5. Seats and Seat Belts -- SECURE.
6. Wing Flaps -- 40°.
7. Power -- ESTABLISH 300 FT/MIN DESCENT AT 70 KIAS.

NOTE

If no power is available, approach at 85 KIAS with flaps up or at 80 KIAS with 10° flaps.

8. Approach -- High Winds, Heavy Seas -- INTO THE WIND.
   Light Winds, Heavy Swells -- PARALLEL TO SWELLS.

9. Cabin Doors -- UNLATCH.
10. Touchdown -- LEVEL ATTITUDE AT 300 FT/MIN DESCENT.
11. Face -- CUSHION at touchdown with folded coat.
12. ELT -- Activate.
13. Airplane -- EVACUATE through cabin doors. If necessary, open window and flood cabin to equalize pressure so doors can be opened.
14. Life Vests and Raft -- INFLATE WHEN CLEAR OF AIRPLANE.

FIRES

DURING START ON GROUND

1. **Ignition Switch -- START** (continue cranking to get a start which would suck the flames and accumulated fuel into the engine).

If engine starts:

2. Power -- 1800 RPM for a few minutes.
3. Engine -- SHUTDOWN and inspect for damage.

If engine fails to start:

4. **Ignition Switch -- START** (continue cranking).
5. **Throttle -- FULL OPEN.**
6. **Mixture -- IDLE CUT OFF.**
7. **Fuel Selector Valve -- PUSH DOWN and ROTATE to OFF.**
8. **Auxiliary Fuel Pump Switch -- OFF.**
9. Fire Extinguisher -- OBTAIN (have ground attendants obtain, if not installed).
10. Engine -- SECURE.
    a. Master Switch -- OFF.
    b. Ignition Switch -- OFF.
11. Parking Brake -- RELEASE.
12. Airplane -- EVACUATE.
13. Fire -- EXTINGUISH using fire extinguisher, wool blanket, or dirt.
14. Fire Damage -- INSPECT, repair damage or replace damaged components or wiring before conducting another flight.

FIRES (Continued)

ENGINE FIRE IN FLIGHT

1. **Mixture -- IDLE CUT OFF.**
2. **Fuel Selector Valve -- PUSH DOWN and ROTATE to OFF.**
3. **Auxiliary Fuel Pump Switch -- OFF.**
4. **Master Switch -- OFF.**
5. Cabin Heat and Air -- OFF (except overhead vents).
6. Airspeed -- 110 KIAS (If fire is not extinguished, increase glide speed to find an airspeed - within airspeed limitations - which will provide an incombustible mixture).
7. Forced Landing -- EXECUTE (as described in Emergency Landing Without Engine Power).

ELECTRICAL FIRE IN FLIGHT

1. **Master Switch -- OFF.**
2. **Vents/Cabin Air/Heat -- CLOSED.**
3. **Fire Extinguisher -- ACTIVATE.**
4. Avionics Master Switch -- OFF.
5. All Other Switches (except ignition switch) -- OFF.

⚠ WARNING

AFTER DISCHARGING FIRE EXTINGUISHER AND ASCERTAINING THAT FIRE HAS BEEN EXTINGUISHED, VENTILATE THE CABIN.

6. Vents/Cabin Air -- OPEN when it is ascertained that fire is completely extinguished.

If fire has been extinguished and electrical power is necessary for continuance of flight to nearest suitable airport or landing area:

7. Master Switch -- ON.
8. Circuit Breakers -- CHECK for faulty circuit, do not reset.
9. Radio Switches -- OFF.
10. Avionics Master Switch -- ON.
11. Radio/Electrical Switches -- ON (minimum needed) one at a time, with delay after each until short circuit is localized or necessary equipment is energized.

(Continued Next Page)

FIRES (Continued)

CABIN FIRE

1. **Master Switch -- OFF.**
2. **Vents/Cabin Air/Heat -- CLOSED** (to avoid drafts).
3. **Fire Extinguisher -- ACTIVATE.**

WARNING

AFTER DISCHARGING FIRE EXTINGUISHER AND ASCERTAINING THAT FIRE HAS BEEN EXTINGUISHED, VENTILATE THE CABIN.

4. Vents/Cabin Air -- OPEN when it is ascertained that fire is completely extinguished.
5. Land the airplane as soon as possible to inspect for damage.

WING FIRE

1. **Landing/Taxi Light Switches -- OFF.**
2. **Navigation Light Switch -- OFF.**
3. **Strobe Light Switch -- OFF.**
4. **Pitot Heat Switch -- OFF.**

NOTE

Perform a sideslip to keep the flames away from the fuel tank and cabin. Land as soon as possible using flaps only as required for final approach and touchdown.

ICING

INADVERTENT ICING ENCOUNTER

1. **Turn pitot heat switch ON.**
2. **Turn back or change altitude** to obtain an outside air temperature that is less conducive to icing.
3. **Pull cabin heat and defrost controls full out** to obtain maximum windshield defroster airflow.

(Continued Next Page)

4. Increase engine speed to minimize ice build-up on propeller blades. If excessive vibration is noted, momentarily reduce engine speed to 2200 RPM with the propeller control, and then rapidly move the control full forward.

NOTE

Cycling the RPM flexes the propeller blades and high RPM increases centrifugal force, causing ice to shed more readily.

5. Watch for signs of induction air filter icing and regain manifold pressure by increasing the throttle setting.

NOTE

If ice accumulates on the intake filter (causing alternate air door to open), decreases of up to 15 in. Hg. in full throttle manifold pressure can be experienced, above 8000 feet.

6. Plan a landing at the nearest airport. With an extremely rapid ice build up, select a suitable "off airport" landing site.
7. With an ice accumulation of 1/4 inch or more on the wing leading edges, be prepared for significantly higher power requirement, higher approach and stall speeds and a longer landing roll.
8. Open left window and, if practical, scrape ice from a portion of the windshield for visibility in the landing approach.
9. Use a 10°-20° landing flap setting for ice accumulations of 1 inch or less. With heavier ice accumulations, approach with flaps retracted to ensure adequate elevator effectiveness in the approach and landing.
10. Approach at 95-100 KIAS with 20° flaps and 110-120 KIAS with 0° - 10° flaps, depending upon the amount of ice accumulation. If ice accumulation is unusually large, decelerate to the planned approach speed while in the approach configuration at a high enough altitude which would permit recovery in the event that a stall buffet is encountered.
11. Land on the main wheels first, avoiding the slow and high type of flare-out.

12. Missed approaches should be avoided whenever possible because of severely reduced climb capability. However, if a go-around is mandatory, make the decision much earlier in the approach than normal. Apply maximum power and maintain 100 KIAS while retracting the flaps slowly in 10° increments.

STATIC SOURCE BLOCKAGE
(Erroneous Instrument Reading Suspected)

1. **Static Pressure Alternate Source Valve -- PULL ON.**
2. Heat and Air Valves -- PULL ON.
3. Vents -- CLOSED.
4. Airspeed -- Consult appropriate calibration tables in Section 5.
5. Altitude -- Consult appropriate calibration tables in Section 5.

EXCESSIVE FUEL VAPOR

FUEL FLOW STABILIZATION PROCEDURES
(If Fuel Flow Fluctuations of 1 GPH Or More Or Power Surges Occur)

1. **Auxiliary Fuel Pump Switch -- ON.**
2. Mixture -- RESET as required.
3. Fuel Selector Valve -- SELECT OPPOSITE TANK if vapor symptoms continue.
4. Auxiliary Fuel Pump Switch -- OFF after fuel flow has stabilized.

LANDING WITH A FLAT MAIN TIRE

1. Approach -- NORMAL.
2. Wing Flaps -- AS DESIRED. (0° - 10° below 140 KIAS,
   10° - 40° below 100 KIAS).
3. Touchdown -- GOOD MAIN TIRE FIRST, hold airplane off flat tire as long as possible with aileron control.
4. Directional Control -- MAINTAIN using brake on good wheel as required.

LANDING WITH A FLAT NOSE TIRE

1. Approach -- NORMAL.
2. Flaps -- AS REQUIRED.
3. Touchdown -- ON MAINS, hold nose wheel off the ground as long as possible.
4. When nose wheel touches down, maintain full up elevator as airplane slows to stop.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

AMMETER SHOWS EXCESSIVE RATE OF CHARGE
(Full Scale Deflection)

1. Alternator -- OFF.

⚠ CAUTION

WITH THE ALTERNATOR SIDE OF THE MASTER SWITCH OFF, COMPASS DEVIATIONS OF AS MUCH AS 25° MAY OCCUR.

2. Nonessential Electrical Equipment -- OFF.
3. Flight -- TERMINATE as soon as practical.

LOW VOLTAGE ANNUNCIATOR (VOLTS) ILLUMINATES DURING FLIGHT (Ammeter Indicates Discharge)

NOTE

Illumination of "VOLTS" on the annunciator panel may occur during low RPM conditions with an electrical load on the system such as during a low RPM taxi. Under these conditions, the annunciator will go out at higher RPM. The master switch need not be recycled since an overvoltage condition has not occurred to deactivate the alternator system.

1. Avionics Master Switch -- OFF.
2. Alternator Circuit Breaker (ALT FLD) -- CHECK IN.
3. Master Switch -- OFF (both sides).
4. Master Switch -- ON.
5. Low Voltage Annunciator (VOLTS) -- CHECK OFF.
6. Avionics Master Switch -- ON.

If low voltage annunciator (VOLTS) illuminates again:

7. Alternator-- OFF.

CAUTION

WITH THE ALTERNATOR SIDE OF THE MASTER SWITCH OFF, COMPASS DEVIATIONS OF AS MUCH AS 25° MAY OCCUR.

8. Nonessential Radio and Electrical Equipment -- OFF.
9. Flight -- TERMINATE as soon as practical.

EMERGENCY DESCENT PROCEDURES

SMOOTH AIR

1. Seats and Seat Belts -- SECURE.
2. Throttle -- IDLE.
3. Propeller -- HIGH RPM.
4. Mixture -- FULL RICH.
5. Wing Flaps -- UP.
6. Airspeed -- 182 KIAS.

ROUGH AIR

1. Seats and Seat Belts -- SECURE.
2. Throttle -- IDLE.
3. Propeller -- HIGH RPM.
4. Mixture -- FULL RICH.
5. Wing Flaps -- UP.
6. Weights and Airspeeds:
   3600 Lbs -- 125 KIAS.
   2950 Lbs -- 120 KIAS.
   2300 Lbs -- 106 KIAS.

VACUUM SYSTEM FAILURE

Left Vacuum Annunciator (L VAC) or Right Vacuum Annunciator (VAC R) Illuminates.

CAUTION

IF VACUUM IS NOT WITHIN NORMAL OPERATING LIMITS, A FAILURE HAS OCCURRED IN THE VACUUM SYSTEM AND PARTIAL PANEL PROCEDURES MAY BE REQUIRED FOR CONTINUED FLIGHT.

1. **Vacuum Gauge -- CHECK** to ensure vacuum within normal operating limits.

AMPLIFIED EMERGENCY PROCEDURES

The following Amplified Emergency Procedures elaborate upon information contained in the Emergency Procedures Checklists portion of this section. These procedures also include information not readily adaptable to a checklist format, and material to which a pilot could not be expected to refer in resolution of a specific emergency. This information should be reviewed in detail prior to flying the airplane, as well as reviewed on a regular basis to keep pilot's knowledge of procedures fresh.

ENGINE FAILURE

If an engine failure occurs during the takeoff roll, the most important thing to do is stop the airplane on the remaining runway. Those extra items on the checklist will provide added safety after a failure of this type.

Prompt lowering of the nose to maintain airspeed and establish a glide attitude is the first response to an engine failure after takeoff. In most cases, the landing should be planned straight ahead with only small changes in direction to avoid obstructions. Altitude and airspeed are seldom sufficient to execute a 180° gliding turn necessary to return to the runway. The checklist procedures assume that adequate time exists to secure the fuel and ignition systems prior to touchdown.

After an engine failure in flight, the most important course of action is to continue flying the airplane. Best glide speed as shown in Figure 3-1 should be established as quickly as possible. While gliding toward a suitable landing area, an effort should be made to identify the cause of the failure. If time permits, an engine restart should be attempted as shown in the checklist. If the engine cannot be restarted, a forced landing without power must be completed.

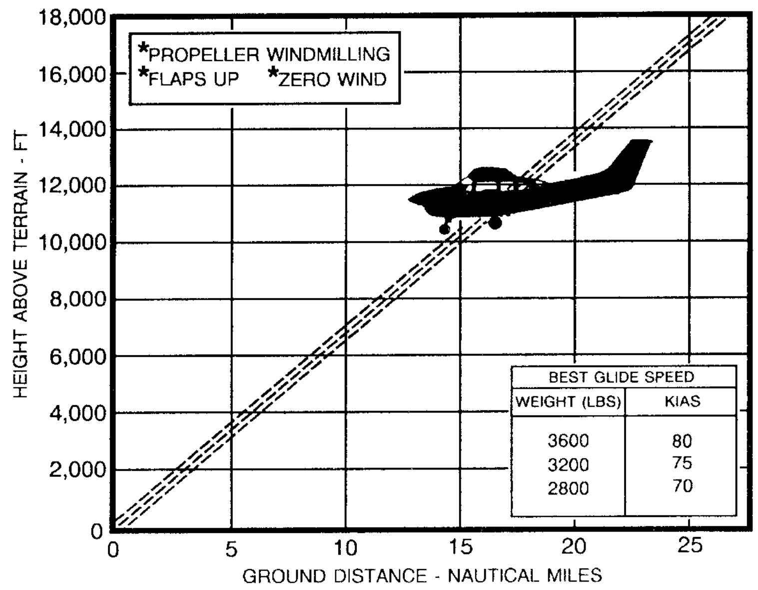


Figure 3-1. Maximum Glide

FORCED LANDINGS

If all attempts to restart the engine fail and a forced landing is imminent, select a suitable field and prepare for the landing as discussed under the Emergency Landing Without Engine Power checklist. Transmit Mayday message on 121.5 MHz giving location and intentions and squawk 7700.

Before attempting an "off airport" landing with engine power available, one should fly over the landing area at a safe but low altitude to inspect the terrain for obstructions and surface conditions, proceeding as discussed under the Precautionary Landing With Engine Power checklist.

Prepare for ditching by securing or jettisoning heavy objects located in the baggage area and collect folded coats for protection of occupants' face at touchdown. Transmit Mayday message on 121.5 MHz giving location and intentions and squawk 7700. Avoid a landing flare because of difficulty in judging height over a water surface. The checklist assumes the availability of power to make a precautionary water landing. If power is not available, use of the airspeeds noted with minimum flap extension will provide a more favorable attitude for a power off ditching.

In a forced landing situation, do not turn off the AVIONICS MASTER switch or the MASTER switch until a landing is assured. Premature deactivation of the switches will disable the airplane electrical systems.

Before performing a forced landing, especially in remote and mountainous areas, activate the ELT transmitter by positioning the cockpit-mounted switch to the ON position. For complete information on ELT operation, refer to the Supplements, Section 9.

LANDING WITHOUT ELEVATOR CONTROL

Trim for horizontal flight with an airspeed of approximately 90 KIAS by using throttle and elevator trim controls. Then **do not change the elevator trim control setting;** control the glide angle by adjusting power exclusively.

At flare out, the nose down moment resulting from power reduction is an adverse factor and the airplane may hit on the nose wheel. Consequently, at flareout, the elevator trim control should be adjusted toward the full nose-up position and the power adjusted so that the airplane will rotate to the horizontal attitude for touchdown. Close the throttle at touchdown.

FIRES

Improper starting procedures involving the excessive use of auxiliary fuel pump operation can cause engine flooding and subsequent collection of fuel on the parking ramp as the excess fuel drains overboard from the intake manifolds. This is sometimes experienced in difficult starts in cold weather where engine preheat service is not available. If this occurs, the airplane should be pushed away from the fuel puddle before another engine start is attempted. Otherwise, there is a possibility of raw fuel accumulations in the exhaust system igniting during an engine start, causing a long flame from the tailpipe, and possibly igniting the collected fuel on the pavement. If a fire occurs, proceed according to the checklist.

Although engine fires are extremely rare in flight, the steps of the appropriate checklist should be followed if one is encountered. After completion of this procedure, execute a forced landing. Do not attempt to restart the engine.

The initial indication of an electrical fire is usually the odor of burning insulation. The checklist for this problem should result in elimination of the fire.

EMERGENCY OPERATION IN CLOUDS (Total Vacuum System Failure)

If both the vacuum pumps fail in flight, the directional indicator and attitude indicator will be disabled, and the pilot will have to rely on the turn coordinator if he inadvertently flies into clouds. If an autopilot is installed, it too may be affected. Refer to Section 9, Supplements, for additional details concerning autopilot operation. The following instructions assume that only the electrically powered turn coordinator is operative, and that the pilot is not completely proficient in instrument flying.

EXECUTING A 180° TURN IN CLOUDS

Upon inadvertently entering the clouds, an immediate plan should be made to turn back as follows:

1. Note the compass heading.
2. Using the clock, initiate a standard rate left turn, holding the turn coordinator symbolic airplane wing opposite the lower left index mark for 60 seconds. Then roll back to level flight by leveling the miniature airplane.
3. Check accuracy of the turn by observing the compass heading which should be the reciprocal of the original heading.
4. If necessary, adjust heading primarily with skidding motions rather than rolling motions so that the compass will read more accurately.
5. Maintain altitude and airspeed by cautious application of elevator control. Avoid over controlling by keeping the hands off the control wheel as much as possible and steering only with rudder.

EMERGENCY DESCENT THROUGH CLOUDS

If conditions preclude reestablishment of VFR flight by a 180° turn, a descent through a cloud deck to VFR conditions may be appropriate. If possible, obtain radio clearance for an emergency descent through clouds. To guard against a spiral dive, choose an easterly or westerly heading to minimize compass card swings due to changing bank angles. In addition, keep hands off the control wheel and steer a straight course with rudder control by monitoring the turn coordinator. Occasionally check the compass heading and make minor corrections to hold an approximate course. Before descending into the clouds, set up a stabilized letdown condition as follows:

1. Apply full rich mixture or adjust mixture for smooth operation.
2. Reduce power to set up a 500 to 800 ft/min rate of descent.
3. Adjust the elevator trim and rudder trim for a stabilized descent at 100 KIAS.
4. Keep hands off the control wheel.
5. Monitor turn coordinator and make corrections by rudder alone.
6. Adjust rudder trim to relieve unbalanced rudder force, if present.

7. Check trend of compass card movement and make cautious corrections with rudder to stop the turn.
8. Upon breaking out of clouds, resume normal cruising flight.

RECOVERY FROM SPIRAL DIVE IN THE CLOUDS

If a spiral is encountered in the clouds, proceed as follows:

1. Retard throttle to idle position.
2. Stop the turn by using coordinated aileron and rudder control to align the symbolic airplane in the turn coordinator with the horizon reference line.
3. Cautiously apply elevator back pressure to slowly reduce the airspeed to 100 KIAS.
4. Adjust the elevator trim control to maintain a 100 KIAS glide.
5. Keep hands off the control wheel, using rudder control to hold a straight heading. Adjust rudder trim to relieve unbalanced rudder force.
6. Clear engine occasionally, but avoid using enough power to disturb the trimmed glide.
7. Upon breaking out of clouds, resume normal cruising flight.

INADVERTENT FLIGHT INTO ICING CONDITIONS

Flight into known icing conditions is prohibited and can be extremely dangerous. An inadvertent encounter with these conditions can best be handled using the checklist procedures. The best procedure, of course, is to turn back or change altitude to escape icing conditions.

STATIC SOURCE BLOCKED

If erroneous readings of the static source instruments (airspeed, altimeter and vertical speed) are suspected, the static pressure alternate source valve should be pulled on (out), thereby supplying static pressure to these instruments from the cabin.

With the alternate static source on, refer to the Alternate Static Source Airspeed Calibration and Altimeter Correction tables in Section 5 for additional details.

Maximum airspeed and altimeter variation from normal is 5 knots and 70 feet over the normal operating range with the window(s) closed. See Section 5 tables for airspeed and altimeter calibration data.

SPINS

Intentional spins are prohibited in this airplane. Should an inadvertent spin occur, the following recovery procedure should be used:

1. RETARD THROTTLE TO IDLE POSITION.
2. PLACE AILERONS IN NEUTRAL POSITION.
3. APPLY AND **HOLD** FULL RUDDER OPPOSITE TO THE DIRECTION OF ROTATION.
4. JUST **AFTER** THE RUDDER REACHES THE STOP, MOVE THE CONTROL WHEEL **BRISKLY** FORWARD FAR ENOUGH TO BREAK THE STALL. (Full down elevator may be required at aft center of gravity loadings to assure optimum recoveries.)
5. **HOLD** THESE CONTROL INPUTS UNTIL ROTATION STOPS. Premature relaxation of the control inputs may extend the recovery.
6. AS ROTATION STOPS, NEUTRALIZE RUDDER, AND MAKE A SMOOTH RECOVERY FROM THE RESULTING DIVE.

NOTE

If disorientation precludes a visual determination of the direction of rotation, the symbolic airplane in the turn coordinator may be referred to for this information.

ROUGH ENGINE OPERATION OR LOSS OF POWER

SPARK PLUG FOULING

A slight engine roughness in flight may be caused by one or more spark plugs becoming fouled by carbon or lead deposits. This may be verified by turning the ignition switch momentarily from BOTH to either L or R position. An obvious power loss in single ignition operation is evidence of spark plug or magneto trouble.

Assuming that spark plugs are the more likely cause, lean the mixture to the recommended lean setting for cruising flight. If the problem does not clear up in several minutes, determine if a richer mixture setting will produce smoother operation. If not, proceed to the nearest airport for repairs using the BOTH position of the ignition switch unless extreme roughness dictates the use of a single ignition position.

MAGNETO MALFUNCTION

A sudden engine roughness or misfiring is usually evidence of magneto problems. Switching from BOTH to either L or R ignition switch position will identify which magneto is malfunctioning. Select different power settings and enrichen the mixture to determine if continued operation on BOTH magnetos is practicable. If not, switch to the good magneto and proceed to the nearest airport for repairs.

ENGINE DRIVEN FUEL PUMP FAILURE

Failure of the engine driven fuel pump will be evidenced by a sudden reduction in the fuel flow indication **immediately prior to a loss of power,** while operating from a fuel tank containing adequate fuel.

In the event of an engine driven fuel pump failure, immediately turn the auxiliary fuel pump switch ON to restore engine power. In this event, the flight should be terminated when practical and the fuel pump repaired.

EXCESSIVE FUEL VAPOR INDICATIONS

Excessive fuel vapor indications are most likely to occur on the ground typically during prolonged taxi operations, when operating at higher altitudes and/or in unusually warm temperatures.

An indication of excessive fuel vapor accumulation is fuel flow gage fluctuations greater than 1 gal./hr. This condition with leaner mixtures or with larger fluctuations may result in power surges, and if not corrected, may cause power loss.

To eliminate vapor and stabilize fuel flow on the ground or in the air, turn the auxiliary fuel pump on and reset the mixture as required. If vapor symptoms persist, select the opposite fuel tank. When fuel flow stabilizes, turn off the auxiliary fuel pump and reset the mixture as desired.

LOW OIL PRESSURE

If the low oil pressure annunciator (OIL PRESS) illuminates, check the oil pressure gage to confirm low oil pressure condition. If gage oil pressure and oil temperature remains normal, it is possible the oil pressure sending unit or relief valve is malfunctioning. However, land at the nearest airport to inspect the source of trouble.

If a total loss of oil pressure is accompanied by a rise in oil temperature, there is good reason to suspect an engine failure is imminent. Reduce engine power immediately and select a suitable forced landing field. Use only the minimum power required to reach the desired touchdown spot.

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

Malfunctions in the electrical power supply system can be detected by periodic monitoring of the ammeter and low voltage annunciator (VOLTS); however, the cause of these malfunctions is usually difficult to determine. A broken alternator drive belt or wiring is most likely the cause of alternator failures, although other factors could cause the problem. A defective alternator control unit can also cause malfunctions. Problems of this nature constitute an electrical emergency and should be dealt with immediately. Electrical power malfunctions usually fall into two categories: excessive rate of charge and insufficient rate of charge. The following paragraphs describe the recommended remedy for each situation.

EXCESSIVE RATE OF CHARGE

After engine starting and heavy electrical usage at low engine speeds (such as extended taxiing) the battery condition will be low enough to accept above normal charging during the initial part of a flight. However, after thirty minutes of cruising flight, the ammeter should be indicating less than two needle widths of charging current. If the charging rate were to remain above this value on a long flight, the battery would overheat and evaporate the electrolyte at an excessive rate.

Electronic components in the electrical system can be adversely affected by higher than normal voltage. The alternator control unit includes an overvoltage sensor which normally will automatically shut down the alternator if the charge voltage reaches approximately 31.75 volts. If the overvoltage sensor malfunctions, as evidenced by an excessive rate of charge shown on the ammeter, the alternator should be turned off, nonessential electrical equipment turned off and the flight terminated as soon as practical.

INSUFFICIENT RATE OF CHARGE

NOTE

Illumination of the low voltage annunciator (VOLTS) and ammeter discharge indications may occur during low RPM conditions with an electrical load on the system, such as during a low RPM taxi. Under these conditions, the light will go out at higher RPM.

If the overvoltage sensor should shut down the alternator and trip the alternator circuit breaker (ALT FLD), or if the alternator output is low, a discharge rate will be shown on the ammeter followed by illumination of the low voltage annunciator (VOLTS). Since this may be a "nuisance" trip out, an attempt should be made to reactivate the alternator system. To reactivate, turn the avionics master switch off, check that the alternator circuit breaker (ALT FLD) is in, then turn both sides of the master switch off and then on again. If the problem no longer exists, normal alternator charging will resume and the low voltage annunciator (VOLTS) will go off. The avionics master switch may then be turned back on.

If the annunciator illuminates again, a malfunction is confirmed. In this event, the flight should be terminated and/or the current drain on the battery minimized because the battery can supply the electrical system for only a limited period of time. Battery power must be conserved for later operation of the wing flaps and, if the emergency occurs at night, for possible use of the landing lights during landing.

CARGO DOOR EMERGENCY EXIT

If it is necessary to use the cargo doors as an emergency exit and the wing flaps are not extended, open the doors and exit. If the wing flaps are extended, open the doors in accordance with the instructions shown on the red placard which is mounted on the forward cargo door. Here the forward door must be opened far enough to allow access to the aft door latch. After unlatching the aft door, release the latch lever and push the aft door full open. These placarded instructions may also be found in Section 2.

OTHER EMERGENCIES

WINDSHIELD DAMAGE

If a bird strike or other incident should damage the windshield in flight to the point of creating an opening, a significant loss in performance may be expected. This loss may be minimized in some cases (depending on amount of damage, altitude, etc.) by opening the side windows while the airplane is maneuvered for a landing at the nearest airport. If airplane performance or other adverse conditions preclude landing at an airport, prepare for an "off airport" landing in accordance with the Precautionary Landing With Engine Power or Ditching checklists.

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SECTION 4
NORMAL PROCEDURES

TABLE OF CONTENTS

Page

Introduction 4-5

AIRSPEEDS

Airspeeds For Normal Operation 4-5

CHECKLIST PROCEDURES

Preflight Inspection 4-7
  Cabin 4-7
  Empennage 4-8
  Right Wing, Trailing Edge 4-9
  Right Wing 4-9
  Nose 4-10
  Left Wing 4-11
  Left Wing, Leading Edge 4-11
  Left Wing, Trailing Edge 4-11
Before Starting Engine 4-12
Starting Engine (With Battery) 4-12
Starting Engine (With External Power) 4-13
Before Taxiing 4-14
Before Takeoff 4-14
Takeoff 4-15
  Normal Takeoff 4-15
  Short Field Takeoff 4-15
Enroute Climb 4-15
  Normal Climb 4-15
  Maximum Performance Climb 4-16

TABLE OF CONTENTS (Continued)

	Page
Cruise	4-17
Descent	4-17
Before Landing	4-18
Landing	4-18
Normal Landing	4-18
Short Field Landing	4-19
Balked Landing	4-19
After Landing	4-19
Securing Airplane	4-19

AMPLIFIED PROCEDURES

Preflight Inspection	4-20
Starting Engine	4-21
Taxiing	4-22
Before Takeoff	4-24
Warm Up	4-24
Magneto Check	4-24
Alternator Check	4-24
Landing Lights	4-25
Takeoff	4-25
Power Check	4-25
Wing Flap Settings	4-25
Crosswind Takeoff	4-26
Enroute Climb	4-26
Cruise	4-27
Leaning With the T.I.T. Indicator	4-29
Fuel Savings Procedures for Normal Flight Operations	4-31
Fuel Vapor Procedures	4-31

TABLE OF CONTENTS (Continued)

	Page
Stalls	4-32
Descent	4-33
Landing	4-33
Normal Landing	4-33
Short Field Landing	4-34
Crosswind Landing	4-34
Balked Landing	4-34
Cold Weather Operation	4-35
Starting	4-36
Hot Weather Operation	4-37
Noise Characteristics And Noise Reduction	4-37

INTRODUCTION

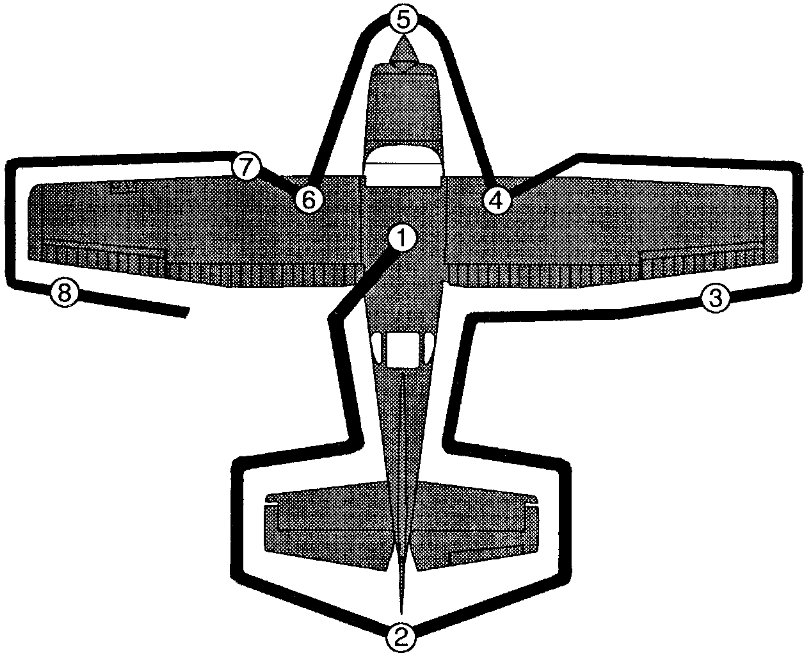
Section 4 provides checklist and amplified procedures for the conduct of normal operation. Normal procedures associated with optional systems can be found in Supplements, Section 9.

AIRSPEEDS

AIRSPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 3600 pounds and may be used for any lesser weight. However, to achieve the performance specified in Section 5 for takeoff distance and climb performance the speed appropriate to the particular weight must be used.

Takeoff:	
Normal Climb Out	75-85 KIAS
Short Field Takeoff, Flaps 20°, Speed at 50 Feet	74 KIAS
Enroute Climb, Flaps Up:	
Normal	95 KIAS
Best Rate of Climb, Sea Level to 17,000 feet	89 KIAS
Best Rate of Climb, 24,000 feet	79 KIAS
Best Angle of Climb, Sea Level	69 KIAS
Best Angle of Climb, 10,000 Feet	72 KIAS
Landing Approach:	
Normal Approach, Flaps Up	80-90 KIAS
Normal Approach, Flaps 40°	70-80 KIAS
Short Field Approach, Flaps 40°	67 KIAS
Balked Landing:	
Maximum Power, Flaps 20°	85 KIAS
Maximum Recommended Turbulent Air Penetration Speed:	
3600 Lbs	125 KIAS
2950 Lbs	120 KIAS
2300 Lbs	106 KIAS
Maximum Demonstrated Crosswind Velocity:	
Takeoff or Landing	20 KNOTS



NOTE

Visually check airplane for general condition during walk-around inspection. Airplane should be parked in a normal ground attitude (refer to Figure 1-1) to ensure that fuel drain valves allow for accurate sampling. Use of the refueling steps and assist handles will simplify access to the upper wing surfaces for visual checks and refueling operations. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. Also, make sure that control surfaces contain no internal accumulations of ice or debris. Prior to flight, check that pitot heater is warm to touch within 30 seconds with battery and pitot switches on. If a night flight is planned, check operation of all lights, and make sure a flashlight is available.

Figure 4-1. Preflight Inspection

PREFLIGHT INSPECTION

(1) CABIN

1. Pitot Tube Cover -- REMOVE. Check for pitot blockage.
2. Pilot's Operating Handbook -- AVAILABLE IN THE AIRPLANE.
3. Cargo Door Locking Pin (Airplane Serial Numbers T20608438 and On) -- REMOVE and STOW.
4. Airplane Weight and Balance -- CHECKED.
5. Parking Brake -- SET.
6. Control Wheel Lock -- REMOVE.
7. Ignition Switch -- OFF
8. Avionics Master Switch -- OFF.

⚠ WARNING

WHEN TURNING ON THE MASTER SWITCH, USING AN EXTERNAL POWER SOURCE, OR PULLING THE PROPELLER THROUGH BY HAND, TREAT THE PROPELLER AS IF THE IGNITION SWITCH WERE ON. DO NOT STAND, NOR ALLOW ANYONE ELSE TO STAND, WITHIN THE ARC OF THE PROPELLER, SINCE A LOOSE OR BROKEN WIRE OR A COMPONENT MALFUNCTION COULD CAUSE THE PROPELLER TO ROTATE.

9. Master Switch -- ON.
10. Fuel Quantity Indicators -- CHECK QUANTITY and ENSURE LOW FUEL ANNUNCIATORS (L LOW FUEL R) ARE EXTINGUISHED.
11. Avionics Master Switch -- ON.
12. Avionics Cooling Fan -- CHECK AUDIBLY FOR OPERATION.
13. Avionics Master Switch -- OFF.
14. Static Pressure Alternate Source Valve -- OFF.
15. Annunciator Panel Switch -- PLACE AND HOLD IN TST POSITION and ensure all annunciators illuminate.

(Continued Next Page)

PREFLIGHT INSPECTION (Continued)

(1) CABIN (Continued)

16. Annunciator Panel Test Switch -- RELEASE. Check that appropriate annunciators remain on.

NOTE

When master switch is turned ON, some annunciators will flash for approximately 10 seconds before illuminating steadily. When panel TST switch is toggled up and held in position, all remaining lights will flash until the switch is released.

17. Fuel Selector Valve -- BOTH.
18. Flaps -- EXTEND.
19. Pitot Heat -- ON. (Carefully check that pitot tube is warm to the touch within 30 seconds.)
20. Pitot Heat -- OFF.
21. Master Switch -- OFF.
22. Trim Controls -- NEUTRAL.
23. Oxygen Supply Pressure -- CHECK.
24. Oxygen Masks -- CHECK.

(2) EMPENNAGE

1. Rudder Gust Lock (if installed) -- REMOVE.
2. Tail Tie-Down -- DISCONNECT.
3. Control Surfaces -- CHECK freedom of movement and security.
4. Trim Tab -- CHECK security.
5. Check that cargo doors are securely latched (right side only). If cargo load will not permit access to the front cargo door inside handle, lock the door from the outside by pulling the handle from its recess, pulling outboard on the vertical tab behind the handle and pushing the handle back into its recess. Door locking can be verified by observing that the inside door handle has rotated toward the locked position. The outside handle can then be locked using the key.

(Continued Next Page)

NOTE

The cargo doors must be fully closed and latched before operating the electric wing flaps. A switch in the upper door sill of the front cargo door interrupts the wing flap electrical circuit when the front door is opened or removed, thus preventing the flaps from being lowered with possible damage to the cargo door or wing flaps when the cargo door is open.

6. Antennas -- CHECK for security of attachment and general condition.

(3) RIGHT WING Trailing Edge

1. Flap -- CHECK for security and condition.
2. Aileron -- CHECK freedom of movement and security.

(4) RIGHT WING

1. Wing Tie-Down -- DISCONNECT.
2. Fuel Tank Vent Opening -- CHECK for stoppage.
3. Main Wheel Tire -- CHECK for proper inflation and general condition (weather checks, tread depth and wear, etc...).
4. Fuel Tank Sump Quick Drain Valves -- DRAIN at least a cupful of fuel (using sampler cup) from each sump location to check for water, sediment, and proper fuel grade before each flight and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from **all** fuel drain points until **all** contamination has been removed. If contaminants are still present, refer to WARNING below and do not fly airplane.

⚠ WARNING

IF, AFTER REPEATED SAMPLING, EVIDENCE OF CONTAMINATION STILL EXISTS, THE AIRPLANE SHOULD NOT BE FLOWN. TANKS SHOULD BE DRAINED AND SYSTEM PURGED BY QUALIFIED MAINTENANCE PERSONNEL. ALL EVIDENCE OF CONTAMINATION MUST BE REMOVED BEFORE FURTHER FLIGHT.

5. Fuel Quantity -- CHECK VISUALLY for desired level.
6. Fuel Filler Cap -- SECURE and VENT UNOBSTRUCTED.

(5) NOSE

1. Static Source Opening (right side of fuselage) -- CHECK for blockage.
2. Fuel Strainer Quick Drain Valve (Located on bottom of fuselage) -- DRAIN at least a cupful of fuel (using sampler cup) from valve to check for water, sediment, and proper fuel grade before each flight and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from **all** fuel drain points, including the fuel reservoirs and the fuel selector, until **all** contamination has been removed. If contaminants are still present, refer to WARNING on page 4-9 and do not fly airplane.
3. Engine Oil Dip Stick/Filler Cap -- CHECK oil level, then check dipstick SECURE. Do not operate with less than 6 quarts. Fill to 11 quarts for extended flight.
4. Engine Cooling Air Inlets -- CHECK left and right upper inlets clear of obstructions. Also, CHECK lower left oil cooling air inlet clear of obstructions.
5. Propeller and Spinner -- CHECK for nicks and security.
6. Engine Induction Air Filter -- CHECK for restrictions by dust or other foreign matter.
7. Nose Wheel Strut and Tire -- CHECK for proper inflation of strut and general condition (weather checks, tread depth and wear, etc...) of tire.
8. Static Source Opening (left side of fuselage)-- CHECK for blockage.

(6) LEFT WING

1. Fuel Quantity -- CHECK VISUALLY for desired level.
2. Fuel Filler Cap -- SECURE AND VENT UNOBSTRUCTED.
3. Fuel Tank Sump Quick Drain Valves -- DRAIN at least a cupful of fuel (using sampler cup) from each sump location to check for water, sediment, and proper fuel grade before each flight and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from **all** fuel drain points until **all** contamination has been removed. If contaminants are still present, refer to WARNING on page 4-9 and do not fly airplane.
4. Main Wheel Tire -- CHECK for proper inflation and general condition (weather checks, tread depth and wear, etc.).

(7) LEFT WING Leading Edge

1. Fuel Tank Vent Opening -- CHECK for blockage.
2. Stall Warning Vane -- CHECK for freedom of movement. To check the system, place the vane upward; a sound from the warning horn will confirm system operation.
3. Wing Tie-Down -- DISCONNECT.
4. Landing/Taxi Light(s) -- CHECK for condition and cleanliness of cover.

(8) LEFT WING Trailing Edge

1. Aileron -- CHECK for freedom of movement and security.
2. Flap -- CHECK for security and condition.

BEFORE STARTING ENGINE

1. Preflight Inspection -- COMPLETE.
2. Passenger Briefing -- COMPLETE.
3. Seats and Seat Belts -- ADJUST and LOCK. Ensure inertia reel locking.
4. Brakes -- TEST and SET.
5. Circuit Breakers -- CHECK IN.
6. Electrical Equipment -- OFF.

⚠ CAUTION

THE AVIONICS MASTER SWITCH MUST BE OFF DURING ENGINE START TO PREVENT POSSIBLE DAMAGE TO AVIONICS.

7. Avionics Master Switch -- OFF.
8. Cowl Flaps -- OPEN.
9. Fuel Selector Valve -- BOTH.
10. Avionics Circuit Breakers -- CHECK IN.

STARTING ENGINE (With Battery)

1. Throttle -- OPEN 1/4 INCH.
2. Propeller -- HIGH RPM.
3. Mixture -- IDLE CUT OFF.
4. Propeller Area -- CLEAR.
5. Master Switch -- ON.

NOTE

If engine is warm, omit priming procedure of step 6, 7, and 8 below.

6. Auxiliary Fuel Pump Switch -- ON.
7. Mixture -- ADVANCE to full rich until the fuel flow just starts to rise, then return to IDLE CUT OFF position.
8. Auxiliary Fuel Pump Switch -- OFF.

9. Ignition Switch -- START (release when engine starts).
10. Mixture -- ADVANCE smoothly to RICH when engine fires.

NOTE

If engine floods, turn off auxiliary fuel pump, place mixture in idle cut off, open throttle 1/2 to full, and crank engine. When engine fires, advance mixture to full rich and retard throttle promptly.

11. Oil Pressure -- CHECK.
12. Flashing Beacon and Navigation Lights -- ON as required.
13. Avionics Master Switch -- ON.
14. Radios -- ON.

STARTING ENGINE (With External Power)

1. Throttle -- OPEN 1/4 INCH.
2. Propeller -- HIGH RPM.
3. Mixture -- IDLE CUT OFF.
4. Propeller Area -- CLEAR.
5. External Power -- CONNECT to airplane receptacle.
6. Master Switch -- ON.

NOTE

If engine is warm, omit priming procedure of step 7, 8, and 9 below.

7. Auxiliary Fuel Pump Switch -- ON.
8. Mixture -- ADVANCE to full rich until the fuel flow just starts to rise, then return to IDLE CUT OFF position.
9. Auxiliary Fuel Pump Switch -- OFF.
10. Ignition Switch -- START (release when engine starts).
11. Mixture -- ADVANCE smoothly to RICH when engine fires.

NOTE

If engine floods, turn off auxiliary fuel pump, place mixture in idle cut off, open throttle 1/2 to full, and crank engine. When engine fires, advance mixture to full rich and retard throttle promptly.

12. Oil Pressure -- CHECK.
13. External Power -- DISCONNECT from airplane receptacle. Secure external power door.
14. Ammeter -- CHECK (see checklist, Section 7, Ground Service Plug Receptacle).
15. Flashing Beacon and Navigation Lights -- ON as required.
16. Avionics Master Switch -- ON.
17. Radios -- ON.

BEFORE TAXIING

1. Windows, vents and heater -- ADJUST as desired.
2. Mixture -- AS REQUIRED. Preferably LEANED at 1200 RPM.
3. Throttle -- AS REQUIRED or 1800 RPM to 2000 RPM as required by fuel vapor conditions.
4. Auxiliary Fuel Pump -- OFF (ON, if fuel vapor conditions exist).
5. Parking Brake -- RELEASE.

BEFORE TAKEOFF

1. Parking Brake -- SET.
2. Passenger Seats -- AS FAR FORWARD AS PRACTICAL.
3. Passenger Seat Backs -- MOST UPRIGHT POSITION.
4. Seats and Seat Belts -- CHECK SECURE.
5. Cabin Doors -- CLOSED and LOCKED.
6. Cargo Door (Airplane Serial Numbers T20608438 and On) -- CHECK (Locking Pin removed and stowed).
7. Flight Controls -- FREE and CORRECT.
8. Flight Instruments -- CHECK and SET.
9. Fuel Quantity -- CHECK.
10. Auxiliary Fuel Pump -- OFF.
11. Mixture -- RICH.
12. Fuel Selector Valve -- RECHECK BOTH.
13. Throttle -- 1800 RPM.
    a. Magnetos -- CHECK (RPM drop should not exceed 150 RPM on either magneto or 50 RPM differential between magnetos).
    b. Propeller -- CYCLE from high to low RPM; return to high RPM (full in).
    c. Vacuum Gage -- CHECK.
    d. Engine Instruments and Ammeter -- CHECK.
    e. Annunciator Panel -- Ensure no annunciators are illuminated.
14. Throttle -- CHECK IDLE.
15. Throttle -- 1000 RPM.

16. Throttle Friction Lock -- ADJUST.
17. Strobe Lights -- AS DESIRED.
18. Electric Trim (if installed) -- PREFLIGHT TEST.
19. Radios and Avionics -- SET.
20. NAV/GPS Switch (if installed) -- SET.
21. Autopilot (if installed) -- OFF.
22. Elevator Trim and Rudder Trim -- SET for takeoff.
23. Cowl Flaps -- OPEN.
24. Wing Flaps -- SET for takeoff (0° TO 20°).
25. Brakes -- RELEASE.

TAKEOFF

NORMAL TAKEOFF

1. Wing Flaps -- 0° - 20°.
2. Power -- 39 INCHES Hg. and 2500 RPM.
3. Mixture -- ADJUST to 34 GPH fuel flow.
4. Elevator Control -- LIFT NOSE WHEEL at 55 KIAS.
5. Climb Speed -- 75 - 85 KIAS (flaps 20°).
6. Wing Flaps -- RETRACT (after obstacles are cleared).

SHORT FIELD TAKEOFF

1. Wing Flaps -- 20°.
2. Brakes -- APPLY.
3. Power -- 39 INCHES Hg. and 2500 RPM.
4. Mixture -- Adjust to 34 GPH fuel flow.
5. Brakes -- RELEASE.
6. Elevator Control -- MAINTAIN SLIGHTLY TAIL LOW ATTITUDE.
7. Climb Speed -- 74 KIAS (until all obstacles are cleared).
8. Wing Flaps -- RETRACT slowly after reaching 90 KIAS.

NOTE

Do not reduce power until wing flaps have been retracted.

ENROUTE CLIMB

NORMAL CLIMB

1. Airspeed -- 95-105 KIAS.
2. Power -- 30 in. Hg. and 2400 RPM.

3. Mixture -- LEAN to 20 GPH fuel flow.
4. Fuel Selector Valve -- BOTH.
5. Cowl Flaps -- OPEN as required.

MAXIMUM PERFORMANCE CLIMB

1. Airspeed -- 89 KIAS.

NOTE

Some optional equipment items require the use of higher indicated airspeed for maximum performance climbs. This information is included in the Supplements section for applicable installed options.

2. Power -- 39 in. Hg. and 2500 RPM.
3. Mixture -- ADJUST to 34 GPH fuel flow.

NOTE

See Minimum Fuel Flow placard for maximum continuous power manifold pressure and fuel flow above 17,000 feet.

NOTE

On hot days at higher altitudes, be alert for possible fuel vapor indications. If fuel flow fluctuations are observed or if desired fuel flows cannot be maintained, turn the auxiliary fuel pump ON and reset the mixture as required.

4. Fuel Selector Valve -- BOTH.
5. Cowl Flaps -- FULL OPEN.

CRUISE

1. Power -- 15 - 30 in. Hg., 2000 - 2400 RPM (no more than 75%).
2. Mixture -- LEAN for cruise fuel flow using the T.I.T. gage or the Cruise Data in Section 5.
3. Elevator and Rudder Trim -- ADJUST.
4. Cowl Flaps -- AS REQUIRED.

NOTE

Turn auxiliary fuel pump on momentarily when switching tanks in cruise.

DESCENT

Serials T20608001 thru T20608361:

1. Power -- AS DESIRED.
2. Mixture -- ENRICHEN as required.
3. Cowl Flaps -- CLOSED.
4. Altimeter -- SET.
5. Nav/GPS Switch -- SET.
6. Fuel Selector Valve -- BOTH.
7. Wing Flaps -- AS DESIRED (0°-10° below 140 KIAS; 10° - 40° below 100 KIAS).

Serials T20608362 and on:

1. Power -- AS DESIRED.
2. Mixture -- ENRICHEN as required.
3. Cowl Flaps -- CLOSED.
4. Altimeter -- SET.
5. Nav/GPS Switch -- SET.
6. Fuel Selector Valve -- BOTH.
7. Wing Flaps -- AS DESIRED (0°-10° below 140 KIAS; 10°-20° below 120 KIAS; 20° - 40° below 100 KIAS).

BEFORE LANDING

1. Passenger Seats -- AS FAR FORWARD AS PRACTICAL.
2. Pilot and Passenger Seat Backs -- MOST UPRIGHT POSITION.
3. Seats and Seat Belts -- SECURED and LOCKED.
4. Fuel Selector Valve -- BOTH.
5. Mixture -- RICH.
6. Propeller -- HIGH RPM.
7. Landing/Taxi Lights -- ON.
8. Autopilot (if installed) -- OFF.

LANDING

NORMAL LANDING

Serials T20608001 thru T20608361:

1. Airspeed -- 80 - 90 KIAS (flaps UP).
2. Wing Flaps -- AS DESIRED (0°-10° below 140 KIAS; 10° - 40° below 100 KIAS).
3. Airspeed -- 70 - 80 KIAS (flaps DOWN).
4. Trim -- ADJUST as desired.
5. Touchdown -- MAIN WHEELS FIRST.
6. Landing Roll -- LOWER NOSE WHEEL GENTLY.
7. Braking -- MINIMUM REQUIRED.

Serials T20608362 and on:

1. Airspeed -- 80 - 90 KIAS (flaps UP).
2. Wing Flaps -- AS DESIRED (0°-10° below 140 KIAS; 10°-20° below 120 KIAS; 20° - 40° below 100 KIAS).
3. Airspeed -- 70 - 80 KIAS (flaps DOWN).
4. Trim -- ADJUST as desired.
5. Touchdown -- MAIN WHEELS FIRST.
6. Landing Roll -- LOWER NOSE WHEEL GENTLY.
7. Braking -- MINIMUM REQUIRED.

(Continued Next Page)

SHORT FIELD LANDING

1. Airspeed -- 80-90 KIAS (flaps UP).
2. Wing Flaps -- FULL (below 100 KIAS).
3. Airspeed -- MAINTAIN 67 KIAS.
4. Power -- REDUCE TO IDLE as obstacle is cleared.
5. Trim -- ADJUST.
6. Touchdown -- MAIN WHEELS FIRST.
7. Brakes -- APPLY HEAVILY.
8. Wing Flaps -- RETRACT for maximum brake effectiveness.

BALKED LANDING

1. Power -- 39 in. Hg and 2500 RPM.
2. Mixture -- ADJUST to 34 GPH fuel flow.
3. Wing Flaps -- RETRACT TO 20°.
4. Climb Speed -- 85 KIAS.
5. Wing Flaps -- RETRACT slowly.
6. Cowl Flaps -- OPEN.

AFTER LANDING

1. Wing Flaps -- RETRACT.
2. Cowl Flaps -- OPEN.

SECURING AIRPLANE

1. Parking Brake -- SET.
2. Throttle -- IDLE.
3. Electrical Equipment, Avionics Master Switch, Autopilot (if installed) -- OFF.
4. Mixture -- IDLE CUT-OFF (pulled full out).
5. Ignition Switch -- OFF.
6. Master Switch -- OFF.
7. Control Lock -- INSTALL.
8. Fuel Selector Valve -- LEFT or RIGHT to prevent cross feeding.
9. Cowl Flaps -- Closed.
10. Cargo Door Locking Pin (Airplane Serial Numbers T20608438 and On) -- INSTALL.

AMPLIFIED PROCEDURES

PREFLIGHT INSPECTION

The Preflight Inspection, described in Figure 4-1 and adjacent checklist, is recommended prior to each flight. If the airplane has been in extended storage, has had recent major maintenance, or has been operated from marginal airports, a more extensive exterior inspection is recommended.

After major maintenance has been performed, the flight and trim tab controls should be double checked for free and correct movement and security. The security of all inspection plates on the airplane should be checked following periodic inspections. If the airplane has been waxed or polished, check the external static pressure source hole for stoppage.

If the airplane has been exposed to a great deal of ground handling in a crowded hangar, it should be checked for dents and scratches on wings, fuselage, and tail surfaces, damage to navigation and anti- collision lights, damage to nose wheel as a result of exceeding tow limits, and avionics antennas.

Outside storage for long periods may result in dust and dirt accumulation on the induction air filter, obstructions in airspeed system lines, water contamination in fuel tanks and bird/rodent nests in any opening. If any water is detected in the fuel system, the fuel tank sump quick drain valves, fuel reservoir quick drain valve, and fuel strainer quick drain valve should all be thoroughly drained. Then, the wings should be gently rocked and the tail lowered to the ground to move any further contaminants to the sampling points. Repeated samples should then be taken at **all** quick drain points until **all** contamination has been removed. If, after repeated sampling, evidence of contamination still exists, the fuel tanks should be completely drained and the fuel system cleaned.

Additionally, if the airplane has been stored outside in windy or gusty areas, or tied down adjacent to taxiing airplanes, special attention should be paid to control surface stops, hinges, and brackets to detect the presence of potential wind damage.

If the airplane has been operated from muddy fields or in snow or slush, check the main and nose gear wheel fairings for obstructions and cleanliness. Operation from a gravel or cinder field will require extra attention to propeller tips and abrasion on leading edges of the horizontal tail. Stone damage to the propeller can seriously reduce the fatigue life of the blades.

Airplanes that are operated from rough fields, especially at high altitudes, are subjected to abnormal landing gear abuse. Frequently check all components of the landing gear, shock strut, tires, and brakes. If the shock strut is insufficiently extended, undue landing and taxi loads will be subjected on the airplane structure.

To prevent loss of fuel in flight, make sure the fuel tank filler caps are tightly sealed after any fuel system check or servicing. Fuel system vents should also be inspected for obstructions, ice or water, especially after exposure to cold, wet weather.

Prior to flight, check to be sure that there is an adequate oxygen supply for the trip, by noting the oxygen pressure gage reading, and referring to the Oxygen Duration Chart of the Pilot's Operating Handbook. Also check that the face masks and hoses are accessible and in good condition.

STARTING ENGINE

In cooler weather, the engine compartment temperature drops off rapidly following engine shutdown and the injector nozzle lines remain nearly full of fuel.

However, in warmer weather, engine compartment temperatures may increase rapidly following engine shutdown, and fuel in the lines will vaporize and escape into the intake manifold. Hot weather starting procedures depend considerably on how soon the next engine start is attempted. Within the first 20 to 30 minutes after shutdown, the fuel manifold is adequately primed and the empty injector nozzle lines will fill before the engine dies. However, after approximately 30 minutes, the vaporized fuel in the manifold will have nearly dissipated and some “priming” could be required to refill the nozzle lines and keep the engine running after the initial start. Starting a hot engine is facilitated by advancing the mixture control promptly to 1/3 open when the engine fires, and then smoothly to full rich as power develops.

Should the engine tend to die after starting, turn on the auxiliary fuel pump temporarily and adjust the throttle and/or mixture as necessary to keep the engine running. In the event of over priming or flooding, turn off the auxiliary fuel pump, open the throttle from 1/2 to full open, and continue cranking with the mixture full lean. When the engine fires, smoothly advance the mixture control to full rich and retard the throttle to desired idle speed.

If the engine is under primed (most likely in cold weather with a cold engine) it will not fire at all, and additional priming will be necessary.

After starting, if the oil pressure does not begin to indicate pressure within 30 seconds in the summer and approximately one minute in very cold weather, stop the engine and investigate. Lack of oil pressure can cause serious engine damage.

NOTE

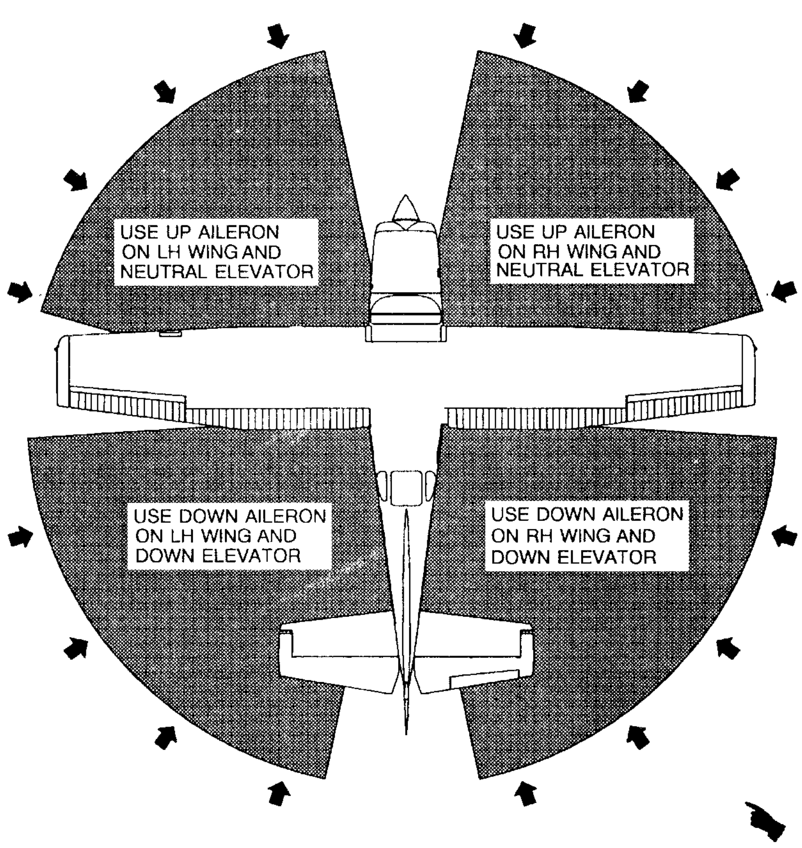
Additional details concerning cold weather starting and operation may be found under COLD WEATHER OPERATION paragraphs in this section.

Recommended starter duty-cycle: Crank the starter for 10 seconds followed by a 20 second cool-down period. This cycle can be repeated two additional times, followed by a ten minute cool-down period before resuming cranking. After cool-down, crank the starter again, three cycles of 10 seconds followed by 20 seconds of cool-down. If the engine still fails to start, an investigation to determine the cause should be initiated.

TAXIING

When taxiing, it is important that speed and use of brakes be held to a minimum and that all controls be utilized (Refer to Figure 4-2, Taxiing Diagram) to maintain directional control and balance.

Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips.



CODE

WIND DIRECTION ➡

NOTE

Strong quartering tail winds require caution. Avoid sudden bursts of the throttle and sharp braking when the airplane is in this situation. Use the steerable nose wheel and rudder to maintain direction.

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Figure 4-2. Taxiing Diagram

BEFORE TAKEOFF

WARM UP

If the engine idles (approximately 650 RPM) and accelerates smoothly, the airplane is ready for takeoff. Since the engine is closely cowled for efficient in-flight engine cooling, precautions should be taken to avoid overheating during prolonged engine operation on the ground. Also, with the oil cooler inlet located on the lower left cowl, oil cooling should be monitored closely during ground operations with a right cross-wind. Further, long periods of idling may cause fouled spark plugs.

MAGNETO CHECK

The magneto check should be made at 1800 RPM as follows. Move ignition switch first to R position and note RPM. Next move switch back to BOTH to clear the other set of plugs. Then move switch to the L position, note RPM and return the switch to the BOTH position. RPM drop should not exceed 150 RPM on either magneto or show greater than 50 RPM differential between magnetos. If there is doubt concerning operation of the ignition system, RPM checks at higher engine speeds will usually confirm whether a deficiency exists.

An absence of RPM drop may be an indication of faulty grounding of one side of the ignition system or should be cause for suspicion that the magneto timing is set in advance of the setting specified.

ALTERNATOR CHECK

Prior to flights where verification of proper alternator and alternator control unit operation is essential (such as night or instrument flights), a positive verification can be made by loading the electrical system momentarily (3 to 5 seconds) with the landing light or by operating the wing flaps during the engine runup (1800 RPM). The ammeter will remain within a needle width of its initial reading if the alternator and alternator control unit are operating properly.

LANDING LIGHTS

If landing lights are to be used to enhance the visibility of the airplane in the traffic pattern or enroute, it is recommended that only the taxi light be used. This will extend the service life of the landing light appreciably.

TAKEOFF

POWER CHECK

It is important to check takeoff power early in the takeoff roll. Any sign of rough engine operation or sluggish engine acceleration is good cause for discontinuing the takeoff.

Full power run ups over loose gravel are especially harmful to propeller tips. When takeoffs must be made over a gravel surface, it is very important that the throttle be advanced slowly. This allows the airplane to start rolling before high RPM is developed, and the gravel will be blown back of the propeller rather than pulled into it.

On the first flight of the day when the throttle is advanced for takeoff, manifold pressure will normally exceed 39 in. Hg and fuel flows will exceed 34 GPH if the throttle is opened fully. On any takeoff, the manifold pressure should be monitored and the throttle set to provide 39 in. Hg; then, for maximum engine power, the mixture should be adjusted as required, during the initial takeoff roll to 34 GPH fuel flow.

After full throttle is applied, adjust the throttle friction lock clockwise to prevent the throttle from creeping back from a maximum power position. Similar friction lock adjustments should be made as required in other flight conditions to maintain a fixed throttle setting.

WING FLAP SETTINGS

Normal takeoffs are accomplished with wing flaps 0° to 20°. Using 20° wing flaps reduces the ground roll and total distance over an obstacle by approximately 10 percent. Flap deflections greater than 20° are not approved for takeoff.

On a short field, 20° wing flaps and an obstacle clearance speed of 74 KIAS should be used. If 20° wing flaps are used for takeoff, they should be left down until all obstacles are cleared and a safe flap retraction speed of 90 KIAS is reached.

Soft or rough field takeoffs are performed with 20° flaps by lifting the airplane off the ground as soon as practical in a slightly tail low attitude. If no obstacles are ahead, the airplane should be leveled off immediately to accelerate to a higher climb speed.

CROSSWIND TAKEOFF

Takeoffs into strong crosswind conditions normally are performed with the minimum flap setting necessary for the field length, to minimize the drift angle immediately after takeoff. With the ailerons partially deflected into the wind, the airplane is accelerated to a speed slightly higher than normal, then pulled off briskly to prevent possible settling back to the runway while drifting. When clear of the ground, make a coordinated turn into the wind to correct for drift.

ENROUTE CLIMB

Power settings for a Best Rate-of-Climb Profile using MCP must be limited to 39 inches of manifold pressure, 2500 RPM and 34 GPH fuel flow.

A cruise climb at 30 inches of manifold pressure, 2400 RPM, 20 GPH fuel flow, and 95 to 105 KIAS is normally recommended to provide an optimum combination of performance, visibility ahead, engine cooling, economy and passenger comfort (due to lower noise level). However, MCP power settings may be used for increased climb performance, as desired.

If it is necessary to climb rapidly to clear mountains or reach favorable winds or better weather at high altitudes, the best rate-of-climb speed should be used with maximum continuous power. This speed is 89 KIAS from sea level to 17,000 feet, decreasing to 79 KIAS at 24,000 feet.

If an obstruction dictates the use of a steep climb angle, climb with flaps retracted and maximum continuous power at 69-72 KIAS. Engine temperatures should be monitored closely at these climb speeds.

For maximum power, the mixture should be set in accordance with the Minimum Fuel Flow placard.

CRUISE

Normal cruising is performed between 55% and 75% of the rated maximum continuous power (MCP). However, any power setting within the green arc ranges on the manifold pressure gage and tachometer may be used. The power settings and corresponding fuel consumption for various altitudes can be determined by using the data in Section 5.

NOTE

Cruising should be done at 65% to 75% power as much as practicable until a total of 50 hours has been accumulated or oil consumption has stabilized. Operation at this higher power will ensure proper seating of the rings and is applicable to new engines, and engines in service following cylinder replacement or top overhaul of one or more cylinders.

The Cruise Performance charts in Section 5 provide the pilot with detailed information concerning the cruise performance of the Model T206H in still air. Power and altitude, as well as winds aloft, have a strong influence on the time and fuel needed to complete any flight. The Cruise Performance table, Figure 5-3, illustrates the advantage of higher altitude on both true airspeed and nautical miles per gallon. In addition, the beneficial effect of lower cruise power on nautical miles per gallon at a given altitude can be observed. The selection of cruise altitude on the basis of most favorable wind conditions and the use of low power settings are significant factors that should be considered on every trip to reduce fuel consumption.

The Cruise Performance charts in Section 5 provide the pilot with cruise performance at maximum gross weight. When normal cruise is performed at reduced weights, there is an increase in true airspeed. During normal cruise at power settings between 65% and 75%, the true airspeed will increase approximately 1 knot for every 125 pounds below maximum gross weight. During normal cruise at power settings below 65%, the true airspeed will increase approximately 1 knot for every 100 pounds below maximum gross weight.

ALTITUDE	75% POWER		65% POWER		55% POWER	
	KTAS	NMPG	KTAS	NMPG	KTAS	NMPG
5000 feet	144	7.5	135	8.1	125	8.9
10000 feet	150	7.8	141	8.5	129	9.2
15000 feet	157	8.2	147	8.8	132	9.4
20000 feet	164	8.6	152	9.2	135	9.6

Figure 4-3. Cruise Performance Table

For reduced noise levels and lower fuel consumption, select the lowest RPM in the green arc range for a given percent power that will provide smooth engine operation. The cowl flaps should be opened, if necessary, to maintain the cylinder head temperature at approximately two-thirds of the normal operating range (green arc) and the oil temperature within the normal operating range (green arc).

The fuel injection system employed on this engine is considered to be non-icing. In the event that unusual conditions cause the intake air filter to become clogged or iced over, an alternate intake air door opens automatically for the most efficient use of either normal or alternate air, depending on the amount of filter blockage. Due to the lower intake pressure available through the alternate air door or a partially blocked filter, manifold pressure can decrease from a cruise power setting. This manifold pressure should be recovered by increasing the throttle setting or higher RPM as necessary to maintain the desired power.

LEANING WITH THE T.I.T. INDICATOR

Exhaust gas turbine inlet temperature (T.I.T.) as shown on the T.I.T./C.H.T. indicator should be used for mixture leaning in cruising flight. This unit displays the exhaust gas temperature at the inlet of the turbine in degrees Fahrenheit.

CAUTION

LEANING WITH A T.I.T. INDICATOR IS PERMITTED ONLY WHEN USING POWER SETTINGS WITHIN THE GREEN ARC RANGES. IF HIGHER POWER SETTINGS ARE USED, WHETHER FOR LEVEL FLIGHT OR CLIMB, THE MINIMUM FUEL FLOW REQUIREMENTS MUST BE MET.

Cruise performance data in this handbook is based on a recommended lean mixture setting which may be established using the T.I.T. indicator at powers of 75% MCP and below as follows:

1. Lean the mixture slowly until the T.I.T. peaks and begins to drop.
2. Enrichen the mixture 75°F rich of peak for recommended lean or a desired increment based on the data in Figure 4-4, T.I.T. Table.

At maximum cruise power settings, the 1675°F limit (red line) T.I.T. may occur before reaching peak T.I.T. In this case, enrichen the mixture from redline 75°F for Recommended Lean Mixture. Any change in altitude or power setting will require a change in the recommended lean mixture setting an a recheck of the T.I.T. setting.

As noted in the T.I.T. table, Figure 4-4, operation at peak T.I.T. provides the best fuel economy. This results in approximately 5% greater range than shown in this handbook accompanied by a 4 knot decrease in speed. Under some conditions, engine roughness may occur while operating at peak T.I.T. In this case, operate at the Recommended lean Mixture.

MIXTURE DESCRIPTION	TURBINE INLET TEMPERATURE (T.I.T.)
RECOMMENDED LEAN (Pilot's Operating Handbook)	75°F Rich of Peak T.I.T.
BEST ECONOMY	Peak T.I.T.
BEST POWER	150°F Rich of Peak T.I.T.

Figure 4-4. T.I.T. Table

CAUTION

OPERATION ON THE LEAN SIDE OF PEAK T.I.T IS NOT APPROVED.

NOTE

When cruising at altitudes above 22,000 feet, the maximum allowable manifold pressure is below the top of the green arc due to detonation restrictions. Reference Section 5 cruise tables for operational power settings.

Certain considerations must be made when using a T.I.T. indicator. Operations which are not approved include:

1. Power settings above the green arc range limitation.
2. Operations at T.I.T. indications above 1675°F.
3. Mixture settings that cause engine roughness or excessive power loss occurs.

FUEL SAVINGS PROCEDURES FOR NORMAL FLIGHT OPERATIONS

For best fuel economy during normal operations, the following procedures are recommended.

1. After engine start and for all ground operations, set the throttle to 1200 RPM and lean the mixture for maximum RPM. After leaning, set the throttle to the appropiate RPM for ground operations. Leave the mixture at this setting until beginning the BEFORE TAKEOFF checklist. If prolonged ground operations are conducted after the BEFORE TAKEOFF checklist is complete, re-lean the mixture as described above until ready for TAKEOFF checklist.
2. Adjust the mixture for placarded fuel flows during maximum continuous power climbs.
3. Adjust the mixture at any altitude for RECOMMENDED LEAN or BEST ECONOMY fuel flows, when using 75% or less power.

Using the above recommended procedures can provide fuel savings in excess of 5% when compared to typical operations at full rich mixture. In addition, the above procedures will minimize spark plug fouling since the reduction in fuel consumption results in a proportional reduction in tetraethyl lead passing through the engine.

FUEL VAPOR PROCEDURES

The engine fuel system can become susceptible to fuel vapor formation on the ground during warm weather. This will generally occur when the outside ambient air temperature is above 80°F. The situation is further aggravated by the fact that the engine fuel flows are lower at idle and taxi engine speeds. When vapor occurs as evidenced by idle engine speed and fuel flow fluctuations, the following procedures are recommended.

1. With the mixture full rich, set the throttle at 1800 RPM to 2000 RPM. Maintain this power setting for 1 to 2 minutes or until smooth engine operation returns.
2. Retard the throttle to idle to verify normal engine operation.

3. Advance the throttle to 1200 RPM and lean the mixture as described under FUEL SAVINGS PROCEDURES FOR NORMAL FLIGHT OPERATIONS.

4. In addition to the above procedures, the Auxiliary Fuel Pump may be turned ON with the mixture adjusted as required to aid vapor suppression during ground operations. The Auxiliary Fuel Pump should be turned OFF prior to takeoff.

5. Just prior to TAKEOFF, advance the throttle to 39 inches Hg. for approximately 10 seconds to verify smooth engine operation for takeoff.

NOTE

When the engine is operated above 1800 RPM, the resulting increased fuel flow also makes for lower fuel temperatures throughout the engine fuel system. This increased flow purges the fuel vapor and the cooler fuel minimizes vapor formation.

In addition to the above procedures, the sections below should be reviewed and where applicable, adhered to:

Section 2 -- Take note of the placard on "When Switching From Dry Tank".
Section 3 -- Take note of the excessive fuel vapor procedures in both the checklist and amplified procedures sections.
Section 4 -- Take note of the hot weather operational notes and procedures in both the checklist and the amplified procedures sections.
Section 7 -- Take note of the altitude operational procedures and the section on auxiliary fuel pump operation.

STALLS

The stall characteristics are conventional and aural warning is provided by a stall warning horn which sounds between 5 and 10 knots above the stall in all configurations.

Power off stall speeds at maximum weight for both forward and aft C.G. positions are presented in Section 5.

DESCENT

Descent should be initiated far enough in advance of estimated landing to allow at gradual rate of descent at cruising speed.

Descent should be at approximately 500 FPM for passenger comfort, using enough power to keep the engine warm. The optimum engine RPM in a let-down is usually the lowest RPM in the green arc range that will allow cylinder head temperature to remain in the recommended operating range.

The airplane is equipped with a specially marked altimeter to attract the pilot's attention and prevent misreading the altimeter. A striped warning segment on the face of the altimeter is exposed at all altitudes below 10,000 feet to indicate low altitude.

LANDING

NORMAL LANDING

Normal landing approaches can be made with power on or power off with any flap setting desired. Surface winds and air turbulence are usually the primary factors in determining the most comfortable approach speeds.

Actual touchdown should be made with power off and on the main wheels first to reduce the landing speed and subsequent need for braking in the landing roll. The nose wheel is lowered to the runway gently after the speed has diminished to avoid unnecessary nose gear loads. This procedure is especially important in rough or soft field landings.

At light operating weights, during ground roll with full flaps, hold the control wheel full back to ensure maximum weight on the main wheels for braking. Under these conditions, full nose down elevator (control wheel full forward) will raise the main wheels off the ground.

SHORT FIELD LANDING

For a short field landing in smooth air conditions, make an approach at 67 KIAS with full flaps using enough power to control the glide path. (Slightly higher approach speeds should be used under turbulent air conditions.) After all approach obstacles are cleared, smoothly reduce power and maintain the approach speed by lowering the nose of the airplane. Touchdown should be made with power off and on the main wheels first. Immediately after touchdown, lower the nose wheel and apply heavy braking as required. For maximum brake effectiveness, retract the flaps, hold the control wheel full back, and apply maximum brake pressure without sliding the tires.

CROSSWIND LANDING

When landing in a strong crosswind, use the minimum flap setting required for the field length. Although the crab or combination method of drift correction may be used, the wing low method gives the best control. After touchdown, hold a straight course with the steerable nose wheel and occasional braking if necessary.

The maximum allowable crosswind velocity is dependent upon pilot capability as well as airplane limitations. Operation in direct crosswinds of 20 knots has been demonstrated.

BALKED LANDING

In a balked landing (go-around) climb, reduce the flap setting to 20° immediately after full power is applied. After all obstacles are cleared and a safe altitude and airspeed are obtained, the wing flaps should be retracted.

COLD WEATHER OPERATION

Special consideration should be given to the operation of the airplane fuel system during the winter season or prior to any flight in cold temperatures. Proper preflight draining of the fuel system is especially important and will eliminate any free water accumulation. The use of additives such as isopropyl alcohol, ethylene glycol monomethyl ether or diethylene glycol monomethyl ether may also be desirable. Refer to Section 8 for information on the proper use of additives.

Cold weather often causes conditions which require special care during airplane operations. Even small accumulations of frost, ice, or snow must be removed, particularly from wing, tail and all control surfaces to assure satisfactory flight performance and handling. Also, control surfaces must be free of any internal accumulations of ice or snow.

If snow or slush covers the takeoff surface, allowance must be made for takeoff distances which will be increasingly extended as the snow or slush depth increases. The depth and consistency of this cover can, in fact, prevent takeoff in many instances.

NOTE

The waste gate controller will not respond quickly to variations in manifold pressure when oil temperature is near the lower limit of the green arc. Therefore, under these conditions, throttle motion should be made slowly and care should be exercised to prevent exceeding the 39 inches Hg manifold pressure limit. In addition, the fuel flow indications may exceed 34 GPH on takeoff if the mixture isn't leaned to compensate.

The Turbo-System engine installation has been designed such that a winterization kit is not required. With the cowl flaps fully closed, engine temperature will be normal (in the green arc range) in outside air temperature as low as 20° to 30°C below standard. When cooler surface temperatures are encountered, the normal air temperature inversion will result in warmer temperatures at cruise altitudes above 5000 feet.

If low altitude cruise in very cold temperature results in engine temperature below the green arc, increasing cruise altitude or cruise power will increase engine temperature into the green arc. Cylinder head temperatures will increase approximately 50°F as cruise altitudes increase from 5000 feet to 24,000 feet.

During let-down, observe engine temperatures closely and carry sufficient power to maintain them in the recommended operating range.

STARTING

WARNING

WHEN PULLING THE PROPELLER THROUGH BY HAND, TREAT IT AS IF THE IGNITION SWITCH IS TURNED ON. A LOOSE OR BROKEN GROUND WIRE ON EITHER MAGNETO COULD CAUSE THE ENGINE TO FIRE.

Prior to starting on cold mornings, it is advisable to pull the propeller through several times by hand to "break loose" or "limber" the oil, thus conserving battery energy.

When air temperatures are below 20°F (-6°C), the use of an external preheater and an external power source are recommended whenever possible to obtain positive starting and to reduce wear and abuse to the engine and electrical system. Preheat will thaw the oil trapped in the oil cooler, which probably will be congealed prior to starting in extremely cold temperatures.

When using an external power source, the master switch must be in the OFF position before connecting the external power source to the airplane receptacle. See Section 7, Ground Service Plug Receptacle, for external power source operations.

COLD WEATHER OPERATION (Continued)

STARTING (Continued)

Cold weather starting procedures are the same as the normal starting procedures. Use caution to prevent inadvertent forward movement of the airplane during starting when parked on snow or ice.

NOTE

If the engine does not start during the first few attempts, or if engine firing diminishes in strength, it is probable that the spark plugs have been frosted over. Preheat must be used before another start is attempted.

During cold weather operations, no indication will be apparent on the oil temperature gage prior to takeoff if outside air temperatures are very cold. After a suitable warm up period (2 to 5 minutes at 1000 RPM), accelerate the engine several times to higher engine RPM. If the engine accelerates smoothly and the oil pressure remains normal and steady, the airplane is ready for takeoff.

HOT WEATHER OPERATION

Refer to the general warm temperature starting information under Starting Engine in this section. Avoid prolonged engine operation on the ground.

NOISE CHARACTERISTICS AND NOISE REDUCTION

The certificated takeoff noise level for the Model T206H at 3600 pounds maximum weight is 75.8 dB(A) per 14CFR Part 36 Appendix G and 79.9 dB(A) per ICAO Annex 16 Chapter 10. No determination has been made that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

(Continued Next Page)

NOISE CHARACTERISTICS AND NOISE REDUCTION (Continued)

For reduced noise levels, it is desirable to select the lowest RPM and manifold pressure combination in the green arc ranges (consistent with safe operating practice under prevailing flight conditions) that will provide smooth engine operation and required performance.

The following procedures are suggested to minimize the effect of airplane noise on the public:

1. Pilots operating airplanes under VFR over outdoor assemblies of persons, recreational and park areas, and other noise sensitive areas 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.

2. During departure from or approach to an airport, climb after takeoff and descent for landing should be made so as to avoid prolonged flight at low altitude near noise sensitive areas.

NOTE

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

SECTION 5
PERFORMANCE

TABLE OF CONTENTS

	Page
Introduction	5-3
Use of Performance Charts	5-3
Sample Problem	5-3
Takeoff	5-4
Cruise	5-5
Fuel Required	5-6
Landing	5-8
Demonstrated Operating Temperature	5-8
Figure 5-1, Airspeed Calibration - Normal Static Source	5-9
Airspeed Calibration - Alternate Static Source	5-10
Figure 5-2, Altimeter Correction	5-13
Figure 5-3, Temperature Conversion Chart	5-14
Figure 5-4, Stall Speeds	5-15
Figure 5-5, Crosswind Components	5-16
Figure 5-6, Takeoff Distance - 3600 Lbs	5-17
Takeoff Distance - 3300 Lbs	5-18
Takeoff Distance - 3000 Lbs	5-19
Figure 5-7, Maximum Rate of Climb	5-20
Figure 5-8, Time, Fuel, and Distance to Climb	5-21
Figure 5-9, Cruise Performance	5-23
Figure 5-10, Range Profile	5-37
Figure 5-11, Endurance Profile	5-41
Figure 5-12, Landing Distance	5-45/5-46

INTRODUCTION

Performance data charts on the following pages are presented so that you may know what to expect from the airplane under various conditions, and also, to facilitate the planning of flights in detail and with reasonable accuracy. The data in the charts has been computed from actual flight tests with the airplane and engine in good condition and using average piloting techniques.

It should be noted that performance information presented in the range and endurance profile charts allows for 45 minutes reserve fuel at the specified cruise power. Fuel flow data for cruise is based on the recommended lean mixture setting at all altitudes. Some indeterminate variables such as mixture leaning technique, fuel metering characteristics, engine and propeller condition, and air turbulence may account for variations of 10% or more in range and endurance. Therefore, it is important to utilize all available information to estimate the fuel required for the particular flight and to flight plan in a conservative manner.

USE OF PERFORMANCE CHARTS

Performance data is presented in tabular or graphical form to illustrate the effect of different variables. Sufficiently detailed information is provided in the tables so that conservative values can be selected and used to determine the particular performance figure with reasonable accuracy.

SAMPLE PROBLEM

The following sample flight problem utilizes information from the various charts to determine the predicted performance data for a typical flight. Assume the following information has already been determined:

AIRPLANE CONFIGURATION:

Serials T20608001 thru T20608361:

Takeoff weight	3550 Pounds
Usable fuel	88.0 Gallons

(Continued Next Page)

SAMPLE PROBLEM (Continued)

AIRPLANE CONFIGURATION:

Serials T20608362 and on:	
Takeoff weight	3550 Pounds
Usable fuel	87.0 Gallons
TAKEOFF CONDITIONS	
Field pressure altitude	3500 Feet
Temperature	24°C (16°C above standard)
Wind component along runway	12 Knot Headwind
Field length	4000 Feet
CRUISE CONDITIONS:	
Total distance	475 Nautical Miles
Pressure altitude	11,500 Feet
Temperature	8°C
Expected wind enroute	10 Knot Headwind
LANDING CONDITIONS:	
Field pressure altitude	3000 Feet
Temperature	25°C
Field length	3000 Feet

TAKEOFF

The takeoff distance chart, Figure 5-6, should be consulted, keeping in mind that distances shown are based on the short field technique. Conservative distances can be established by reading the chart at the next higher value of weight, altitude and temperature. For example, in this particular sample problem, the takeoff distance information presented for a weight of 3600 pounds, pressure altitude of 4000 feet and a temperature of 30°C should be used and results in the following:

Ground roll	1310 Feet
Total distance to clear a 50-foot obstacle	2430 Feet

(Continued Next Page)

SAMPLE PROBLEM (Continued)

TAKEOFF (Continued)

These distances are well within the available takeoff field length. However, a correction for the effect of wind may be made based on Note 2 of the takeoff chart. The correction for a 12 knot headwind is:

$$\frac{12 \text{ Knots}}{10 \text{ Knots}} \times 10\% = 12\% \text{ Decrease}$$

This results in the following distances, corrected for wind:

Ground roll, zero wind	1310
Decrease in ground roll (1310 feet X 12%)	-157
Corrected ground roll	1153 Feet
Total distance to clear a 50-foot obstacle, zero wind	2430
Decrease in total distance (2430 feet X 12%)	-291
Corrected total distance to clear 50-foot obstacle	2139 Feet

CRUISE

The cruising altitude should be selected based on a consideration of trip length, winds aloft, and the airplane's performance. A typical cruising altitude and the expected wind enroute have been given for this sample problem. However, the power setting selection for cruise must be determined based on several considerations. These include the cruise performance characteristics presented in Figure 5-9, the range profile charts presented in Figure 5-10, and the endurance profile charts presented in Figure 5-11.

(Continued Next Page)

SAMPLE PROBLEM (Continued)

CRUISE (Continued)

The relationship between power and range is illustrated by the range profile chart. Considerable fuel savings and longer range result when lower power settings are used. For this sample problem, a cruise power of approximately 70% will be used.

The cruise performance chart, Figure 5-9, is entered at 12,000 feet altitude and 20°C above standard temperature. These values most nearly correspond to the planned altitude and expected temperature conditions. The engine speed chosen is 2400 RPM and 30 inches of manifold pressure, which results in the following:

Power	70%
True airspeed	151 Knots
Cruise fuel flow	17.9 GPH

FUEL REQUIRED

The total fuel requirement for the flight may be estimated using the performance information in Figure 5-8 and Figure 5-9. For this sample problem, Figure 5-8 shows that a climb from 4000 feet to 12,000 feet requires 4.6 gallons of fuel. The corresponding distance during the climb is 24 nautical miles. These values are for a standard temperature and are sufficiently accurate for most flight planning purposes. However, a further correction for the effect of temperature may be made as noted on the climb chart. The approximate effect of a non-standard temperature is to increase the time, fuel, and distance by 10% for each 8°C above standard temperature, due to the lower rate of climb. In this case, assuming a temperature 16°C above standard, the correction would be:

$$\frac{16^\circ}{8^\circ C} \times 10\% = 20\% \text{ Increase}$$

(Continued Next Page)

SAMPLE PROBLEM (Continued)

FUEL REQUIRED (Continued)

With this factor included, the fuel estimate would be calculated as follows:

Fuel to climb, standard temperature	4.6
Increase due to non-standard temperature (4.6 X 20%)	1.0
Corrected fuel to climb	5.6 Gallons

Using a similar procedure for the distance to climb results in 29 nautical miles.

The resultant cruise distance is:

Total distance	475
Climb distance	-29
Cruise distance	446 Nautical Miles

With an expected 10 knot headwind, the ground speed for cruise is predicted to be:

151
-10
141 Knots

Therefore, the time required for the cruise portion of the trip is:

$$\frac{446 \text{ Nautical Miles}}{141 \text{ Knots}} = 3.2 \text{ Hours}$$

The fuel required for cruise is:

3.2 hours X 17.9 gallons/hour = 57.3 Gallons

(Continued Next Page)

SAMPLE PROBLEM (Continued)

FUEL REQUIRED (Continued)

A 45-minute reserve requires:

$$\frac{45}{60} \times 17.9 \text{ gallons / hour} = 13.4 \text{ Gallons}$$

The total estimated fuel required is as follows:

Engine start, taxi, and takeoff	2.6
Climb	5.6
Cruise	57.3
Reserve	13.4
Total fuel required	78.9 Gallons

Once the flight is underway, ground speed checks will provide a more accurate basis for estimating the time enroute and the corresponding fuel required to complete the trip with ample reserve.

LANDING

A procedure similar to takeoff should be used for estimating the landing distance at the destination airport. Figure 5-12 presents landing distance information for the short field technique. The distances corresponding to 3000 feet and 30°C are as follows:

Ground roll	865 Feet
Total distance to clear a 50-foot obstacle	1580 Feet

A correction for the effect of wind may be made based on Note 2 of the landing chart, using the same procedure as outlined for takeoff.

DEMONSTRATED OPERATING TEMPERATURE

Satisfactory engine cooling has been demonstrated for this airplane with an outside air temperature 23°C above standard. This is not to be considered as an operating limitation. Reference should be made to Section 2 for engine operating limitations.

AIRSPEED CALIBRATION

NORMAL STATIC SOURCE

Condition: Power required for level flight or maximum power descent.

FLAPS UP														
KIAS	---	60	70	80	90	100	110	120	130	140	150	160	170	180
KCAS	---	65	72	80	89	99	108	118	128	138	148	158	168	177
FLAPS 20°														
KIAS	50	60	70	80	90	100	---	---	---	---	---	---	---	---
KCAS	54	59	68	78	89	99	---	---	---	---	---	---	---	---
FLAPS FULL														
KIAS	50	60	70	80	90	100	---	---	---	---	---	---	---	---
KCAS	56	62	71	80	90	100	---	---	---	---	---	---	---	---

Figure 5-1. Airspeed Calibration (Sheet 1 of 4)
Serials T20608001 thru T20608361.

AIRSPEED CALIBRATION

ALTERNATE STATIC SOURCE

HEATER ON, VENTS AND WINDOWS CLOSED
CABIN HEAT/CABIN AIR AND DEFROSTER ON MAXIMUM

Condition: Power required for level flight or maximum power descent.

FLAPS UP														
KIAS	---	60	70	80	90	100	110	120	130	140	150	160	170	180
KCAS	---	67	74	82	91	99	109	118	128	138	148	159	170	180
FLAPS 20°														
KIAS	50	60	70	80	90	100	---	---	---	---	---	---	---	---
KCAS	59	65	72	80	90	101	---	---	---	---	---	---	---	---
FLAPS FULL														
KIAS	50	60	70	80	90	100	---	---	---	---	---	---	---	---
KCAS	58	65	74	83	93	104	---	---	---	---	---	---	---	---

Figure 5-1. Airspeed Calibration (Sheet 2)
Serials T20608001 thru T20608361.

AIRSPEED CALIBRATION

NORMAL STATIC SOURCE

Condition: Power required for level flight or maximum power descent.

FLAPS UP														
KIAS	---	60	70	80	90	100	110	120	130	140	150	160	170	180
KCAS	---	65	72	80	89	99	108	118	128	138	148	158	168	177
FLAPS 20°														
KIAS	50	60	70	80	90	100	110	120	---	---	---	---	---	---
KCAS	54	59	68	78	89	99	113	127	---	---	---	---	---	---
FLAPS FULL														
KIAS	50	60	70	80	90	100	---	---	---	---	---	---	---	---
KCAS	56	62	71	80	90	100	---	---	---	---	---	---	---	---

Figure 5-1. Airspeed Calibration (Sheet 3)
Serials T20608362 and on.

AIRSPEED CALIBRATION

ALTERNATE STATIC SOURCE

HEATER ON, VENTS AND WINDOWS CLOSED
CABIN HEAT/CABIN AIR AND DEFROSTER ON MAXIMUM

Condition: Power required for level flight or maximum power descent.

FLAPS UP														
KIAS	---	60	70	80	90	100	110	120	130	140	150	160	170	180
KCAS	---	67	74	82	91	99	109	118	128	138	148	159	170	180
FLAPS 20°														
KIAS	50	60	70	80	90	100	110	120	---	---	---	---	---	---
KCAS	59	65	72	80	90	101	110	123	---	---	---	---	---	---
FLAPS FULL														
KIAS	50	60	70	80	90	100	---	---	---	---	---	---	---	---
KCAS	58	65	74	83	93	104	---	---	---	---	---	---	---	---

Figure 5-1. Airspeed Calibration (Sheet 4)
Serials T20608362 and on.

ALTIMETER CORRECTION

ALTERNATE STATIC SOURCE

NOTE:

Add correction to desired altitude to obtain indicated altitude to fly.
Windows closed, ventilators closed, cabin heater, cabin air, and defroster on maximum.

CONDITIONS:

Power required for level flight or maximum power descent cruise configuration. Altimeter corrections for the takeoff and landing configuration are less than 50 feet.

CONDITION FLAPS UP	CORRECTION TO BE ADDED-FEET KIAS - alternate static source **ON**					
	60	80	100	120	140	160
S.L.	50	10	-20	-20	-10	0
5000 ft.	50	10	-20	-20	-10	0
10,000 ft.	60	10	-20	-30	-10	0
15,000 ft.	70	10	-30	-30	-10	0

Figure 5-2. Altimeter Correction

TEMPERATURE CONVERSION CHART

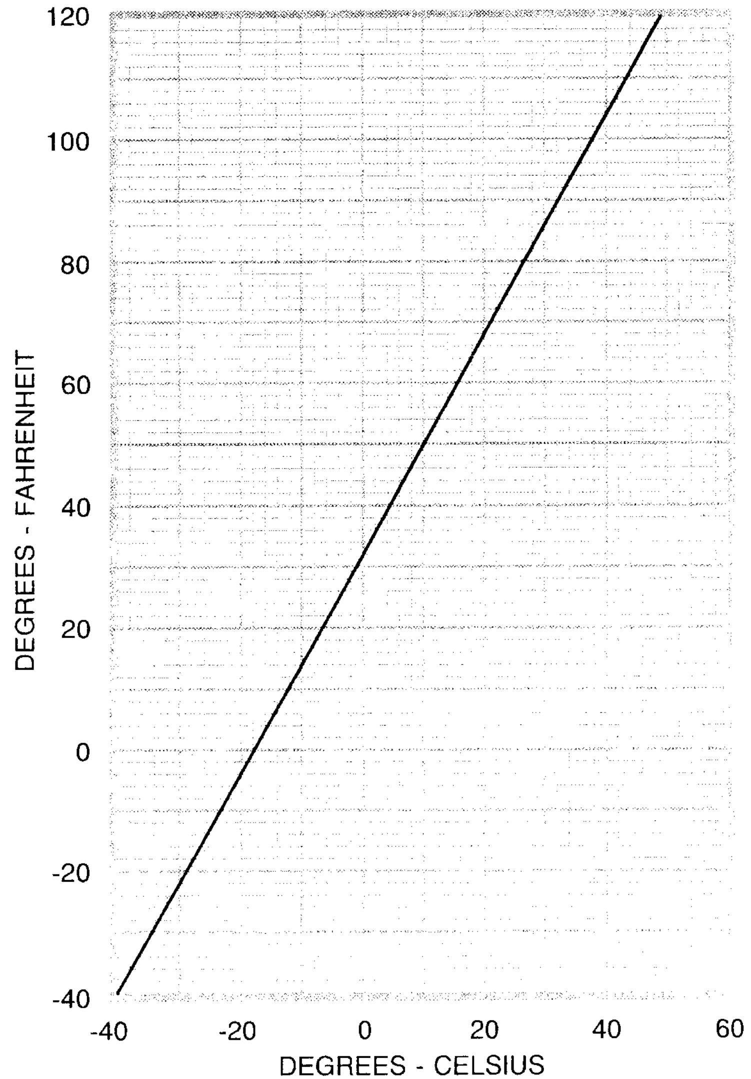


Figure 5-3. Temperature Conversion Chart

STALL SPEEDS AT 3600 POUNDS

Conditions:
Power Off

MOST REARWARD CENTER OF GRAVITY

ANGLE OF BANK

FLAP SETTING	ANGLE OF BANK							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	50	62	54	67	59	74	71	88
20°	43	57	46	61	51	68	61	81
40°	39	54	42	58	46	64	55	76

MOST FORWARD CENTER OF GRAVITY

ANGLE OF BANK

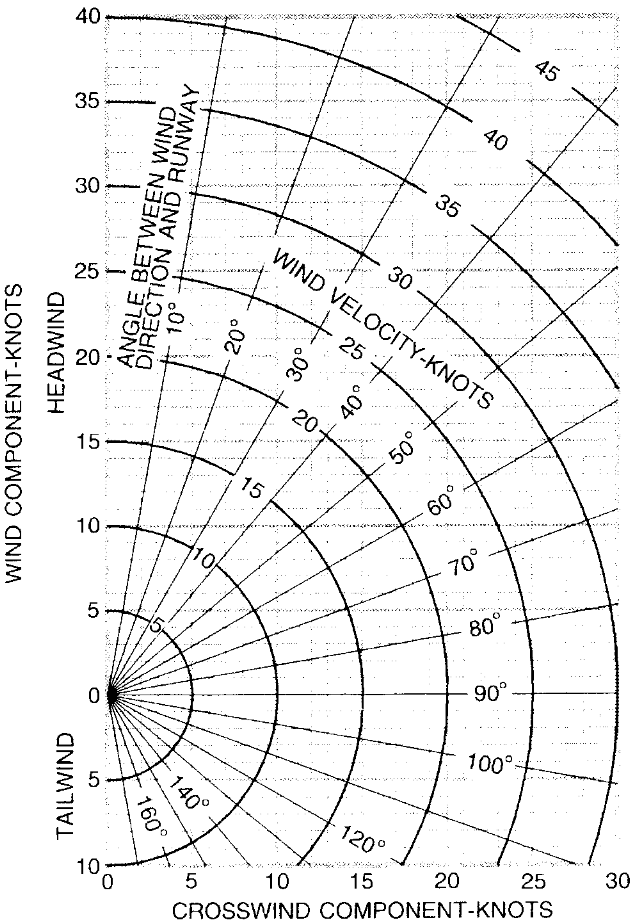
FLAP SETTING	ANGLE OF BANK							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	59	67	63	72	70	80	83	95
20°	50	60	54	65	59	71	71	85
40°	47	57	51	61	56	68	66	81

NOTES:

1. Altitude loss during a stall recovery may be as much as 360 feet.
2. KIAS values are approximate.

Figure 5-4. Stall Speeds

CROSSWIND COMPONENTS



NOTE: Maximum Demonstrated Crosswind velocity is 20 knots (Not a limitation).

Figure 5-5. Crosswind Components

SHORT FIELD TAKEOFF DISTANCE AT 3600 POUNDS

CONDITIONS:
Flaps 20°
2500 RPM, 39 inches Hg. and Mixture set at 34 GPH
Prior to Brake Release
Cowl Flaps Open
Paved, level, dry runway
Zero Wind
Lift Off: 64 KIAS
Speed at 50 Ft: 74 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	825	1575	885	1685	945	1800	1015	1920	1085	2050
1000	875	1665	940	1785	1010	1905	1080	2035	1155	2170
2000	935	1765	1005	1890	1075	2020	1150	2160	1230	2305
3000	1000	1870	1070	2005	1150	2145	1230	2290	1315	2445
4000	1065	1985	1145	2125	1225	2275	1310	2430	1400	2595
5000	1135	2105	1220	2255	1310	2415	1400	2580	1500	2765
6000	1215	2235	1305	2395	1405	2570	1505	2760	1615	2955
7000	1300	2380	1405	2560	1510	2750	1620	2950	1735	3160
8000	1400	2545	1510	2735	1625	2940	1740	3155	1865	3380

NOTES:

1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 10 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2.5 knots.
3. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.

Figure 5-6. Short Field Takeoff Distance (Sheet 1 of 3)

SHORT FIELD TAKEOFF DISTANCE AT 3300 POUNDS

CONDITIONS:
Flaps 20°
2500 RPM, 39 inches Hg. and Mixture set at 34 GPH
Prior to Brake Release
Cowl Flaps Open
Paved, level, dry runway
Zero Wind
Lift Off: 61 KIAS
Speed at 50 Ft: 71 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	675	1320	725	1410	775	1505	830	1600	885	1705
1000	720	1395	770	1490	825	1590	885	1695	945	1805
2000	765	1475	825	1580	880	1685	945	1795	1010	1915
3000	820	1565	880	1670	940	1785	1005	1905	1075	2030
4000	875	1655	935	1770	1005	1895	1075	2020	1145	2150
5000	930	1755	1000	1880	1070	2005	1145	2140	1225	2290
6000	995	1865	1070	1995	1150	2135	1230	2285	1320	2445
7000	1065	1985	1150	2130	1235	2280	1325	2440	1420	2610
8000	1145	2115	1235	2270	1325	2435	1425	2605	1525	2785

NOTES:

1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 10 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2.5 knots.
3. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.

Figure 5-6. Short Field Takeoff Distance (Sheet 2)

SHORT FIELD TAKEOFF DISTANCE AT 3000 POUNDS

CONDITIONS:
Flaps 20°
2500 RPM, 39 inches Hg. and Mixture set at 34 GPH
Prior to Brake Release
Cowl Flaps Open
Paved, level, dry runway
Zero Wind
Lift Off: 57 KIAS
Speed at 50 Ft: 67 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	545	1100	585	1175	625	1250	670	1330	715	1410
1000	580	1160	625	1240	665	1320	715	1405	760	1490
2000	620	1230	665	1310	710	1395	760	1485	810	1580
3000	660	1300	710	1385	760	1475	810	1570	865	1675
4000	705	1375	755	1465	810	1565	865	1665	925	1770
5000	750	1455	805	1555	865	1655	925	1765	990	1885
6000	805	1540	860	1645	925	1760	9995	1880	1060	2010
7000	860	1640	925	1755	995	1880	1065	2005	1140	2140
8000	925	1745	995	1870	1070	2005	1145	2140	1225	2280

NOTES:

1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 10 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2.5 knots.
3. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.

Figure 5-6. Short Field Takeoff Distance (Sheet 3)

MAXIMUM RATE-OF-CLIMB

CONDITIONS:

Flaps Up
2500 RPM
Cowl Flaps Open

PRESS ALT	MP	GPH
S.L. to 17,000	39	34
18,000	37	30.5
20,000	35	28.5
22,000	33	26.5
24,000	31	24.5

WEIGHT LBS	PRESS ALT FT	CLIMB SPEED KIAS	RATE OF CLIMB - FPM			
			-20°C	0°C	20°C	40°C
3600	S.L.	87	1305	1160	1015	865
	2000	87	1235	1090	945	795
	4000	87	1170	1025	880	730
	6000	87	1100	955	810	660
	8000	87	1030	890	745	600
	10,000	87	970	825	685	545
	12,000	87	900	760	625	485
	14,000	87	830	695	560	430
	16,000	87	765	635	510	385
	20,000	81	515	400	285	175
	24,000	79	230	120	- - -	- - -
3300	S.L.	85	1485	1330	1180	1025
	2000	85	1410	1260	1105	950
	4000	85	1340	1190	1040	885
	6000	85	1265	1120	970	815
	8000	85	1195	1050	900	750
	10,000	85	1130	985	840	695
	12,000	85	1060	915	775	635
	14,000	85	990	850	715	580
	16,000	85	925	790	660	530
	20,000	79	670	550	435	325
	24,000	77	370	260	155	- - -
3000	S.L.	83	1695	1530	1370	1205
	2000	83	1615	1455	1290	1130
	4000	83	1540	1385	1225	1060
	6000	83	1460	1310	1155	990
	8000	83	1385	1235	1085	925
	10,000	83	1315	1170	1015	865
	12,000	83	1240	1095	950	805
	14,000	83	1170	1030	890	750
	16,000	83	1105	970	835	700
	20,000	77	840	720	605	485
	24,000	75	525	415	310	210

Figure 5-7. Maximum Rate of Climb

TIME, FUEL AND DISTANCE TO CLIMB AT 3600 POUNDS

MAXIMUM RATE OF CLIMB

CONDITIONS:

Flaps Up
2500 RPM
Cowl Flaps Open
Standard Temperature

PRESS ALT	MP	GPH
S.L. to 17,000	39	34
18,000	37	30.5
20,000	35	28.5
22,000	33	26.5
24,000	31	24.5

PRESS ALT FT	CLIMB SPEED KIAS	RATE OF CLIMB FPM	FROM SEA LEVEL		
			TIME IN MIN	FUEL USED GAL	DIST NM
S.L.	87	1050	0	0.0	0
2000	87	1010	2	1.1	3
4000	87	975	4	2.2	6
6000	87	935	6	3.4	9
8000	87	895	8	4.7	13
10,000	87	860	11	6.0	16
12,000	87	820	13	7.3	20
14,000	87	780	15	8.8	25
16,000	87	745	18	10.2	30
18,000	82	665	21	11.8	35
20,000	81	545	24	13.4	41
22,000	80	420	29	15.4	49
24,000	79	300	34	17.8	60

NOTES:

1. Add 2.6 gallons of fuel for engine start, taxi and takeoff allowance.
2. Increase time, fuel and distance by 10% for each 10°C above standard temperature.
3. Distances shown are based on zero wind.

Figure 5-8. Time, Fuel and Distance to Climb (Sheet 1 of 4)

TIME, FUEL AND DISTANCE TO CLIMB AT 3300 POUNDS

MAXIMUM RATE OF CLIMB

CONDITIONS:

Flaps Up
2500 RPM
Cowl Flaps Open
Standard Temperature

PRESS ALT	MP	GPH
S.L. to 17,000	39	34
18,000	37	30.5
20,000	35	28.5
22,000	33	26.5
24,000	31	24.5

PRESS ALT FT	CLIMB SPEED KIAS	RATE OF CLIMB FPM	FROM SEA LEVEL		
			TIME IN MIN	FUEL USED GAL	DIST NM
S.L.	85	1215	0	0.0	0
2000	85	1175	2	1.0	2
4000	85	1140	3	1.9	5
6000	85	1095	5	3.0	8
8000	85	1055	7	4.0	11
10,000	85	1020	9	5.1	14
12,000	85	980	11	6.2	17
14,000	88	940	13	7.4	21
16,000	88	905	15	8.7	25
18,000	88	825	18	9.9	29
20,000	87	695	20	11.2	34
22,000	87	565	24	12.7	39
24,000	86	440	28	14.4	47

NOTES:

1. Add 2.6 gallons of fuel for engine start, taxi and takeoff allowance.
2. Increase time, fuel and distance by 10% for each 10°C above standard temperature.
3. Distances shown are based on zero wind.

Figure 5-8. Time, Fuel and Distance to Climb (Sheet 2)

TIME, FUEL AND DISTANCE TO CLIMB AT 3000 POUNDS

MAXIMUM RATE OF CLIMB

CONDITIONS:

Flaps Up
2500 RPM
Cowl Flaps Open
Standard Temperature

PRESS ALT	MP	GPH
S.L. to 17,000	39	34
18,000	37	30.5
20,000	35	28.5
22,000	33	26.5
24,000	31	24.5

PRESS ALT FT	CLIMB SPEED KIAS	RATE OF CLIMB FPM	FROM SEA LEVEL		
			TIME IN MIN	FUEL USED GAL	DIST NM
S.L.	83	1410	0	0.0	0
2000	83	1365	1	0.8	2
4000	83	1325	3	1.7	4
6000	83	1285	4	2.5	6
8000	83	1240	6	3.4	9
10,000	83	1205	8	4.4	12
12,000	83	1160	9	5.3	14
14,000	83	1120	11	6.3	17
16,000	83	1085	13	7.4	20
18,000	78	1005	15	8.4	24
20,000	77	870	17	9.4	28
22,000	76	730	20	10.6	32
24,000	75	595	23	11.9	38

NOTES:

1. Add 2.6 gallons of fuel for engine start, taxi and takeoff allowance.
2. Increase time, fuel and distance by 10% for each 10°C above standard temperature.
3. Distances shown are based on zero wind.

Figure 5-8. Time, Fuel and Distance to Climb (Sheet 3)

TIME, FUEL AND DISTANCE TO CLIMB

NORMAL CLIMB - 95 KIAS

CONDITIONS:
Flaps Up
2400 RPM, 30 inches Hg, 20 GPH Fuel Flow, Cowl Flaps Open.
Standard Temperature

WEIGHT LB	PRESS ALT FT	RATE OF CLIMB FPM	FROM SEA LEVEL		
			TIME IN MIN	FUEL USED GAL	DIST NM
3600	S.L.	690	0	0.0	0
	2000	665	3	1.0	5
	4000	640	6	2.0	10
	6000	615	9	3.1	15
	8000	590	13	4.2	21
	10,000	560	16	5.4	27
	12,000	535	20	6.6	34
	14,000	510	24	7.9	41
	16,000	485	28	9.2	49
	18,000	460	32	10.6	58
3300	S.L.	815	0	0.0	0
	2000	790	2	0.8	4
	4000	765	5	1.7	8
	6000	740	8	2.6	13
	8000	715	11	3.5	17
	10,000	690	13	4.5	22
	12,000	665	16	5.4	28
	14,000	635	19	6.5	34
	16,000	615	23	7.5	40
	18,000	585	26	8.7	47
3000	S.L.	965	0	0.0	0
	2000	935	2	0.7	3
	4000	910	4	1.4	7
	6000	885	7	2.2	10
	8000	860	9	2.9	14
	10,000	830	11	3.7	18
	12,000	805	14	4.5	23
	14,000	780	16	5.4	28
	16,000	755	19	6.3	33
	18,000	730	21	7.2	38

NOTES:

1. Add 2.6 gallons of fuel for engine start, taxi and takeoff allowance.
2. Increase time, fuel and distance by 10% for each 8°C above standard temperature.
3. Distances shown are based on zero wind.

Figure 5-8. Time, Fuel and Distance to Climb (Sheet 4)

CRUISE PERFORMANCE

PRESSURE ALTITUDE 2000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -9°C			STANDARD TEMPERATURE 11°C			20°C ABOVE STANDARD TEMP 31°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	74	139	18.9	69	138	17.8
	28	73	135	18.7	69	135	17.6	65	134	16.5
	26	68	131	17.4	64	131	16.4	60	130	15.4
	24	63	127	16.1	59	126	15.1	56	125	14.2
	22	57	122	14.7	54	121	13.8	51	119	13.0
	20	52	116	13.3	49	114	12.6	46	111	11.8
2300	30	75	137	19.2	71	137	18.1	67	136	17.0
	28	70	133	17.9	66	132	16.8	62	131	15.8
	26	64	128	16.4	61	128	15.5	57	126	14.5
	24	59	124	15.1	56	123	14.2	52	120	13.3
	22	54	119	13.8	51	117	13.0	48	114	12.2
	20	49	112	12.5	46	110	11.8	43	105	11.1
2200	30	72	134	18.4	68	134	17.3	64	133	16.3
	28	67	130	17.0	63	130	16.1	59	128	15.1
	26	61	125	15.5	57	124	14.6	54	122	13.7
	24	55	120	14.1	52	118	13.3	49	115	12.5
	22	50	115	12.9	48	112	12.2	45	109	11.5
	20	45	107	11.7	43	104	11.0	40	99	10.4
2100	30	69	132	17.6	65	132	16.6	61	130	15.5
	28	64	128	16.3	60	127	15.3	56	125	14.4
	26	58	123	14.9	55	122	14.0	51	119	13.1
	24	53	117	13.5	50	115	12.7	47	112	12.0
	22	48	112	12.3	45	109	11.7	42	105	11.0
2000	30	66	129	16.8	62	129	15.8	58	127	14.8
	28	60	125	15.5	57	124	14.6	53	122	13.7
	26	56	120	14.2	52	119	13.4	49	116	12.6
	24	50	114	12.9	47	112	12.2	44	108	11.5
	22	46	108	11.8	43	105	11.1	40	100	10.5

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 1 of 12)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 4000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -13°C			STANDARD TEMPERATURE 7°C			20°C ABOVE STANDARD TEMP 27°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	75	142	19.1	70	141	17.9
	28	74	138	18.9	70	138	17.8	65	137	16.7
	26	69	134	17.6	65	134	16.6	61	132	15.6
	24	64	130	16.3	60	129	15.4	56	127	14.4
	22	58	125	14.9	55	124	14.0	51	121	13.2
	20	53	119	13.5	50	117	12.8	47	113	12.0
2300	30	76	140	19.4	71	139	18.3	67	138	17.1
	28	71	136	18.0	66	135	17.0	62	134	15.9
	26	65	131	16.6	61	130	15.7	57	129	14.7
	24	60	126	15.3	56	125	14.4	53	123	13.5
	22	55	121	14.0	51	119	13.2	48	116	12.4
	20	49	115	12.7	47	112	12.0	44	108	11.3
2200	30	72	137	18.5	68	137	17.4	64	136	16.4
	28	67	133	17.1	63	132	16.1	59	131	15.1
	26	61	128	15.7	58	127	14.8	54	125	13.8
	24	56	122	14.3	53	121	13.5	49	118	12.7
	22	51	117	13.1	48	114	12.3	45	110	11.6
	20	46	109	11.8	43	106	11.2	41	101	10.6
2100	30	69	135	17.7	65	134	16.7	61	133	15.7
	28	64	130	16.4	60	130	15.4	57	128	14.5
	26	59	125	15.0	55	124	14.2	52	122	13.3
	24	53	120	13.6	50	118	12.9	47	114	12.1
	22	49	114	12.5	46	111	11.8	43	106	11.1
2000	30	66	132	16.9	62	132	16.0	59	130	15.0
	28	61	128	15.6	57	127	14.7	54	124	13.8
	26	56	123	14.4	53	121	13.5	50	118	12.7
	24	51	117	13.0	48	114	12.3	45	110	11.6
	22	46	110	11.9	44	107	11.3	41	102	10.7

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 2)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 6000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -17°C			STANDARD TEMPERATURE 3°C			20°C ABOVE STANDARD TEMP 23°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	75	145	19.2	70	144	18.0
	28	75	141	19.1	70	141	18.0	66	140	16.9
	26	69	137	17.7	65	136	16.7	61	135	15.6
	24	64	133	16.5	61	132	15.5	57	130	14.5
	22	59	127	15.0	55	126	14.1	52	123	13.3
	20	54	122	13.7	51	120	13.0	47	115	12.2
2300	30	76	142	19.5	72	142	18.3	67	141	17.2
	28	71	138	18.1	67	138	17.1	63	137	16.0
	26	65	134	16.7	62	133	15.8	58	131	14.8
	24	60	129	15.4	57	128	14.5	53	125	13.6
	22	55	123	14.1	52	121	13.3	49	118	12.5
	20	50	117	12.8	47	114	12.1	44	109	11.4
2200	30	73	140	18.6	68	139	17.5	64	138	16.4
	28	67	135	17.2	63	135	16.2	59	133	15.2
	26	62	130	15.8	58	129	14.8	54	127	13.9
	24	56	125	14.4	53	123	13.6	50	120	12.8
	22	51	119	13.1	48	116	12.4	45	112	11.7
	20	46	111	11.9	44	108	11.3	41	103	10.7
2100	30	70	137	17.8	66	137	16.8	62	135	15.7
	28	64	133	16.5	61	132	15.5	57	130	14.5
	26	59	128	15.1	56	127	14.3	52	124	13.4
	24	54	122	13.7	51	120	13.0	47	115	12.2
	22	49	116	12.6	46	112	11.9	43	108	11.2
2000	30	67	135	17.1	63	134	16.1	59	132	15.1
	28	61	130	15.7	58	129	14.8	54	127	13.9
	26	57	125	14.5	53	124	13.7	50	120	12.9
	24	51	119	13.1	48	116	12.4	45	111	11.6
	22	47	112	12.0	44	108	11.4	41	103	10.7

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 3)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 8000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -21°C			STANDARD TEMPERATURE -1°C			20°C ABOVE STANDARD TEMP 19°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	75	147	19.2	70	146	18.0
	28	75	144	19.1	70	144	18.0	66	142	16.9
	26	69	139	17.7	65	139	16.7	61	137	15.6
	24	65	135	16.5	61	134	15.6	57	132	14.6
	22	59	130	15.1	56	128	14.2	52	125	13.3
	20	54	124	13.8	51	121	13.0	48	117	12.3
2300	30	76	145	19.5	72	145	18.3	67	144	17.2
	28	71	141	18.2	67	140	17.1	63	139	16.0
	26	66	136	16.8	62	135	15.8	58	133	14.8
	24	61	131	15.5	57	130	14.6	54	127	13.7
	22	55	126	14.1	52	123	13.3	49	119	12.5
	20	50	119	12.9	48	115	12.2	45	111	11.5
2200	30	73	142	18.6	69	142	17.5	64	140	16.4
	28	67	138	17.2	63	137	16.2	59	135	15.2
	26	62	133	15.8	58	131	14.9	55	129	14.0
	24	56	127	14.4	53	125	13.6	50	121	12.8
	22	52	121	13.2	49	117	12.5	46	113	11.8
	20	47	113	12.1	44	109	11.4	41	104	10.8
2100	30	70	140	17.9	66	139	16.8	62	138	15.8
	28	65	135	16.5	61	134	15.5	57	132	14.6
	26	59	130	15.2	56	129	14.3	53	125	13.4
	24	54	124	13.8	51	121	13.0	48	117	12.3
	22	49	117	12.7	46	113	12.0	44	109	11.3
2000	30	67	137	17.1	63	137	16.1	59	135	15.1
	28	62	133	15.8	58	131	14.9	55	129	14.0
	26	57	128	14.6	54	126	13.8	51	122	12.9
	24	52	121	13.2	49	117	12.5	46	113	11.7
	22	47	113	12.1	44	109	11.4	42	104	10.8

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 4)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 10,000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -25°C			STANDARD TEMPERATURE -5°C			20°C ABOVE STANDARD TEMP 15°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	75	150	19.2	70	149	18.0
	28	75	147	19.2	71	146	18.0	66	145	16.9
	26	69	142	17.7	65	141	16.7	61	139	15.6
	24	65	138	16.6	61	137	15.6	57	134	14.7
	22	59	132	15.2	56	130	14.3	52	126	13.4
	20	54	126	13.9	51	123	13.1	48	119	12.4
2300	30	76	148	19.5	72	147	18.4	67	146	17.2
	28	71	144	18.2	67	143	17.1	63	141	16.1
	26	66	139	16.8	62	137	15.8	58	135	14.8
	24	61	134	15.5	57	132	14.6	54	128	13.7
	22	56	128	14.2	52	125	13.4	49	120	12.6
	20	51	121	13.0	48	117	12.3	45	112	11.6
2200	30	73	145	18.6	69	144	17.6	64	143	16.5
	28	67	140	17.2	63	139	16.2	59	137	15.2
	26	62	135	15.8	58	133	14.9	55	130	14.0
	24	57	129	14.5	53	126	13.6	50	122	12.8
	22	52	123	13.3	49	119	12.5	46	114	11.8
	20	47	115	12.2	45	111	11.5	42	105	10.9
2100	30	70	143	17.9	66	142	16.9	62	140	15.8
	28	65	138	16.6	61	137	15.6	57	134	14.6
	26	60	133	15.3	56	131	14.4	53	127	13.5
	24	54	126	13.9	51	123	13.1	48	118	12.3
	22	50	119	12.7	47	115	12.0	44	110	11.3
2000	30	67	140	17.2	63	139	16.2	59	137	15.2
	28	62	135	15.9	59	134	15.0	55	131	14.1
	26	58	130	14.7	54	128	13.9	51	124	13.0
	24	52	123	13.3	49	119	12.5	46	114	11.8
	22	47	115	12.2	45	111	11.5	42	105	10.9

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 5)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 12,000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -29°C			STANDARD TEMPERATURE -9°C			20°C ABOVE STANDARD TEMP 11°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	75	153	19.1	70	151	17.9
	28	74	149	19.0	70	148	17.9	66	147	16.8
	26	69	144	17.7	65	143	16.6	61	141	15.6
	24	65	140	16.5	61	138	15.6	57	135	14.6
	22	59	134	15.2	56	132	14.3	52	127	13.4
	20	55	128	14.0	51	124	13.2	48	120	12.4
2300	30	76	150	19.5	72	150	18.3	67	148	17.2
	28	71	146	18.1	67	145	17.0	62	143	16.0
	26	65	141	16.7	62	139	15.8	58	136	14.8
	24	61	136	15.5	57	133	14.6	53	129	13.7
	22	56	129	14.2	52	126	13.4	49	121	12.6
	20	51	122	13.0	48	118	12.3	45	113	11.6
2200	30	73	148	18.6	69	147	17.5	64	145	16.4
	28	67	142	17.1	63	141	16.1	59	138	15.1
	26	62	137	15.8	58	135	14.9	55	131	14.0
	24	56	131	14.4	53	127	13.6	50	123	12.8
	22	52	124	13.3	49	120	12.5	46	115	11.8
	20	47	116	12.2	45	111	11.5	42	105	10.9
2100	30	70	145	17.9	66	144	16.9	62	142	15.8
	28	65	140	16.5	61	139	15.6	57	135	14.6
	26	60	135	15.3	56	132	14.4	53	128	13.5
	24	54	128	13.9	51	124	13.1	48	119	12.3
	22	50	120	12.7	47	116	12.0	44	110	11.4
2000	30	67	143	17.2	63	142	16.2	60	139	15.2
	28	62	138	16.0	59	136	15.0	55	132	14.1
	26	58	132	14.8	54	129	13.9	51	125	13.1
	24	52	124	13.3	49	120	12.6	46	115	11.9
	22	48	116	12.2	45	112	11.6	42	105	10.9

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 6)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 14,000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -33°C			STANDARD TEMPERATURE -13°C			20°C ABOVE STANDARD TEMP 7°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	75	155	19.1	70	154	17.9
	28	74	151	18.9	70	151	17.8	65	149	16.7
	26	69	147	17.6	65	145	16.6	61	143	15.6
	24	64	142	16.5	61	140	15.5	57	136	14.5
	22	59	136	15.2	56	133	14.3	52	128	13.4
	20	55	130	14.0	52	126	13.2	48	120	12.4
2300	30	76	153	19.4	72	152	18.3	67	151	17.2
	28	70	148	18.0	66	147	17.0	62	145	15.9
	26	65	143	16.7	62	141	15.7	58	138	14.8
	24	60	137	15.4	57	135	14.5	53	130	13.6
	22	56	131	14.2	52	127	13.4	49	122	12.6
	20	51	123	13.0	48	119	12.3	45	113	11.6
2200	30	73	150	18.6	68	149	17.5	64	147	16.4
	28	67	144	17.1	63	143	16.1	59	140	15.1
	26	62	139	15.8	58	137	14.8	54	132	13.9
	24	56	132	14.4	53	128	13.6	50	123	12.8
	22	52	125	13.3	49	121	12.5	46	115	11.8
	20	47	116	12.1	44	111	11.5	42	105	10.8
2100	30	70	148	17.9	66	147	16.9	62	144	15.8
	28	65	142	16.5	61	140	15.6	57	137	14.6
	26	60	137	15.3	56	134	14.4	53	129	13.5
	24	54	129	13.9	51	125	13.1	48	120	12.3
	22	50	121	12.8	47	117	12.1	44	111	11.4
2000	30	67	145	17.3	64	144	16.3	60	141	15.3
	28	63	140	16.0	59	138	15.1	55	134	14.1
	26	58	134	14.8	54	131	13.9	51	126	13.1
	24	52	126	13.4	49	122	12.7	46	116	11.9
	22	48	117	12.3	45	113	11.6	42	106	11.0

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 7)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 16,000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -37°C			STANDARD TEMPERATURE -17°C			20°C ABOVE STANDARD TEMP 3°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	75	158	19.1	70	156	17.9
	28	74	154	18.8	69	153	17.7	65	150	16.6
	26	69	149	17.6	65	148	16.6	61	144	15.5
	24	64	144	16.4	60	142	15.4	57	137	14.5
	22	59	138	15.2	56	135	14.3	52	129	13.4
	20	55	131	14.0	52	127	13.2	48	121	12.4
2300	30	76	156	19.4	71	155	18.2	67	153	17.1
	28	70	150	17.9	66	149	16.9	62	146	15.8
	26	65	145	16.6	61	143	15.7	58	139	14.7
	24	60	139	15.4	57	136	14.5	53	131	13.6
	22	56	132	14.2	52	128	13.4	49	123	12.6
	20	51	124	13.0	48	119	12.3	45	113	11.6
2200	30	72	153	18.5	68	152	17.4	64	149	16.4
	28	66	146	17.0	63	145	16.0	59	141	15.0
	26	61	141	15.7	58	138	14.8	54	133	13.9
	24	56	133	14.4	53	129	13.5	50	124	12.7
	22	52	126	13.3	49	121	12.5	46	115	11.8
	20	47	117	12.1	44	111	11.4	42	103	10.8
2100	30	70	150	17.9	66	149	16.9	62	146	15.8
	28	64	144	16.5	61	142	15.5	57	138	14.6
	26	60	139	15.3	56	135	14.4	53	130	13.5
	24	54	130	13.9	51	126	13.1	48	120	12.3
	22	50	122	12.8	47	117	12.1	44	111	11.4
2000	30	68	148	17.3	64	146	16.3	60	143	15.3
	28	63	142	16.0	59	140	15.1	55	135	14.1
	26	58	136	14.8	55	132	14.0	51	127	13.1
	24	53	127	13.5	50	123	12.7	47	117	12.0
	22	48	119	12.3	45	113	11.7	42	106	11.0

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 8)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 18,000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -41°C			STANDARD TEMPERATURE -21°C			20°C ABOVE STANDARD TEMP -1°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	74	161	19.0	70	159	17.8
	28	73	156	18.7	69	155	17.6	65	152	16.5
	26	68	151	17.5	65	149	16.5	61	145	15.5
	24	63	145	16.2	60	142	15.3	56	137	14.3
	22	59	139	15.1	56	135	14.2	52	130	13.4
	20	55	132	14.0	51	127	13.2	48	121	12.4
2300	30	75	158	19.3	71	157	18.2	67	155	17.0
	28	70	152	17.8	65	151	16.7	61	147	15.7
	26	65	147	16.6	61	144	15.6	57	140	14.7
	24	60	140	15.3	56	136	14.4	53	131	13.5
	22	55	133	14.2	52	129	13.3	49	123	12.6
	20	51	125	13.0	48	119	12.3	45	112	11.6
2200	30	72	155	18.4	68	153	17.3	64	150	16.3
	28	66	148	16.9	62	146	15.9	58	141	14.9
	26	61	142	15.6	58	139	14.7	54	134	13.8
	24	56	134	14.3	53	130	13.5	49	124	12.7
	22	52	127	13.2	49	122	12.5	46	115	11.8
	20	47	117	12.0	44	111	11.4	41	101	10.8
2100	30	70	153	17.8	66	151	16.8	62	147	15.8
	28	64	146	16.4	61	144	15.5	57	139	14.5
	26	60	140	15.3	56	136	14.4	53	131	13.5
	24	54	131	13.9	51	127	13.1	48	120	12.3
	22	50	123	12.8	47	118	12.1	44	111	11.4
2000	30	68	150	17.3	64	148	16.3	60	144	15.3
	28	63	144	16.0	59	141	15.1	55	136	14.1
	26	58	138	14.9	55	134	14.0	51	128	13.1
	24	53	129	13.5	50	124	12.7	47	117	12.0
	22	48	120	12.4	45	114	11.7	43	105	11.0

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 9)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 20,000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -45°C			STANDARD TEMPERATURE -25°C			20°C ABOVE STANDARD TEMP -5°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	74	163	19.0	70	161	17.8
	28	73	158	18.6	68	157	17.5	64	153	16.4
	26	68	153	17.4	64	151	16.4	60	146	15.4
	24	63	147	16.1	59	143	15.2	56	138	14.2
	22	59	141	15.1	55	136	14.2	52	130	13.3
	20	54	133	13.9	51	128	13.1	48	121	12.4
2300	30	75	161	19.2	71	160	18.1	66	156	17.0
	28	69	154	17.7	65	152	16.6	61	148	15.6
	26	65	149	16.5	61	146	15.6	57	140	14.6
	24	59	141	15.2	56	137	14.3	52	131	13.4
	22	55	134	14.1	52	129	13.3	49	123	12.5
	20	50	125	12.9	48	119	12.2	45	111	11.5
2200	30	72	157	18.3	67	155	17.2	63	151	16.2
	28	66	150	16.8	62	147	15.8	58	142	14.8
	26	61	144	15.6	57	140	14.7	54	134	13.8
	24	56	135	14.2	52	130	13.4	49	123	12.6
	22	52	127	13.2	49	122	12.5	46	114	11.7
2100	30	70	155	17.8	66	153	16.8	61	148	15.7
	28	64	148	16.4	60	145	15.4	57	139	14.5
	26	60	142	15.2	56	137	14.4	53	131	13.5
	24	54	132	13.9	51	127	13.1	48	120	12.3
	22	50	124	12.8	47	118	12.1	44	109	11.4
2000	30	68	153	17.3	64	150	16.3	60	145	15.3
	28	63	146	16.0	59	142	15.1	55	137	14.1
	26	58	140	14.9	55	135	14.0	51	129	13.2
	24	53	130	13.5	50	125	12.8	47	117	12.0
	22	48	120	12.4	45	114	11.7	43	104	11.1

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 10)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 22,000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -49°C			STANDARD TEMPERATURE -29°C			20°C ABOVE STANDARD TEMP -9°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	---	---	---	---	---	---
	28	72	161	18.5	68	158	17.4	64	154	16.3
	26	68	155	17.3	64	152	16.3	60	147	15.3
	24	63	148	16.0	59	144	15.1	55	138	14.1
	22	59	142	15.0	55	137	14.1	52	130	13.3
	20	54	133	13.8	51	128	13.0	48	120	12.3
2300	30	---	---	---	---	---	---	---	---	---
	28	69	156	17.6	65	154	16.5	61	148	15.5
	26	64	150	16.4	60	146	15.5	57	141	14.5
	24	59	142	15.1	55	137	14.2	52	131	13.3
	22	55	135	14.1	52	129	13.2	49	122	12.5
	20	50	125	12.9	47	119	12.1	44	108	11.5
2200	30	---	---	---	---	---	---	---	---	---
	28	65	152	16.7	61	148	15.7	55	142	14.7
	26	61	145	15.5	57	140	14.6	53	134	13.7
	24	55	135	14.1	52	130	13.3	49	123	12.5
	22	51	128	13.1	48	121	12.4	45	112	11.7
2100	30	---	---	---	---	---	---	---	---	---
	28	64	150	16.3	60	146	15.4	56	140	14.4
	26	59	143	15.2	56	138	14.3	52	132	13.4
	24	54	133	13.8	51	128	13.0	48	120	12.3
	22	50	124	12.7	47	118	12.0	44	107	11.4
2000	30	---	---	---	---	---	---	---	---	---
	28	62	148	16.0	59	143	15.0	55	137	14.1
	26	58	141	14.9	55	136	14.0	51	129	13.2
	24	53	131	13.5	50	125	12.8	47	117	12.0

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 11)

CRUISE PERFORMANCE
PRESSURE ALTITUDE 24,000 FEET

CONDITIONS:
3600 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

RPM	MP	20°C BELOW STANDARD TEMP -53°C			STANDARD TEMPERATURE -33°C			20°C ABOVE STANDARD TEMP -13°C		
		% BPH	KTAS	GPH	% BPH	KTAS	GPH	% BPH	KTAS	GPH
2400	30	---	---	---	---	---	---	---	---	---
	28	72	163	18.4	68	160	17.3	63	155	16.2
	26	67	157	17.2	64	153	16.2	60	147	15.2
	24	62	149	15.9	58	144	15.0	55	137	14.0
	22	58	142	14.9	55	137	14.1	52	129	13.2
	20	54	133	13.7	51	127	12.9	47	117	12.2
2300	30	---	---	---	---	---	---	---	---	---
	28	68	158	17.5	64	155	16.4	60	149	15.4
	26	64	152	16.3	60	147	15.4	56	141	14.4
	24	59	143	15.0	55	137	14.1	52	130	13.2
	22	55	135	14.0	52	129	13.2	48	121	12.4
2200	30	---	---	---	---	---	---	---	---	---
	28	65	153	16.6	61	149	15.6	57	143	14.6
	26	60	145	15.4	57	140	14.5	53	133	13.6
	24	55	136	14.1	52	130	13.3	49	122	12.5
	22	51	128	13.1	48	121	12.4	45	110	11.6
2100	30	---	---	---	---	---	---	---	---	---
	28	64	151	16.2	60	147	15.3	56	140	14.4
	26	59	144	15.1	56	139	14.3	52	131	13.4
	24	54	134	13.8	51	128	13.0	48	118	12.3
2000	30	---	---	---	---	---	---	---	---	---
	28	62	149	15.9	59	144	15.0	55	138	14.1
	26	58	142	14.9	55	137	14.0	51	129	13.2
	24	53	132	13.5	50	125	12.8	47	115	12.0

NOTE:
1. For best fuel economy, operate at 1 gph leaner than shown in this chart or at peak T.I.T.
2. Some power settings may not be obtainable, but are listed to aid interpolation.
3. Power settings not approved for cruising are indicated by dashes.

Figure 5-9. Cruise Performance (Sheet 12)

RANGE PROFILE
45 MINUTES RESERVE
65 GALLONS USABLE FUEL

CONDITIONS:
3600 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature
Zero Wind

NOTE:
This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb up to 20,000 feet and maximum climb above 20,000 feet.

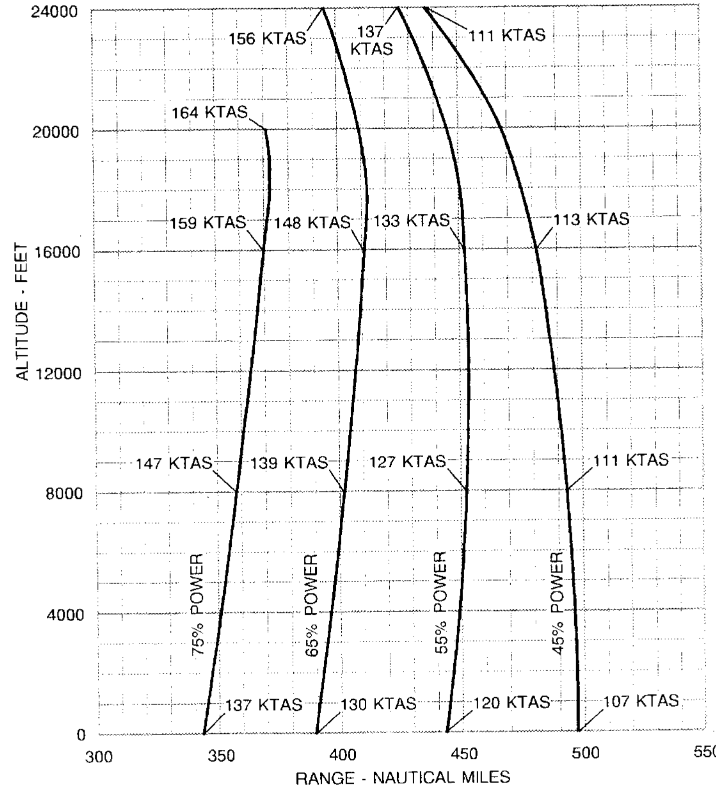


Figure 5-10. Range Profile (Sheet 1 of 4)
Serials T20608001 thru T20608361.

RANGE PROFILE
45 MINUTES RESERVE
88 GALLONS USABLE FUEL

CONDITIONS:
3600 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature
Zero Wind

NOTE:
This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb up to 20,000 feet and maximum climb above 20,000 feet.

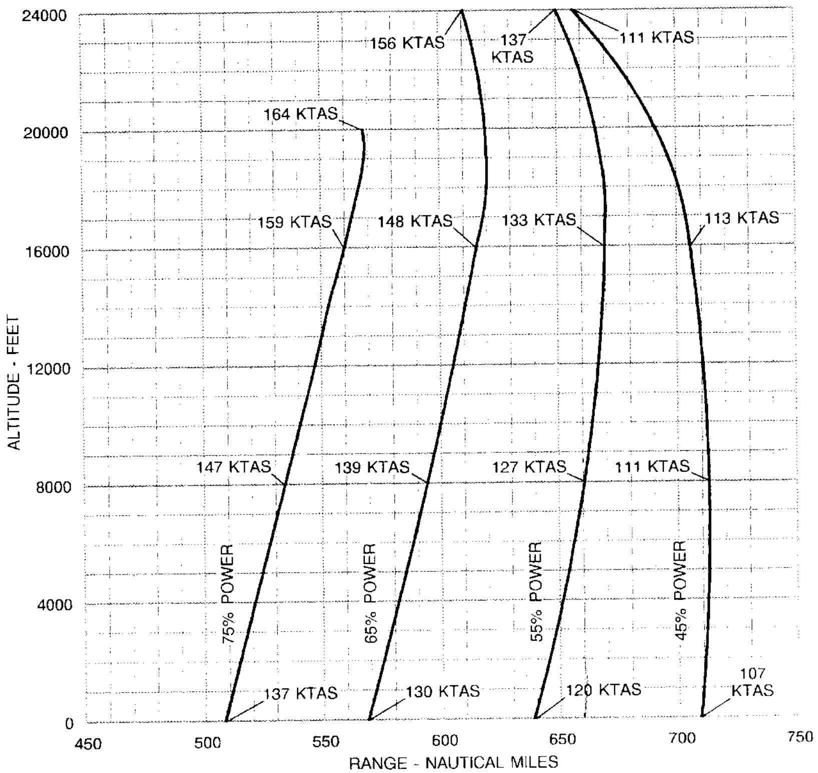


Figure 5-10. Range Profile (Sheet 2)
Serials T20608001 thru T20608361.

RANGE PROFILE
45 MINUTES RESERVE
64 GALLONS USABLE FUEL

CONDITIONS:
3600 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature
Zero Wind

NOTE:
This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb up to 20,000 feet and maximum climb above 20,000 feet.

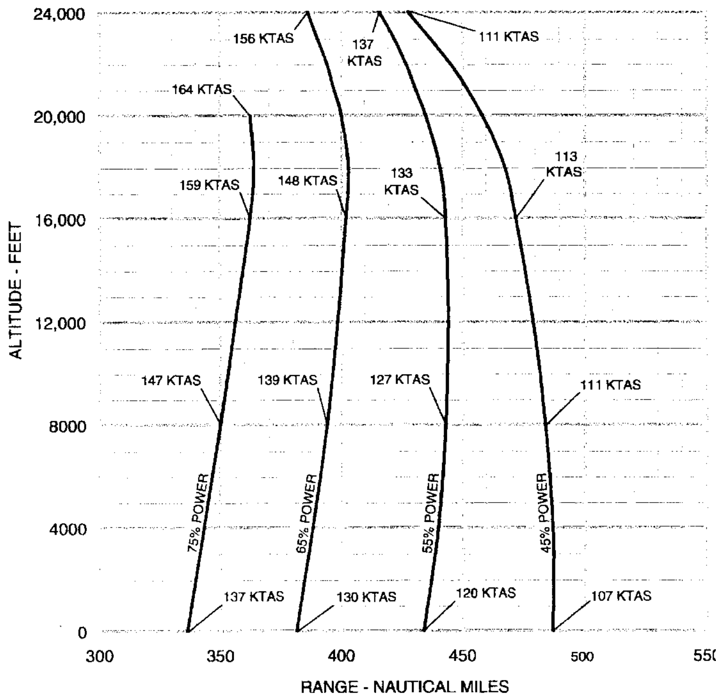


Figure 5-10. Range Profile (Sheet 3)
Serials T20608362 and on.

RANGE PROFILE
45 MINUTES RESERVE
87 GALLONS USABLE FUEL

CONDITIONS:
3600 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature
Zero Wind

NOTE:
This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb up to 20,000 feet and maximum climb above 20,000 feet.

B3574

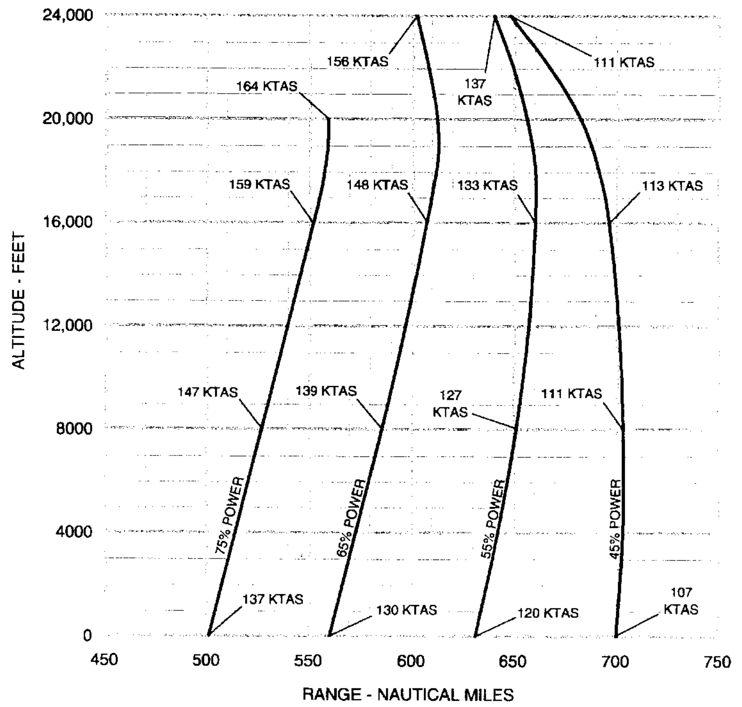


Figure 5-10. Range Profile (Sheet 4)
Serials T20608362 and on.

ENDURANCE PROFILE
45 MINUTES RESERVE
65 GALLONS USABLE FUEL

CONDITIONS:
3600 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature
Zero Wind

NOTE:
This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb up to 20,000 feet and maximum climb above 20,000 feet.

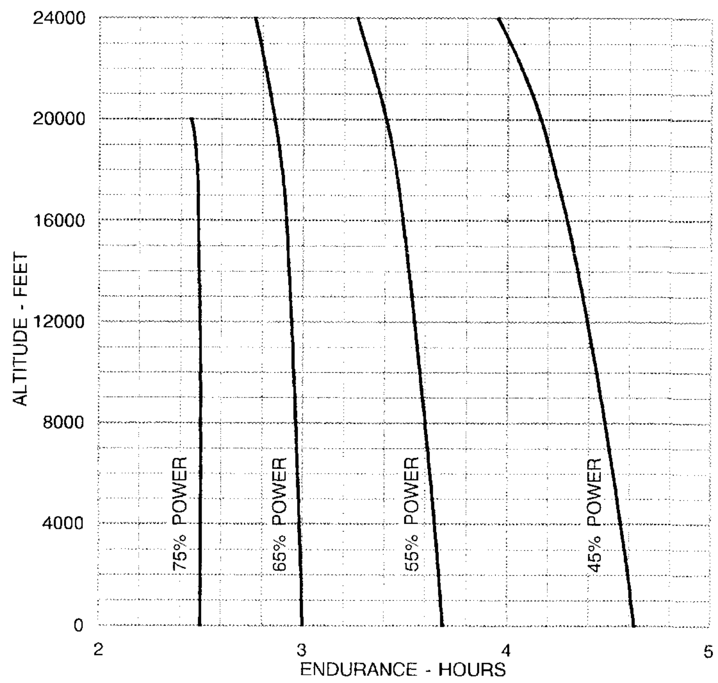


Figure 5-11. Endurance Profile (Sheet 1 of 4)
Serials T20608001 thru T20608361.

ENDURANCE PROFILE
45 MINUTES RESERVE
88 GALLONS USABLE FUEL

CONDITIONS:
3600 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature
Zero Wind

NOTE:
This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb up to 20,000 feet and maximum climb above 20,000 feet.

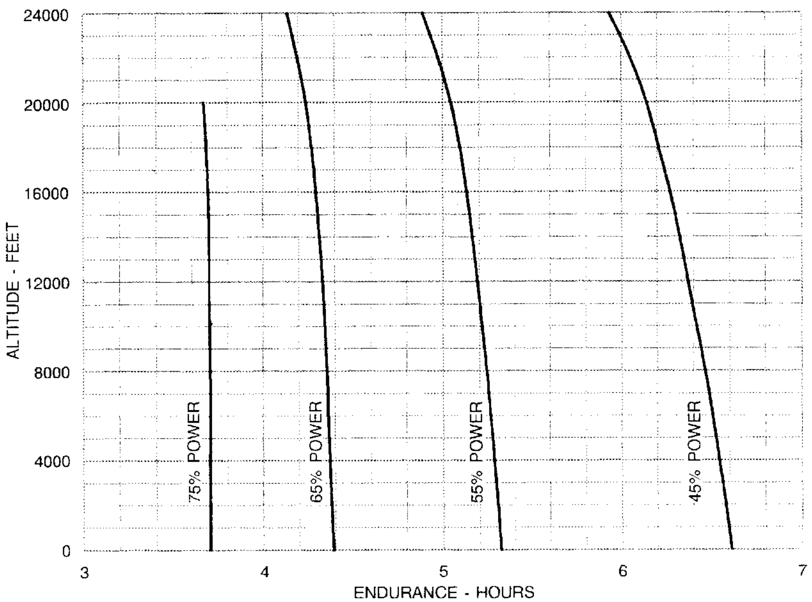


Figure 5-11. Endurance Profile (Sheet 2)
Serials T20608001 thru T20608361.

ENDURANCE PROFILE
45 MINUTES RESERVE
64 GALLONS USABLE FUEL

CONDITIONS:
3600 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature
Zero Wind

NOTE:
This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb up to 20,000 feet and maximum climb above 20,000 feet.

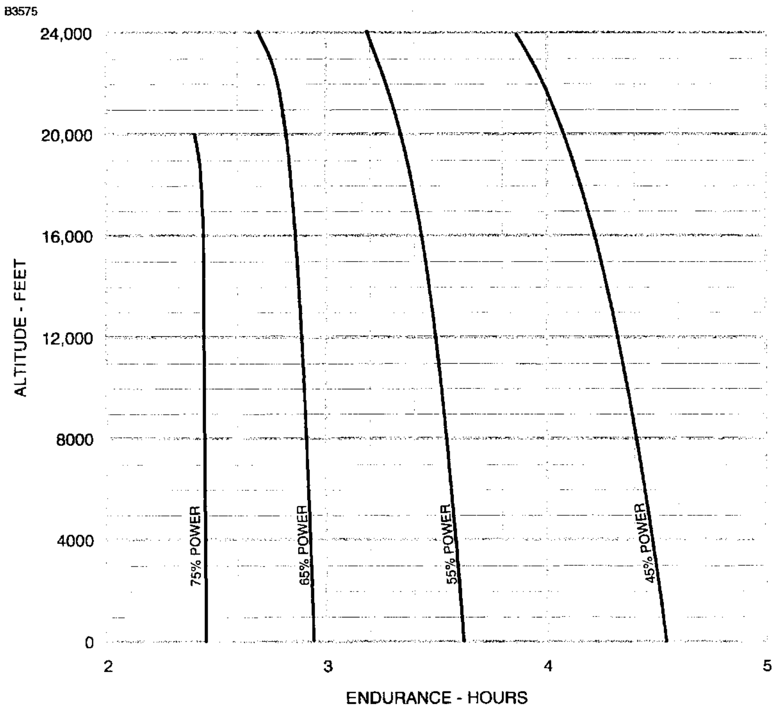


Figure 5-11. Endurance Profile (Sheet 3)
Serials T20608362 and on.

ENDURANCE PROFILE
45 MINUTES RESERVE
87 GALLONS USABLE FUEL

CONDITIONS:
3600 Pounds
Recommended Lean Mixture for Cruise
Standard Temperature
Zero Wind

NOTE:
This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during a normal climb up to 20,000 feet and maximum climb above 20,000 feet.

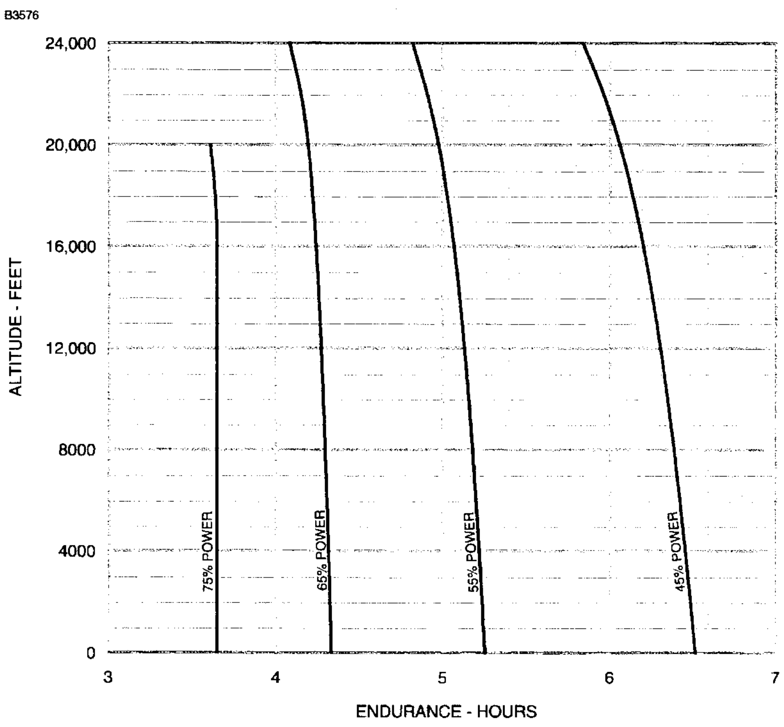


Figure 5-11. Endurance Profile (Sheet 4)
Serials T20608362 and on.

SHORT FIELD LANDING DISTANCE AT 3600 POUNDS

CONDITIONS:

Flaps 40°
Power Off
Maximum Braking
Paved, level, dry runway
Zero Wind
Speed at 50 Ft: 64 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	695	1340	720	1375	750	1415	775	1450	800	1490
1000	720	1375	750	1415	775	1450	800	1490	830	1530
2000	750	1415	775	1455	805	1495	830	1530	860	1575
3000	775	1455	805	1495	835	1540	865	1580	890	1615
4000	805	1495	835	1540	865	1580	895	1625	925	1665
5000	835	1540	870	1585	900	1630	930	1675	960	1715
6000	870	1590	900	1630	935	1680	965	1725	995	1770
7000	905	1635	935	1680	970	1730	1000	1775	1035	1825
8000	940	1690	970	1730	1005	1780	1040	1830	1075	1880

NOTES:

1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 10 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2.5 knots.
3. For operation on dry, grass runway, increase distances by 40% of the "ground roll" figure.
4. If a landing with flaps up is necessary, increase the approach speed by 9 KIAS and allow for 45% longer distances.

Figure 5-12. Landing Distance

SECTION 7
AIRPLANE & SYSTEMS DESCRIPTION

TABLE OF CONTENTS

	Page
Introduction	7-5
Airframe	7-5
Flight Controls	7-6
Trim Systems	7-9
Instrument Panel	7-9
Pilot Panel Layout	7-9
Center Panel Layout	7-12
Copilot Panel Layout	7-12
Center Pedestal Layout	7-12
Ground Control	7-13
Wing Flap System	7-14
Landing Gear System	7-15
Baggage Compartment	7-15
Seats	7-15
Integrated Seat Belt/Shoulder Harness	7-16
Entrance Doors And Cabin Windows	7-18
Control Locks	7-22
Engine	7-22
Engine Controls	7-22
Engine Instruments	7-23
New Engine Break-In And Operation	7-25
Engine Lubrication System	7-26
Ignition And Starter System	7-26
Air Induction System	7-27
Exhaust System	7-27
Fuel Injection System	7-27

TABLE OF CONTENTS (Continued)

	Page
Cooling System	7-28
Turbocharging System	7-29
Propeller	7-35
Fuel System	7-36
Fuel Distribution	7-37
Fuel Indicating System	7-38
Auxiliary Fuel Pump Operation	7-41
Fuel Return System	7-42
Fuel Venting	7-42
Fuel Selector Valve	7-42
Fuel Drain Valves	7-44
Brake System	7-44
Electrical System	7-45
Annunciator Panel	7-45
Master Switch	7-46
Avionics Master Switch	7-51
Ammeter	7-52
Low Voltage Annunciation	7-52
Circuit Breakers And Fuses	7-53
Ground Service Plug Receptacle	7-53
Lighting Systems	7-55
Exterior Lighting	7-55
Interior Lighting	7-56
Cabin Heating, Ventilating And Defrosting System	7-58
Oxygen System	7-60
Pitot-Static System And Instruments	7-65
Airspeed Indicator	7-66

TABLE OF CONTENTS (Continued)

	Page
Vertical Speed Indicator	7-66
Altimeter	7-66
Vacuum System And Instruments	7-67
Attitude Indicator	7-67
Directional Indicator	7-67
Vacuum Gauge	7-69
Low Vacuum Annunciation	7-69
Clock/O.A.T. Indicator	7-70
Stall Warning System	7-70
Standard Avionics	7-70
Avionics Support Equipment	7-71
Avionics Cooling Fan	7-71
Microphone And Headset Installations	7-71
Static Dischargers	7-72
Cabin Features	7-73
Emergency Locator Transmitter	7-73
Cabin Fire Extinguisher	7-73

INTRODUCTION

This section provides description and operation of the airplane and its systems. Some equipment described herein is optional and may not be installed in the airplane. Refer to the Supplements, Section 9 for details of other optional systems and equipment.

AIRFRAME

The airplane is an all metal, six-place, high wing, single engine airplane equipped with tricycle landing gear and is designed for general utility purposes.

The construction of the fuselage is of conventional aluminum bulkhead, stringer and skin design commonly known as "semi-moncoque". Major components of the structure include the front and rear carry-thru spars (to which the wings attach); these form the top element of the forward and aft doorpost bulkhead assemblies. The lower member of the forward doorpost bulkhead assembly is below the cabin floor and provides the fuselage attachment for the wing struts. The lower member of the aft doorpost bulkhead assembly is also below the floor and serves as the forward web of the landing gear carry-thru structure. The main landing gear attaches to the fuselage on each side at an inner and outer forged bulkhead that attaches at the front to the lower member of the aft doorpost bulkhead and at the rear to another transverse bulkhead below the floorboard. The engine mount structure is supported by a keel beam assembly that also supports the lower cowling, passes aft through the firewall into the cabin below the floorboard and attaches to the lower member of the forward doorpost bulkhead assembly. The keel beam assembly also provides the attachments for the nose landing gear.

The externally braced wings, containing integral fuel tanks, are constructed of a front and rear spar with formed sheet metal ribs, doublers, and stringers. The entire structure is covered with aluminum skin. The front spars are equipped with wing-to-fuselage and wing-to-strut attach fittings. The aft spars are equipped with wing-to-fuselage attach fittings, and are partial span spars.

Frise-type ailerons and single-slot type flaps are attached to the trailing edge of the wings. The ailerons are constructed of a forward spar, formed sheet metal ribs, a "V" type corrugated aluminum skin joined together at the trailing edge, and a formed leading edge containing balance weights. The flaps are constructed basically the same as the ailerons, with the exception of the balance weights, aft spars and the addition of a trailing edge stiffener.

The empennage (tail assembly) consists of a conventional vertical stabilizer, rudder, horizontal stabilizer, and elevator. The vertical stabilizer consists of forward and aft spar, formed sheet metal ribs and reinforcements, four skin panels, formed leading edge skins and a dorsal fin.

The rudder is constructed of a forward and aft spar, formed sheet metal ribs and reinforcements, and a wrap-around skin panel. The top of the rudder incorporates a leading edge extension which contains a balance weight.

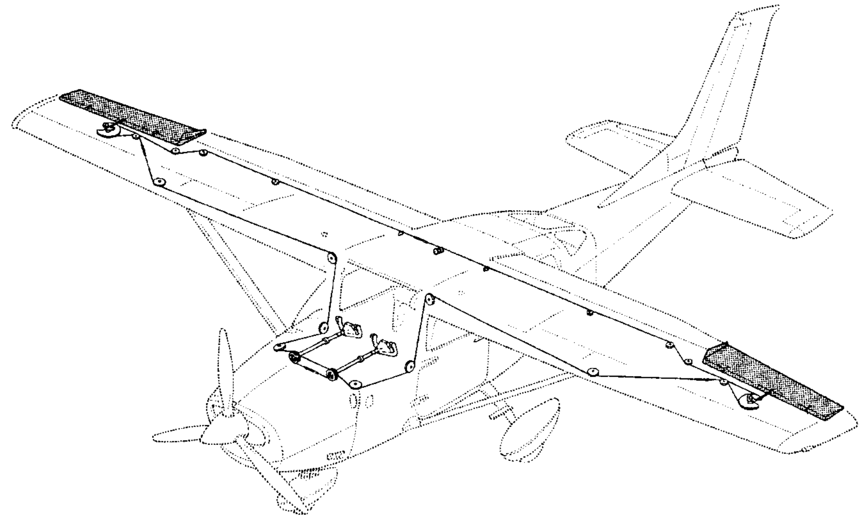
The horizontal stabilizer is constructed of a forward and aft spar, ribs and stiffeners, center upper and lower skin panels, and two left and two right wrap-around skin panels which also form the leading edges. The horizontal stabilizer also contains the elevator trim tab actuator.

Construction of the elevator consists of a forward and aft spar, ribs, torque tube and bellcrank, left upper and lower skin panels, and right inboard and outboard formed trailing edges. The elevator trim tab consists of a bracket assembly, hinge half and a wrap-around skin panel. Both elevator tip leading edge extensions incorporate balance weights.

FLIGHT CONTROLS

The airplane's flight control system (Refer to Figure 7-1) consists of conventional aileron, elevator and rudder control surfaces. The control surfaces are manually operated through mechanical linkage using a control wheel for the ailerons and elevator, and rudder/brake pedals for the rudder. The elevator control system is equipped with downsprings which provide improved stability in flight.

AILERON CONTROL SYSTEM



RUDDER AND RUDDER TRIM CONTROL SYSTEMS

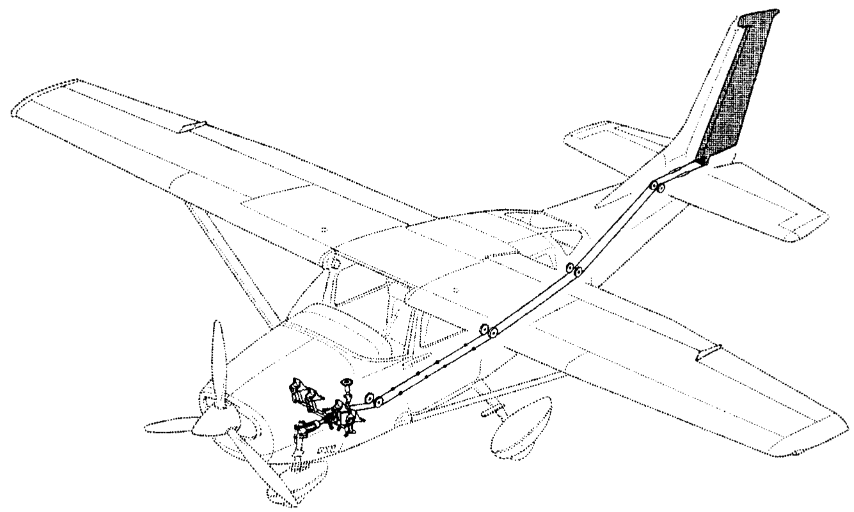


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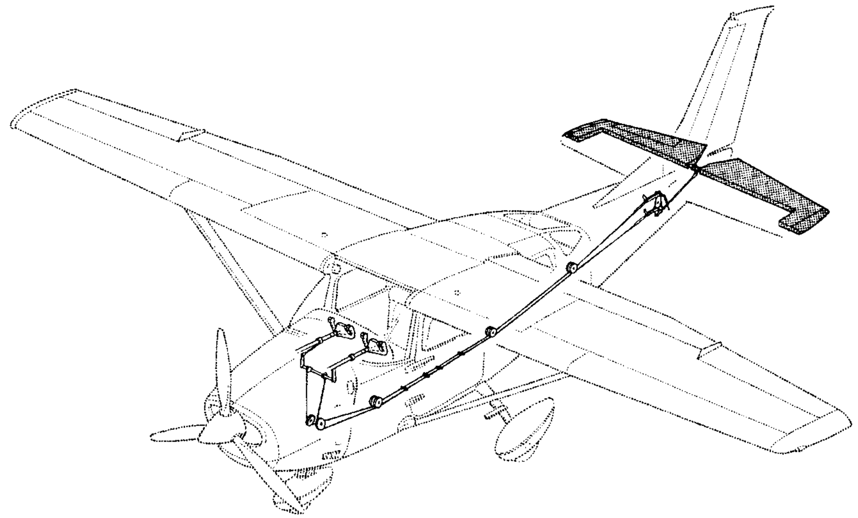
Figure 7-1. Flight Control and Trim Systems (Sheet 1 of 2)

ELEVATOR CONTROL SYSTEM



ELEVATOR TRIM CONTROL SYSTEM

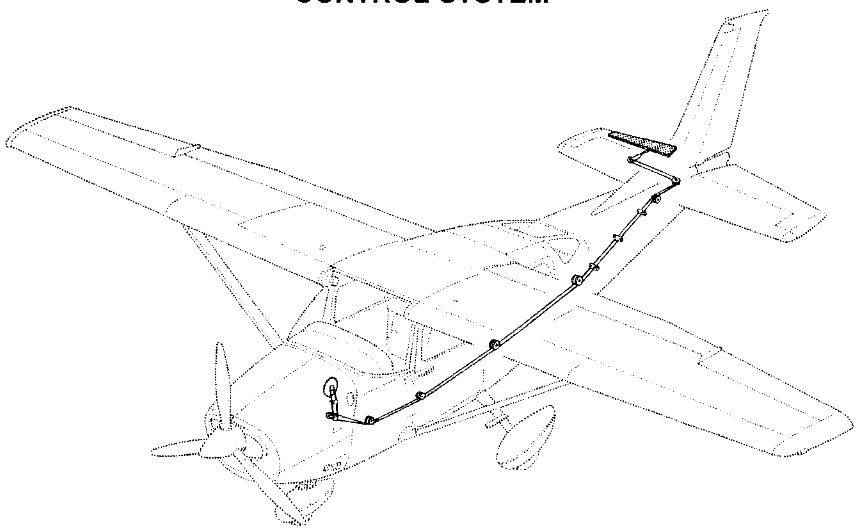


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Figure 7-1. Flight Control and Trim Systems (Sheet 2 of 2)

TRIM SYSTEMS

A manually-operated rudder and elevator trim is provided (refer to Figure 7-1). Rudder trimming is accomplished through a bungee unit connected to the rudder control system and a trim control wheel mounted on the control pedestal. Rudder trimming is accomplished by rotating the horizontally mounted trim control wheel either left or right to the desired trim position. Rotating the trim wheel to the right, will trim nose-right; conversely, rotating it to the left will trim nose-left. Elevator trimming is accomplished through the elevator trim tab by utilizing the vertically mounted trim control wheel. Forward rotation of the trim wheel will trim nose-down, conversely, aft rotation will trim nose-up.

INSTRUMENT PANEL

The instrument panel (Refer to Figure 7-2) is of all-metal construction, and is designed in segments to allow related groups of instruments, switches and controls to be removed without removing the entire panel. For specific details concerning the instruments, switches, circuit breakers, and controls on the instrument panel, refer to related topics in this section.

PILOT PANEL LAYOUT

Flight instruments are contained in a single panel located in front of the pilot. These instruments are designed around the basic "T" configuration. The gyros are located immediately in front of the pilot, and arranged vertically over the control column. The airspeed indicator and altimeter are located to the left and right of the gyros, respectively. The remainder of the flight instruments are clustered around the basic "T".

Below the flight instruments is a sub panel which contains the engine tachometer and the manifold pressure/fuel flow gauge. Various navigational instruments are located to the right. To the left of the flight instruments is a sub panel which contains a left/right fuel quantity indicator unit, an oil temperature/oil pressure indicator, a vacuum gauge/ammeter, a T.I.T./CHT indicator, a clock/OAT indicator and the avionics circuit breaker panel.

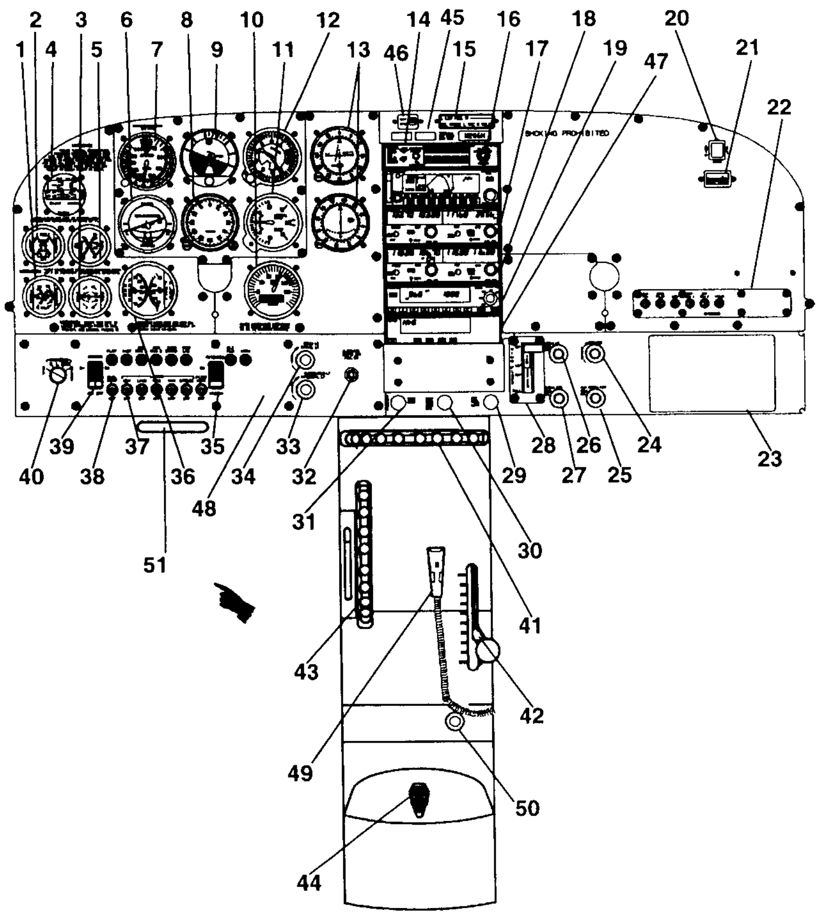

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Figure 7-2. Instrument Panel (Sheet 1 of 2)

1. **Oil Temperature and Oil Pressure Indicator**
2. **Fuel Quantity Indicators**
3. **Vacuum Gauge/Ammeter**
4. **Digital Clock/O.A.T. Indicator**
5. **T.I.T. and CHT Indicator**
6. **Turn Coordinator**
7. **Airspeed Indicator**
8. **Heading Indicator**
9. **Attitude Indicator**
10. **Tachometer**
11. **Vertical Speed Indicator**
12. **Altimeter**
13. **Nav #1/Nav #2 Course Deviation and Glide Slope Indicators**
14. **Audio Control Panel**
15. **Annunciator Panel**
16. **GPS Receiver**
17. **Nav/Com Radio #1**
18. **Nav/Com Radio #2**
19. **Transponder**
20. **ELT Remote Switch/Annunciator**
21. **Hour Meter**
22. **Avionics Circuit Breaker Panel**
23. **Glove Box**
24. **Cabin Defrost**
25. **Auxiliary Cabin Air Control**
26. **Cabin Heat Control**
27. **Cabin Air Control**
28. **Flap Switch Lever and Flap Position Indicator**
29. **Mixture Control**
30. **Propeller Control**
31. **Throttle Control**
32. **Alternate Static Air Control**
33. **Glareshield and Pedestal Dimming Control**
34. **Radio and Panel Dimming Control**
35. **Avionics Master Switch**
36. **Manifold Pressure/Fuel Flow Indicator**
37. **Circuit Breakers and Switch/Breakers**
33. **Auxiliary Fuel Pump Switch**
39. **Master Switch**
40. **Ignition Switch**
41. **Rudder Trim**
42. **Cowl Flap Control Lever**
43. **Elevator Trim Control**
44. **Fuel Selector**
45. **Optional Prop De-ice Annunciator**
46. **NAV/GPS Selector**
47. **Autopilot Computer**
48. **Optional Prop De-Ice Switch**
49. **Hand Mic.**
50. **12-Volt Power Port**
51. **Parking Brake**

Figure 7-2. Instrument Panel (Sheet 2 of 2)

Below the flight and engine instruments are the circuit breakers and switches for most of the airplane systems and equipment. The master switch, avionics master switch, ignition switch, and lighting controls are located in this area of the panel. The parking brake control is mounted below the switch and circuit breaker panel.

CENTER PANEL LAYOUT

The center panel contains various avionics equipment arranged in a vertical rack. This arrangement allows each component to be removed without having to access the backside of the panel. Below the panel are the throttle, propeller, mixture and alternate static air controls.

A multi-function annunciator is located above the radio stack and provides caution and warning messages for low fuel quantity, low oil pressure, low vacuum, low voltage and autopilot pitch trim situations.

COPILOT PANEL LAYOUT

The copilot panel contains the hour meter, ELT switch, avionics equipment, avionics circuit breakers and room for expansion of indicators and other avionics equipment. Below this sub panel are the glove box, cabin heat, defroster and cabin air controls, and wing flap lever.

CENTER PEDESTAL LAYOUT

The center pedestal, located below the center panel, contains the elevator and rudder trim control wheels and position indicators, and provides a bracket for the microphone. The fuel selector valve handle is located at the base of the pedestal.

GROUND CONTROL

Effective ground control while taxiing is accomplished through nose wheel steering by using the rudder pedals; left rudder pedal to steer left and right rudder pedal to steer right. When a rudder pedal is depressed, a spring-loaded steering bungee (which is connected to the nose gear and to the rudder bars) will turn the nose wheel through an arc of approximately 15° each side of center. By applying either left or right brake, the degree of turn may be increased up to 35° each side of center.

Moving the airplane by hand is most easily accomplished by attaching a tow bar to the nose gear strut. If a tow bar is not available, or pushing is required, use the wing struts as push points. Do not use the vertical or horizontal surfaces to move the airplane. If the airplane is to be towed by vehicle, never turn the nose wheel more than 35° either side of center or structural damage to the nose gear could result.

The minimum turning radius of the airplane, using differential braking and nose wheel steering during taxi, is approximately 27 feet. To obtain a minimum radius turn during ground handling, the airplane may be rotated around either main landing gear by pressing down on a tailcone bulkhead just forward of the horizontal stabilizer to raise the nose wheel off the ground. Care should be exercised to ensure that pressure is exerted only on the bulkhead area and not on skin between the bulkheads. Pressing down on the horizontal stabilizer to raise the nose wheel off the ground is not recommended.

WING FLAP SYSTEM

The single slot-type wing flaps (Refer to Figure 7-3), are extended or retracted by positioning the wing flap switch lever on the instrument panel to the desired flap deflection position. The switch lever is moved up or down in a slotted panel that provides mechanical stops at the 10°, 20°, and FULL (40°) positions. To change flap setting, the flap lever is moved to the right to clear mechanical stops at the 10° and 20° positions. A scale and pointer to the left of the flap switch indicates flap travel in degrees. The wing flap system circuit is protected by a 10-ampere circuit breaker, labeled FLAP, on the left side of the control panel.

NOTE

A flap interrupt switch, on the upper sill of the forward cargo door opening, will stop flap operation regardless of flap position anytime the forward cargo door is unlatched. The switch is intended to prevent lowering the flaps into the cargo door when it is open.

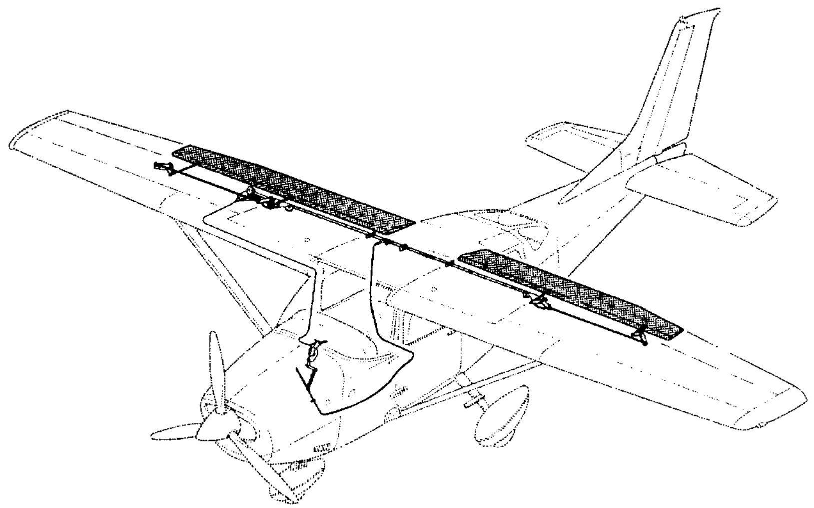

Figure 7-3. Wing Flap System

LANDING GEAR SYSTEM

The landing gear is of the tricycle type, with a steerable nose wheel and two main wheels. Wheel and main gear brake fairings are standard for both the main and nose wheels. Shock absorption is provided by the leaf spring steel main landing gear struts and the air/oil nose gear shock strut. Each main gear wheel is equipped with a hydraulically-actuated disc-type brake on the inboard side of each wheel. Oversized wheels are available to facilitate operations from unimproved runways.

BAGGAGE COMPARTMENT

The baggage compartment consists of the area from the back of the rear passenger seats to the aft cabin bulkhead. Access to the baggage compartment is gained through the cargo door on the right side of the airplane, or from within the airplane cabin. A baggage net with tiedown straps is provided for securing baggage and is attached by tying the straps to tiedown rings provided in the airplane. When utilizing the airplane as a cargo carrier, refer to Section 6 for complete cargo loading details. When loading the airplane, children should not be placed or permitted in the baggage compartment, and any material that might be hazardous to the airplane or occupants should not be placed anywhere in the airplane. For baggage/cargo area and door dimensions, refer to Section 6.

SEATS

The airplane is equipped with the conventional style six seat arrangement. Conventional seating consists of four separate forward facing seats and the rear seat which is a fixed one-piece seat bottom and a three-position, reclining back.

Seats used for the pilot and front seat passenger are adjustable fore and aft, and up and down. Additionally, the angle of the seat back is infinitely adjustable.

Seats used for the 3rd. and 4th. seat passenger are adjustable fore and aft. Additionally, the angle of the seat back is infinitely adjustable.

Fore and aft adjustment is made using the handle located below the center of the seat frame. To position the seat, lift handle, slide the seat into position, release the handle and check that the seat is locked in place. To adjust the height of the seat, rotate the large crank under the right hand corner of the seat until a confortable height is obtained. To adjust the seat back angle, pull up on the release button, position the seat back to the desired angle, and release the button. When the seat is not occupied, the seat back will automatically fold forward whenever the release button is pulled up

The rear passenger' seat consists of fixed, one piece seat bottom and a three position, recicling back. The recicling back is adjusted by a lever located below the center of the seat frame. To adjust the seat back, raise the lever, position the seat back to the desired angle, release the lever and check that the back is locked in place.

Headrests are installed on both the front and rear seats. To adjust the headrest, apply enough pressure to it to raise or lower it to the desired level.

INTEGRATED SEAT BELT/SHOULDER HARNESS

All seat positions are equipped with integrated seat belts/shoulder harness assemblies (Refer to Figure 7-4). The design incorporates an overhead inertia reel for the shoulder portion, and a retractor assembly for the lap portion of the belt. This design allows for complete freedom of movement of the upper torso area while providing restraint in the lap belt area. In the event of a sudden deceleration, reels lock up to provide positive restraint for the user.

In the front and center seats, the inertia reels are located on the centerline of the roof area. In the rear seats, the inertia reels are located outboard of each passenger in the roof area.

To use the integrated seat belt/shoulder harness, grasp the link with one hand, and, in a single motion, extend the assembly and insert into the buckle. Positive locking has occurred when a distinctive "snap" sound is heard.

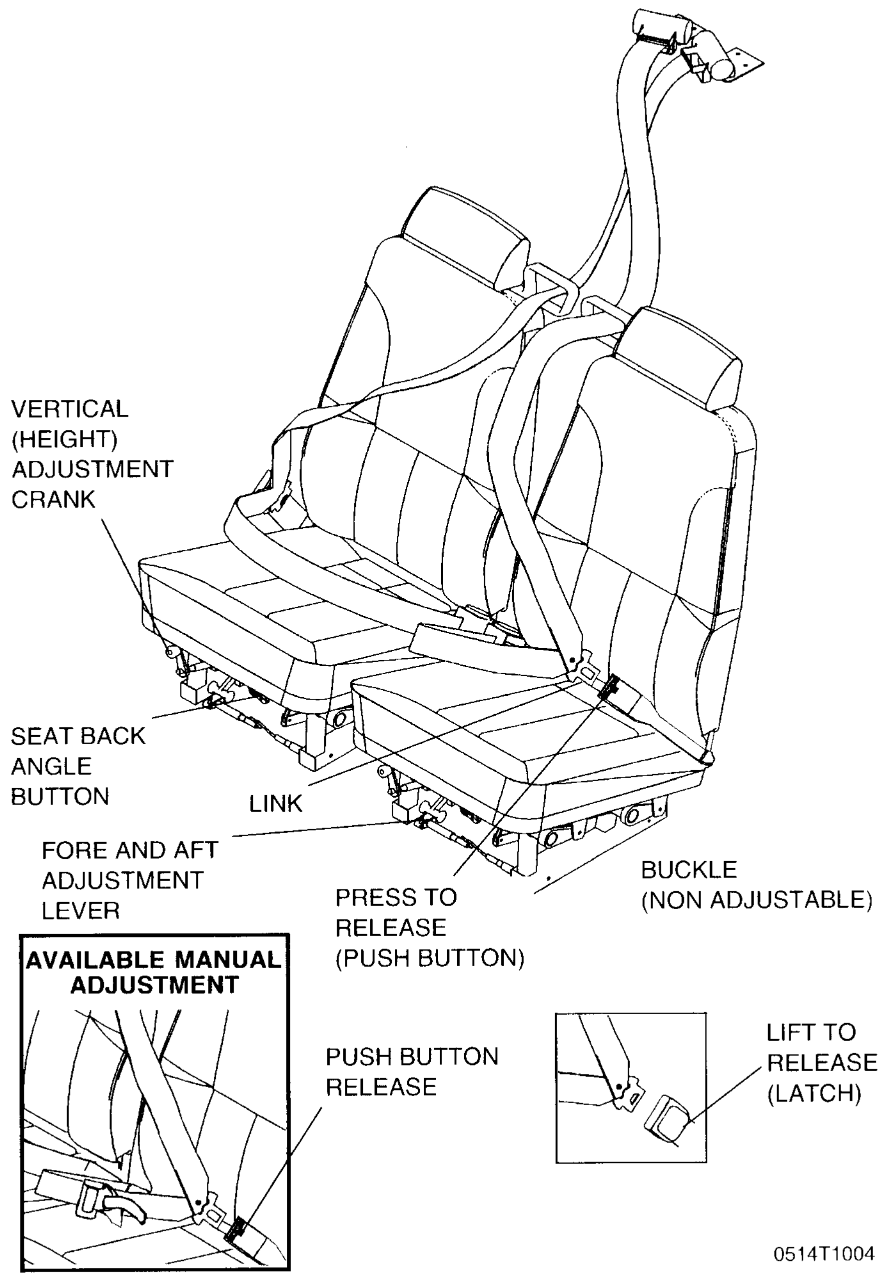

Figure 7-4. Crew Seats, Seat Belts and Shoulder Harnesses

Proper locking of the lap belt can be verified by ensuring that the belts are allowed to retract into the retractors and the lap belt is snug and low on the waist as worn normally during flight. No more than one additional inch of belt should be able to be pulled out of the retractor once the lap belt is in place on the occupant. If more than one additional inch of belt can be pulled out of the retractor, the occupant is too small for the installed restraint system and the seat should not be occupied until the occupant is properly restrained.

Removal is accomplished by lifting the release mechanism on the buckle or by pressing the release button on the buckle and pulling out and up on the harness. Spring tension on the inertia reel will automatically stow the harness.

A manually adjustable seat belt/shoulder harness assembly is available for all seats.

To use the manually adjustable seat belt/shoulder harness, fasten and adjust the seat belt/shoulder harness first. Lengthen the seat belt as required by pulling on the release strap on the belt. Snap the connecting link firmly into the buckle, then adjust to length. A properly adjusted harness will permit the occupant to lean forward enough to sit erect, but prevent excessive forward movement and contact with objects during sudden deceleration. Also, the pilot must have the freedom to reach all controls easily.

Disconnecting the manually adjustable seat belt/shoulder harness is accomplished by pushing the button on the buckle to release the connecting link.

ENTRANCE DOORS AND CABIN WINDOWS

Entry to, and exit from the airplane is accomplished through an entry door on the left side of the cabin at the pilot's seat position and through double cargo doors on the right side of the cabin at the center and rear seat passenger's positions (refer to Section 6 for cabin and cabin door dimensions). The left entry door incorporates a recessed exterior door handle, a conventional interior door handle, a key-operated door lock, and a door stop mechanism and the openable window.

The left door is equipped with an openable window which is held in the closed position by a detent equipped latch on the lower edge of the window frame. To open the window, rotate the latch upward. The window utilizes a spring-loaded retaining arm which will help rotate the window outward and hold it there. An openable window is also installed for the right front passenger's seat position, and functions in the same manner as the window in the entry door. If required, either window may be opened at any speed up to 182 KIAS. All other cabin windows are fixed and cannot be opened.

NOTE

The door latch design on this model requires that the outside door handle on the pilot's door be extended out whenever the doors are open. When closing the door, do not attempt to push the door handle in until the door is fully shut.

To open the left entry door from outside the airplane, utilize the recessed door handle near the aft edge of the door by grasping the forward end of the handle and pulling outboard. To open or close the door from inside the airplane, use the combination door handle and arm rest. The inside door handle has three positions and a placard at its base which reads OPEN, CLOSE, and LOCK. The handle is spring loaded to the CLOSE (up) position. When the door has been pulled shut and latched, lock it by rotating the door handle forward to the LOCK position (flush with the arm rest). When the handle is rotated to the LOCK position, an over center action will hold it in that position. Both cabin doors should be locked prior to flight, and should not be opened intentionally during flight.

NOTE

Accidental opening of the cabin door in flight due to improper closing does not constitute a need to land the airplane. The best procedure is to set up the airplane in a trimmed condition at approximately 90 KIAS, momentarily shove the door outward slightly, and forcefully close and lock the door.

The double cargo doors can be opened from outside the airplane, only when the forward door inside handle is in the CLOSE position, by utilizing the recessed door handle near the aft edge of the forward door. Depress the forward end of the handle to rotate it out of its recess, and then pull outboard. After the forward door is opened, the aft door may be opened by grasping the red handle on the forward edge of the door and pulling downward to release the locking pawls. To close the cargo doors from inside the airplane, close the aft door first using the red handle to latch both locking pawls, and then close the forward door. When the forward door is closed and latched, rotate the door handle, labeled OPEN, CLOSE, and LOCK, to the locked position. Both doors must be securely closed and the forward door locked prior to flight, and they must not be opened intentionally during flight.

NOTE

If the forward cargo door should come unlatched and open slightly in flight, it is suggested that a landing be made at a suitable airport to close and latch the door, unless a passenger is available to close it. It cannot be reached by the pilot. The wing flaps will **not** operate with the cargo door open, even slightly, and the landing should be planned accordingly.

NOTE

A flap interrupt switch, on the upper sill of the forward cargo door opening, will stop flap operation regardless of flap position any time the forward cargo door is unlatched. The switch is intended to prevent lowering the flaps into the cargo door when it is open.

Although with flaps extended, the forward cargo door can only be opened approximately four inches, the aft cargo door will still open fully, if required, once the forward door is unlatched.

If necessary, the outside door handle can be used to latch the forward cargo door. Simply lift the handle out of its recess and grasp the vertical tab of the connecting link behind the handle. Pull the tab outboard until the connecting link engages a detent at its aft end. Push the handle back into its recess while observing the inside handle rotating toward the locked position through the cargo door window. The inside handle must be rotated into the LOCK position from inside the airplane.

CAUTION

IF THE CARGO DOOR IS CLOSED FROM THE OUTSIDE WITH PASSENGERS OCCUPYING THE MIDDLE OR REAR SEAT ROWS, THE INSIDE DOOR HANDLE MUST BE ROTATED FULLY FORWARD TO DISENGAGE THE OUTSIDE CLOSING MECHANISM AND ALLOW THE DOOR TO BE OPENED FROM THE INSIDE.

The left entry door and the forward cargo door have key-operated locks which may be used to secure the aircraft during parking.

NOTE

Since the key-operated outside lock engages the door handle only, the forward cargo door cannot be secured for flight using only the key lock.

For airplane serial numbers T20608438 and On, the forward cargo door uses an external handle that rotates to open or close and latch the door. The new exterior door handle eliminates the keyed-lock for locking the cargo door from the exterior of the airplane. The cargo door is now locked using a locking pin inserted into the forward cargo door operating mechanism from inside the cabin. The cargo door locking pin must be removed and stowed before takeoff.

CONTROL LOCKS

A control lock is provided to lock the aileron and elevator control surfaces to prevent damage to these systems by wind buffeting while the airplane is parked. The lock consists of a shaped steel rod and flag. The flag identifies the control lock and cautions about its removal before starting the engine. To install the control lock, align the hole on the side of the pilot's control wheel shaft with the hole on the side of the shaft collar on the instrument panel and insert the rod into the aligned holes. Installation of the lock will secure the ailerons in a neutral position and the elevators in a slightly trailing edge down position. Proper installation of the lock will place the flag over the ignition switch. In areas where high or gusty winds occur, a control surface lock should be installed over the vertical stabilizer and rudder. The control lock and any other type of locking device should be removed prior to starting the engine.

ENGINE

The airplane is powered by a horizontally opposed, six-cylinder, overhead valve, turbocharged, air-cooled, fuel-injected engine with a wet sump lubrication system. The engine is the Lycoming Model TIO-540-AJ1A and is rated at 310 horsepower at 2500 RPM and 39 inches of manifold pressure. Major accessories include a propeller governor on the front of the engine, starter, a belt driven alternator mounted on the front of the engine, dual magnetos on the rear of the engine, dual vacuum pumps, and a full flow oil filter mounted on the rear of the engine accessory case.

Other major accessories include a turbocharger connected to the induction air and exhaust systems, and associated components.

ENGINE CONTROLS

Engine manifold pressure is set using the throttle control, a smooth black knob, which is located at the center of the instrument panel below the radios. The throttle control is configured so that the throttle is open in the forward position, and closed in the full aft position. A friction lock is located at the base of the throttle control shaft and is operated by rotating the knurled disk clockwise to increase friction or counterclockwise to decrease it.

Engine speed is controlled by the propeller control. The propeller control is a fluted, blue knob located immediately to the right of the throttle control. This system is described under "Propeller" in this section.

The mixture control, mounted near the propeller control, is a red knob with raised points around the circumference and is equipped with a lock button in the end of the knob. The rich position is full forward, and full aft is the idle cutoff position. For small adjustments, the control may be moved forward by rotating the knob clockwise, and aft by rotating the knob counterclockwise. For rapid or large adjustments, the knob may be moved forward or aft by depressing the lock button in the end of the control, and then positioning the control as desired.

ENGINE INSTRUMENTS

Engine operation is monitored by the following instruments: oil temperature/oil pressure indicator, turbine inlet temperature (T.I.T.)/cylinder head temperature indicator, manifold pressure gauge/fuel flow indicator, and tachometer.

Oil pressure signals are generated from a pressure transducer. An oil pressure line is routed from the upper front of the engine case to the rear engine baffle. At the baffle, the oil pressure line is connected to the transducer. This transducer produces an electrical signal which translates into a pressure reading at the indicator.

In addition, a separate low oil pressure indication is provided through the panel annunciator. This annunciator is wired to a pressure switch located on the rear of the engine accessory case. When oil pressure is below 20 PSI, the switch grounds and completes the annunciator circuit, illuminating the red OIL PRESS annunciator. When pressure exceeds 20 PSI, the ground is removed and the OIL PRESS annunciator extinguishes.

NOTE

The low oil pressure switch is also wired into the hour (Hobbs) meter. When pressure exceeds 20 PSI, a ground is supplied to the hour meter, completing the hour meter circuit.

Oil temperature signals are generated from a resistance-type probe located in the accessory case. As oil temperature changes, the probe resistance changes. This resistance is translated into oil temperature readings on the indicator.

The T.I.T./CHT indicator unit, located on the left side of the instrument panel, is activated by electrical signals originating in the engine compartment. Markings for the turbine inlet temperature portion of the indicator are in 25°F increments, with normal range (green arc) between 1350°F and 1675°F and the maximum (red line) at 1675°F. Marking for the cylinder head temperature portion of the indicator are in 50°F increments, with numbers at 200°F, 300°F, 400°F and 500°F. Normal operating temperatures (green arc) for the CHT gauge are 200°F to 480°F, with red line at 480°F.

T.I.T. signals are generated from a thermocouple probe in the exhaust system. The probe generates a voltage potential with respect to temperature. This voltage potential registers as a temperature change in the indicator.

CHT signals are generated from a resistance-type probe screwed into the cylinder head of the number 5 (copilot side aft) cylinder. The resistance of the probe changes in proportion to the temperature, and is registered on the indicator as a change in temperature.

The engine-driven mechanical tachometer is located on the lower right side of the pilot's instrument panel. The instrument is marked in increments of 100 RPM, and indicates both engine and propeller speed. A recording meter in the lower section of the dial records elapsed engine time in hours and tenths based on a record speed of 2400 RPM. Instrument markings include the normal operating range (green arc) of 2000 to 2400 RPM, and a maximum (red line) of 2500 RPM.

The manifold pressure gauge is the left half of a dual-indicating instrument located on the lower left side of the instrument panel. The gauge is direct reading and indicates induction air manifold pressure in inches of mercury. It has a normal operating range (green arc) of 15 to 30 In. Hg and a maximum (red line) of 39 in. Hg. The fuel flow indicator is the right half of a dual-indicating instrument located on the lower left side of the instrument panel. The fuel flow is measured by a transducer mounted on the aft engine baffle. The fuel goes from the engine driven fuel pump through the transducer by a line to the throttle body. The transducer receives a voltage from the indicator and returns a signal depending on the flow through the transducer. The indicator is marked in gallons per hour and has a green arc from 5 to 20 gal/hr and a maximum (red line) fuel flow of 34 gph. There may be some atmospheric conditions that would result in fuel flow rates that exceed the maximum marked value on the indicator (i.e. very low density altitude and full throttle). If the indicator is pegged out, the mixture control should be used to adjust for the desired value. The fuel flow indicator may indicate low fuel flow rates when the fuel injector(s) become blocked or partially blocked.

NEW ENGINE BREAK-IN AND OPERATION

The engine was run-in at the factory and is ready for the full range of use. It is, however, suggested that cruising be accomplished at 65% to 75% power as much as practicable until a total of 50 hours has accumulated or oil consumption has stabilized. This will ensure proper seating of the piston rings.

The airplane is delivered from the factory with corrosion preventive oil in the engine. If, during the first 25 hours, oil must be added, use only ashless dispersant oil conforming to specification MIL-L-22851 or SAE1899.

ENGINE LUBRICATION SYSTEM

The engine utilizes a full pressure, wet sump type lubrication system. The capacity of the engine sump (located on the bottom of the engine) is 11 quarts (one additional quart is contained in the engine oil filter). Oil is drawn from the sump through a filter screen on the end of a pickup tube to the engine-driven oil pump. Oil from the pump passes through a full flow oil filter, a pressure relief valve at the rear of the right oil gallery, and a thermostatically controlled remote oil cooler. Oil from the remote cooler is then circulated to the left oil gallery and propeller governor. The engine parts are then lubricated by oil from the galleries. After lubricating the engine, the oil returns to the sump by gravity. The filter adapter in the full flow filter is equipped with a bypass valve which will cause lubricating oil to bypass the filter in the event the filter becomes plugged, or the oil temperature is extremely cold.

An oil dipstick/filler tube is located on the right side of the engine case. The dipstick and oil filler are accessible through a door on the right side of the engine cowling. The engine should not be operated on less than 6 quarts of oil. For extended flight, fill to eleven quarts (dipstick indication only). For engine oil grade and specifications, refer to Section 8 of this handbook.

IGNITION AND STARTER SYSTEM

Engine ignition is provided by two engine driven magnetos, and two spark plugs in each cylinder. The right magneto fires the lower left and upper right spark plugs, and the left magneto fires the lower right and upper left spark plugs. Normal operation is conducted with both magnetos due to the more complete burning of the fuel/air mixture with dual ignition.

Ignition and starter operation is controlled by a rotary type switch located on the left switch and control panel. The switch is labeled clockwise, OFF, R, L, BOTH, and START. The engine should be operated on both magnetos (BOTH position) except for magneto checks.

The R and L positions are for checking purposes and emergency use only. When the switch is rotated to the START position, (with the master switch in the ON position), the starter contactor is energized and the starter will crank the engine. When the switch is released, it is spring-loaded to return to the BOTH position.

AIR INDUCTION SYSTEM

The engine air induction system receives ram air through an intake on the lower·front portion of the engine cowling. The intake is covered by an air filter which removes dust and other foreign matter from the induction air. Airflow passing through the filter enters an air box. The air box has a spring-loaded alternate air door. If the air induction filter should become blocked, suction created by the engine will open the door and draw unfiltered air from inside the lower cowl area. An open alternate air door can result in manifold pressure losses of up to 15 in. Hg at full throttle above 8,000 feet. After passing through the air box, induction air enters a compressor then to a fuel/air control unit on top of the engine, and is then ducted to the engine cylinders through intake manifold tubes.

EXHAUST SYSTEM

Exhaust gas from each cylinder passes through riser assemblies to a heat exchanger, then turbocharger and single tailpipe. Shrouds are constructed around the outside of the heat exchanger to form a heating chamber which supplies heat to the cabin.

FUEL INJECTION SYSTEM

The engine is equipped with a fuel injection system. The system is comprised of an engine-driven fuel pump, fuel/air control unit, fuel manifold, fuel flow indicator, and air-bleed type injector nozzles.

Fuel is delivered by the engine-driven fuel pump to the fuel/air control unit on top of the engine. The fuel/air control unit correctly proportions the fuel flow to the induction air flow. After passing through the control unit, induction air is delivered to the cylinders through the intake manifold tubes and metered fuel is delivered to a fuel manifold (flow divider). The fuel manifold, through spring tension on a diaphragm and valve, evenly distributes the fuel to an air-bleed type injector nozzle in the intake valve chamber of each cylinder. A fuel flow transducer is also installed upstream of the fuel/air control unit which attaches to the rear baffle, and is connected to a fuel flow indicator on the instrument panel.

COOLING SYSTEM

Ram air for engine cooling enters through two intake openings in the front of the engine cowling. The cooling air is directed from above the engine, around the cylinders and other areas of the engine by baffling, and then exits through cowl flaps on the lower aft edge of the cowling. The cowl flaps are mechanically operated from the cabin by means of a cowl flap lever on the right side of the control pedestal. Before starting the engine, during takeoff or high power operation, the cowl flap lever should be placed in the OPEN position for maximum cooling. This is accomplished by moving the lever to the right to clear the detent, then moving the lever up to the OPEN position.

While in cruise flight, cowl flaps should be closed unless hot day conditions require them to be adjusted to keep the cylinder head temperature at approximately two-thirds of the normal operating range (green arc). During extended let-downs, it may be necessary to completely close the cowl flaps by moving the cowl flap lever to the CLOSED position.

During ground operations, position the aircraft into the wind for optimal engine cooling.

TURBOCHARGING SYSTEM

Because the engine is turbocharged, some of its characteristics are different from a normally aspirated engine. The following information describes the system and points out some of the items that are affected by turbocharging. Section 4 contains the normal operating procedures for the turbocharged engine.

The following steps, when combined with the turbocharger system schematic (Figure 7-5), provide a better understanding of how the turbocharger system works. The steps follow the induction air as it enters and passes through the engine until it is expelled as exhaust gases.

1. Engine induction air is supplied through an opening in the lower cowl, ducted through a filter and into the compressor where it is compressed.

2. The pressurized induction air then passes through the throttle body and induction manifold into the cylinders.

3. The air and fuel are burned and exhausted through the turbine.

4. The exhaust gases drive the turbine which, in turn, drives the compressor, thus completing the cycle.

The compressor has the capability of producing manifold pressure in excess of the takeoff maximum of 39 inches Hg. In order not to exceed 39 inches of manifold pressure, a waste gate is used so that some of the exhaust will bypass the turbine and be vented into the tailpipe.

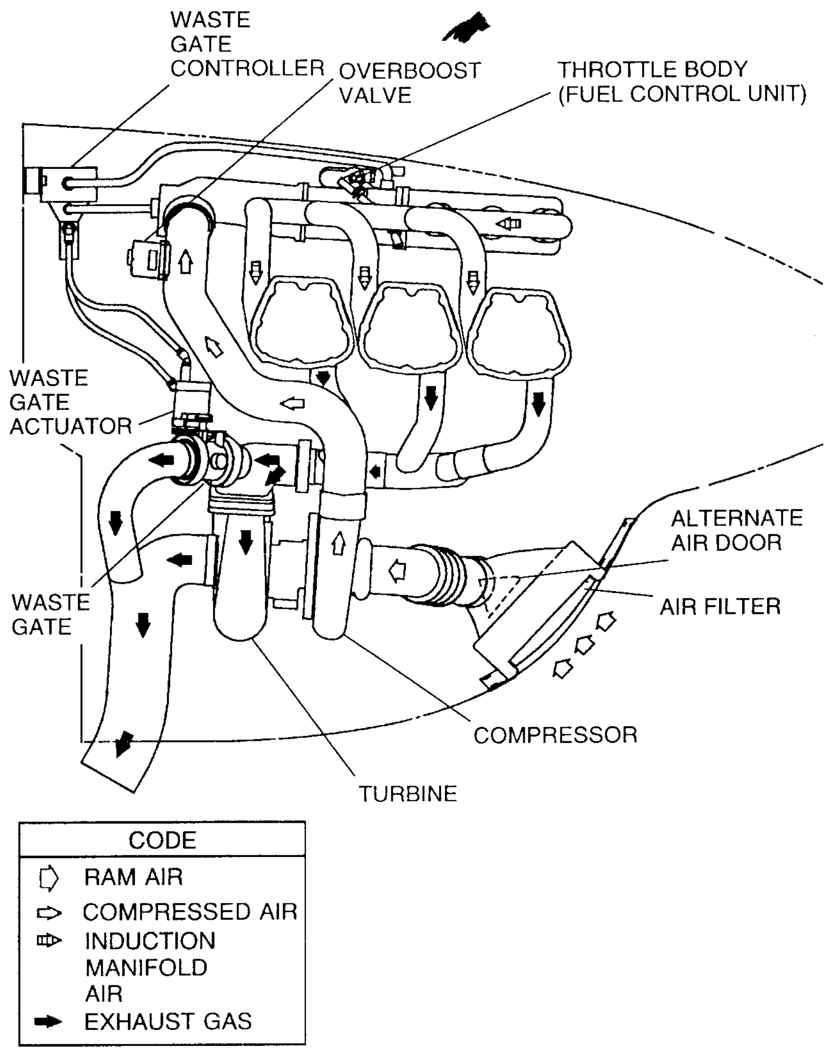

Figure 7-5. Turbocharger Schematic

It can be seen from studying Steps 1 through 4 that anything that affects the flow of induction air into the compressor or the flow of exhaust gases into the turbine will increase or decrease the speed of the turbocharger. This resultant change in flow will have no effect on the engine if the waste gate is still open because the waste gate position is changed to hold compressor discharge pressure constant. A waste gate controller automatically maintains maximum allowable compressor discharge pressure any time the turbine and compressor are capable of producing that pressure.

At high altitude, part throttle, or low RPM, the exhaust flow is not capable of turning the turbine and compressor fast enough to maintain maximum compressor discharge pressure, and the waste gate will close to force all of the exhaust flow through the turbine.

When the waste gate is fully closed, any change in turbocharger speed will mean a change in engine operation. Thus, any increase or decrease in turbine speed will cause an increase or decrease in manifold pressure and fuel flow. If turbine speed increases, the manifold pressure increases; if the turbine speed decreases, the manifold pressure decreases. Since the compression ratio approaches 3 to 1 at high altitude, any change in exhaust flow to the turbine or ram induction air pressure will be magnified proportionally by the compression ration and the change in flow through the exhaust system.

MANIFOLD PRESSURE VARIATION WITH ENGINE RPM

When the waste gate is open, the turbocharged engine will react the same as a normally aspirated engine when the engine RPM is varied. That is, when the RPM is increased, the manifold pressure will decrease slightly. When the engine RPM is decreased, the manifold pressure will increase slightly.

However, when the waste gate is closed, manifold variation with engine RPM is just opposite of the normally aspirated engine. An increase in engine RPM will result in an increase in manifold pressure, and a decrease in engine RPM will result in a decrease in manifold pressure.

MANIFOLD PRESSURE VARIATION WITH ALTITUDE

At full throttle, the turbocharger has the capability of maintaining the maximum continuous manifold pressure of 39 inches Hg. to well above 17,000 feet depending on engine and atmospheric conditions. However, engine operating limitations establish the maximum manifold pressure that may be used. Manifold pressure should be reduced above 17,000 feet, as noted on the operating placard in the airplane (subtract 1 inch Hg. from 39 inches Hg. for each 1000 feet above 17,000 feet).

At part throttle, the turbocharger is capable of maintaining cruise climb power of 2400 RPM and 30 in. Hg. from sea level to 22,000 feet in standard temperatures, and from sea level to 17,000 feet under hot day conditions without changing the throttle position, once the power setting is established after takeoff. Under hot day conditions, this climb power setting is maintained above 17,000 feet by advancing the throttle as necessary to maintain 30 inches of manifold pressure in the same manner as a normally aspirated engine during climb.

MANIFOLD PRESSURE VARIATION WITH AIRSPEED

When the waste gate is closed, manifold pressure will vary with variations in airspeed. This is because the compressor side of the turbocharger operates at pressure ratios of up to 3 to 1 and any change in pressure at the compressor inlet is magnified at the compressor outlet with a resulting effect on the exhaust flow and turbine side of the turbocharger.

FUEL FLOW VARIATIONS WITH CHANGES IN MANIFOLD PRESSURE

The engine-driven fuel pump output is regulated by engine speed and compressor discharge pressure. Engine fuel flow is regulated by fuel pump output and the metering effects of the throttle and mixture control. When the waste gate is open, fuel flow will vary directly with manifold pressure, engine speed, mixture, or throttle control position. In this case, manifold pressure is controlled by throttle position and the waste gate controller, while fuel flow varies with throttle movement and manifold pressure.

ENGINE (Continued)

TURBOCHARGING SYSTEM (Continued)

FUEL FLOW VARIATIONS WITH CHANGES IN MANIFOLD PRESSURE (Continued)

When the waste gate is closed and manifold pressure changes are due to turbocharger output, as discussed previously, fuel flow will follow manifold pressure even though the throttle position is unchanged. This means that fuel flow adjustments required of the pilot are minimized to (1) small initial adjustments on takeoff or climb-out for the proper rich climb setting, (2) lean-out in cruise, and (3) return to full rich position for approach and landing.

MANIFOLD PRESSURE VARIATION WITH INCREASING OR DECREASING FUEL FLOW

When the waste gate is open, movement of the mixture control has little or no effect on the manifold pressure of the turbocharged engine.

When the waste gate is closed, any change in fuel flow to the engine will have a corresponding change in manifold pressure. That is, increasing the fuel flow will increase the manifold pressure and decreasing the fuel flow will decrease the manifold pressure. This is because an increased fuel flow to the engine increases the mass flow of the exhaust. This turns the turbocharger faster, increasing the induction air flow and raising the manifold pressure.

MOMENTARY OVERSHOOT OF MANIFOLD PRESSURE

Under some circumstances (such as rapid throttle movement, especially with cold oil), it is possible that the engine can be overboosted slightly above the maximum takeoff manifold pressure of 39 inches Hg. This would most likely be experienced during the takeoff roll or during a change to full throttle operation in flight. The induction air pressure relief valve will normally limit the overboost to 2 to 3 inches.

(Continued Next Page)

ENGINE (Continued)

TURBOCHARGING SYSTEM (Continued)

MOMENTARY OVERSHOOT OF MANIFOLD PRESSURE (Continued)

A slight overboost of 2 to 3 inches of manifold pressure is not considered detrimental to the engine as long as it is momentary. No corrective action is required when momentary overboost corrects itself and is followed by normal engine operation. However, if overboosting of this nature persists when oil temperature is normal or if the amount of overboost tends to exceed 3 inches or more, the throttle should be retarded to eliminate the overboost and the controller system, including the waste gate and relief valve, should be checked for necessary adjustment or replacement of components.

ALTITUDE OPERATION

Because a turbocharged airplane will climb faster and higher than a normally aspirated airplane, fuel vaporization may be encountered. When fuel flow variations of ±1 GPH or more are observed (as a "nervous" fuel flow needle), or if a full rich mixture setting doesn't provide the desired fuel flow, placing the auxiliary fuel pump switch in the ON position will control vapor. However, it will also increase fuel flow, making it necessary to adjust the mixture control for the desired fuel flow. The auxiliary fuel pump should be left on for the remainder of the climb. It can be turned off whenever fuel flow will remain steady with it off, and the mixture must be adjusted accordingly. The auxiliary fuel pump should be turned off and the mixture reset prior to descent.

HIGH ALTITUDE ENGINE ACCELERATION

The engine will accelerate normally from idle to full throttle with full rich mixture at any altitude below 22,000 feet. At higher altitudes, it is usually necessary to lean the mixture to get smooth engine acceleration from idle to maximum power. At altitudes above 25,000 feet, and with temperatures above standard, it takes up to two minutes for the turbine to accelerate from idle to maximum RPM although adequate power is available in 20 to 30 seconds.

PROPELLER

The airplane has an all metal, three-bladed, constant speed, governor-regulated propeller. Setting the governor with the propeller control establishes the propeller speed, and thus the engine speed to be maintained. The governor controls the flow of engine oil, boosted to high pressure by an internal pump, to or from a piston in the propeller hub. Oil pressure acting on the piston twists the blades toward high pitch (low RPM). When oil pressure to the piston in the propeller hub is reduced, centrifugal force, assisted by an internal spring, twists the blades toward low pitch (high RPM).

The propeller control knob in the lower center of the instrument panel is used to set the governor and control engine RPM as desired for various flight conditions. The knob is labeled PROP PUSH INCR RPM. When the control knob is pushed in, blade pitch will decrease, giving a higher RPM. When the control knob is pulled out, the blade pitch increases, thereby decreasing RPM. The propeller control knob is equipped with a vernier feature which allows slow or fine RPM adjustments by rotating the knob clockwise to increase RPM, and counterclockwise to decrease it. To make rapid or large adjustments, depress the button on the end of the control knob and reposition the control as desired.

An optional propeller de-ice system is available for the airplane. Details of this system are presented in the Supplements section.

FUEL SYSTEM

The airplane fuel system (Refer to Figure 7-6) consists of two vented integral fuel tanks (one tank in each wing), two reservoir tanks (underneath the cockpit floor), a four-position selector valve, an electrically-driven auxiliary fuel pump, and a fuel strainer. The engine-mounted portion of the system consists of the engine-driven fuel pump, a fuel/air control unit, a fuel distribution valve (flow divider) and fuel injection nozzles.

Serials T20608362 and on:

The fuel system also incorporates a fuel return system that returns fuel from the fuel/air control unit (servo) back to each integral wing tank. The system includes a flexible fuel hose assembly between the servo and the firewall. Aluminum fuel lines return the fuel to the top portion of the selector valve and then to the aircraft integral tanks. One drain is added to properly drain the fuel return system.

⚠ WARNING

UNUSABLE FUEL LEVELS FOR THIS AIRPLANE WERE DETERMINED IN ACCORDANCE WITH FEDERAL AVIATION REGULATIONS. FAILURE TO OPERATE THE AIRPLANE IN COMPLIANCE WITH FUEL LIMITATIONS SPECIFIED IN SECTION 2 MAY FURTHER REDUCE THE AMOUNT OF FUEL AVAILABLE IN FLIGHT.

NOTE

Unusable fuel is at a minimum due to the design of the fuel system. However, with 1/4 tank or less, prolonged uncoordinated flight such as slips or skids can uncover the fuel tank outlets, causing fuel starvation and engine stoppage. Therefore, with low fuel reserves, do not allow the airplane to remain in uncoordinated flight for periods in excess of one minute.

(Continued Next Page)

FUEL SYSTEM (Continued)

Serials T20608001 thru T20608361:

FUEL TANKS	FUEL LEVEL (QUANTITY EACH TANK)	TOTAL FUEL	TOTAL UNUSABLE	TOTAL USABLE ALL FLIGHT CONDITIONS
Two	Full (46.0)	92.0	4.0	88.0
Two	Reduced (34.5)	69.0	4.0	65.0

Serials T20608362 and on:

FUEL TANKS	FUEL LEVEL (QUANTITY EACH TANK)	TOTAL FUEL	TOTAL UNUSABLE	TOTAL USABLE ALL FLIGHT CONDITIONS
Two	Full (46.0)	92.0	5.0	87.0
Two	Reduced (34.5)	69.0	5.0	64.0

Figure 7-6. Fuel Quantity Data in U.S. Gallons

FUEL DISTRIBUTION

Fuel flows by gravity from the two wing tanks to two reservoir tanks to a four position selector valve. From the selector valve, fuel flows through the auxiliary fuel pump, the fuel strainer, and to the engine driven fuel pump. From the engine driven fuel pump, fuel is delivered to the fuel/air control unit on the top of the engine. The fuel/air control unit (fuel servo) meters fuel flow in proportion to induction air flow. After passing through the control unit, metered fuel goes to a fuel distribution valve (flow divider) located on top of the engine. From the fuel distribution valve, individual fuel lines are routed to air bleed type injector nozzles located in the intake chamber of each cylinder.

(Continued Next Page)

FUEL SYSTEM (Continued)

FUEL INDICATING SYSTEM

Fuel quantity is measured by two float-type fuel quantity transmitters (one in each tank) and indicated by an electrically operated fuel quantity indicator on the left side of the instrument panel. The indicators are marked in gallons of fuel. An empty tank is indicated by a red line and the number "0". When an indicator shows an empty tank, approximately 2 gallons (Serials T20608001 thru T20608361) or 2.5 gallons (T20608362 and on) remain in a tank as unusable fuel. The indicators should not be relied upon for accurate readings during skids, slips, or unusual attitudes.

The fuel quantity indicators also incorporate warning circuits which can detect low fuel conditions and erroneous transmitter signals. Anytime fuel in the tank drops below approximately 8 gallons (and remains below this level for more than 60 seconds), the amber LOW FUEL message will flash on the annunciator panel for approximately 10 seconds and then remain steady. The annunciator cannot be turned off by the pilot. If the left tank is low, the message will read L LOW FUEL. If the right tank is low, the message will read LOW FUEL R. If both tanks are low, the message will read L LOW FUEL R.

In addition to low fuel annunciation, the warning circuitry is designed to report failures with each transmitter caused by shorts or opens. If the circuitry detects any one of these conditions, the fuel level indicator needle will go to the OFF position (below the "0" mark on the fuel indicator), and the amber annunciator will illuminate. If the left tank transmitter has failed, the message will read L LOW FUEL. If the right tank transmitter has failed, the message will read LOW FUEL R. If both tanks transmitters have failed, the message will read L LOW FUEL R.

Fuel flow is measured by use of a fuel transducer (flowmeter) mounted on the rear engine baffle. This flowmeter produces an electrical signal which is translated in the cockpit-mounted indicator as gallons-per-hour. Normal operating (green arc) range is from 5 to 20 gallons-per-hour.

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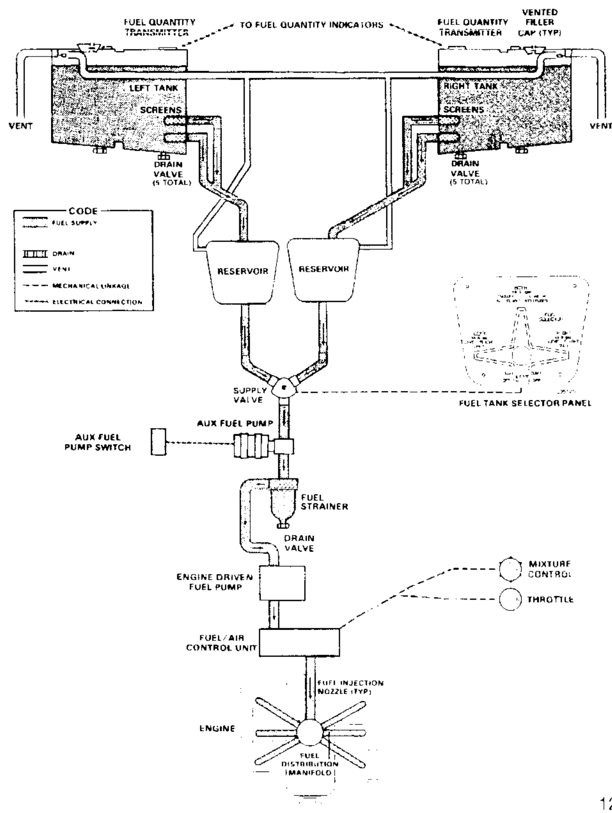

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Figure 7-7. Fuel System Schematic (Sheet 1 of 2)
Serial T20608001 thru T20608361.

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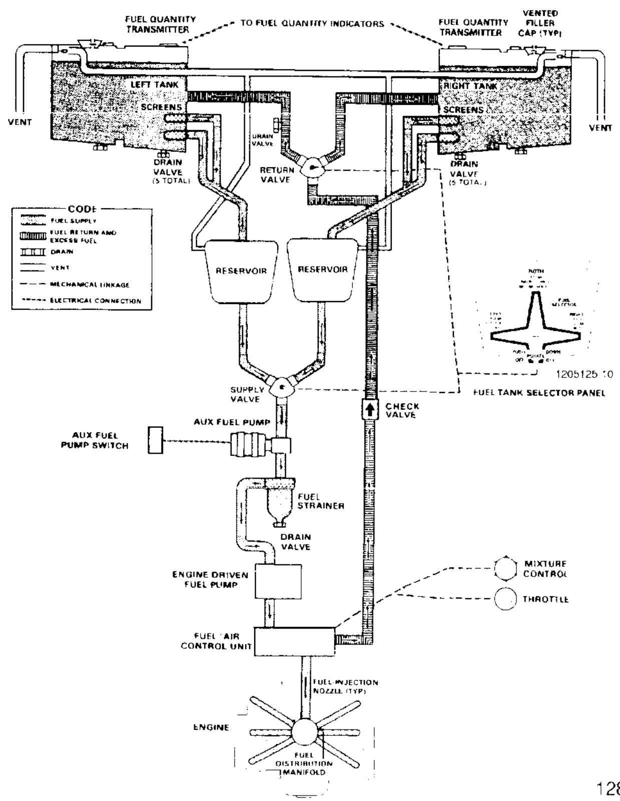

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NOTE: Fuel returns to the tank selected.

Figure 7-7. Fuel System Schematic (Sheet 2)
Serials T20608362 and on.

FUEL SYSTEM (Continued)

AUXILIARY FUEL PUMP OPERATION

The auxiliary fuel pump is used primarily for priming the engine before starting. Priming is accomplished through the fuel injection system. If the auxiliary fuel pump switch is accidentally placed in the ON position for prolonged periods (with master switch turned on and mixture rich) with the engine stopped, the engine may be flooded.

The auxiliary fuel pump is also used for vapor suppression in hot weather. Normally, momentary use will be sufficient for vapor suppression; however, continuous operation is permissible if required. Turning on the auxiliary fuel pump with a normally operating engine pump will result in only a very minor enrichment of the mixture.

It is not necessary to operate the auxiliary fuel pump during normal takeoff and landing, since gravity and the engine driven pump will supply adequate fuel flow. In the event of failure of the engine driven fuel pump, use of the auxiliary fuel pump will provide sufficient fuel to maintain flight at maximum continuous power.

Under hot day, high altitude conditions, or conditions during a climb that are conducive to fuel vapor formation, it may be necessary to utilize the auxiliary fuel pump to attain or stabilize the fuel flow required for the type of climb being performed. In this case, turn the auxiliary fuel pump on, and adjust the mixture to the desired fuel flow. If fluctuating fuel flow (greater than 1 GPH) is observed during climb or cruise at high altitudes on hot days, place the auxiliary fuel pump switch in the ON position to clear the fuel system of vapor. The auxiliary fuel pump may be operated continuously in cruise.

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FUEL SYSTEM (Continued)

FUEL RETURN SYSTEM

Serials T20608362 and on:
A fuel return system is incorporated to improve engine operation during extended idle operation in hot weather environments. The major components of the system include an restrictor fitting located in the top of the fuel servo, a dual stack fuel selector valve, and a drain valve assembly. The system is designed to return fuel/vapor back to the main tanks at approximately 7 gallons per hour. The dual-stack selector valve ensures that fuel returns only to the tank that is selected as the feed tank. For example, if the fuel selector is positioned to use fuel from the left hand tank, the fuel return system is returning fuel to the left hand tank only.

FUEL VENTING

Fuel system venting is essential to system operation. Complete blockage of the venting system will result in decreasing fuel flow and eventual engine stoppage. Venting consists of an interconnecting vent line between the tanks, and check valve equipped overboard vents in each tank. The overboard vents protrude from the bottom surfaces of the wings behind the wing struts, slightly below the upper attach points of the struts. The fuel filler caps are vacuum vented. The vents will open and allow air to enter the fuel tanks in case the overboard vents become blocked.

FUEL SELECTOR VALVE

The fuel selector is a four-position selector valve, labeled BOTH, RIGHT, LEFT and OFF. The selector handle must be pushed down before it can be rotated from RIGHT or LEFT to OFF.

The fuel selector valve should be in the BOTH position for takeoff, climb, landing, and maneuvers that involve prolonged slips or skids of more than 30 seconds. Operation from either LEFT or RIGHT tank is reserved for cruising flight.

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FUEL SYSTEM (Continued)

FUEL SELECTOR VALVE (Continued)

NOTE

When the fuel selector valve handle is in the BOTH position in cruising flight, unequal fuel flow from each tank may occur if the wings are not maintained exactly level. Resulting wing heaviness can be alleviated gradually by turning the selector valve handle to the tank in the "heavy" wing.

NOTE

It is not practical to measure the time required to consume all of the fuel in one tank, and, after switching to the opposite tank, expect an equal duration from the remaining fuel. The airspace in both fuel tanks is interconnected by a vent line and, therefore, some transferring of fuel between tanks can be expected when the tanks are nearly full and the wings are not level.

NOTE

Unusable fuel is at a minimum due to the design of the fuel system. However, with 1/4 tank or less, prolonged uncoordinated flight such as slips or skids can uncover the fuel tank outlets causing fuel starvation and engine stoppage. Therefore, with low fuel reserves, do not allow the airplane to remain in uncoordinated flight for periods in excess of one minute.

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FUEL SYSTEM (Continued)

FUEL DRAIN VALVES

The fuel system is equipped with multiple drain valves to provide a means for the examination of fuel in the system for contamination and grade. The system should be examined before each flight and after each refueling by using the sampler cup provided to drain fuel from each wing tank sump and the fuel strainer. If any evidence of fuel contamination is found, it must be eliminated in accordance with the Preflight Inspection checklist and the discussion in Section 8 of this publication. If takeoff weight limitations for the next flight permit, the fuel tanks should be filled after each flight to prevent condensation.

BRAKE SYSTEM

The airplane has a single-disc, hydraulically-actuated brake on each main landing gear wheel. Each brake is connected, by a hydraulic line, to a master cylinder attached to each of the pilot's rudder pedals. The brakes are operated by applying pressure to the top of either the pilot's or copilot's set of rudder pedals, which are interconnected. When the airplane is parked, both main wheel brakes may be set by utilizing the parking brake which is operated by a handle under the left side of the instrument panel. To set the parking brake, apply the brakes using the rudder pedals, pull the handle aft, and rotate it 90° down.

For maximum brake life, keep the brake system properly maintained, and minimize brake usage during taxi operations and landings.

Some of the symptoms of impending brake failure are: gradual decrease in braking action after brake application, noisy or dragging brakes, soft or spongy pedals, and excessive travel and weak braking action. If any of these symptoms appear, the brake system is in need of immediate attention. If, during taxi or landing roll, braking action decreases, let up on the pedals and then reapply the brakes with heavy pressure. If the brakes become spongy or pedal travel increases, pumping the pedals should build braking pressure. If one brake becomes weak or fails, use the other brake sparingly while using opposite rudder, as required, to offset the good brake.

ELECTRICAL SYSTEM

The airplane is equipped with a 28-volt, direct current electrical system (Refer to Figure 7-8). The system is powered by a belt driven, 60-amp alternator and a 24-volt battery, located in the engine compartment, just forward of the firewall on the right hand side. An optional 95-amp alternator is available with the prop de-ice option. Power is supplied to most general electrical circuits through a split primary bus bar, with an essential bus wired between the two primaries to provide power for the master switch and annunciator circuits.

Each primary bus bar is also connected to an avionics bus bar via a single avionics master switch. The primary buses are on anytime the master switch is turned on, and are not affected by starter or external power usage. The avionics buses are on when the master switch and avionics master switch are in the ON position.

⚠ CAUTION

PRIOR TO TURNING THE MASTER SWITCH ON OR OFF, STARTING THE ENGINE OR APPLYING AN EXTERNAL POWER SOURCE, THE AVIONICS MASTER SWITCH, SHOULD BE TURNED OFF TO PREVENT ANY HARMFUL TRANSIENT VOLTAGE FROM DAMAGING THE AVIONICS EQUIPMENT.

The airplane uses a power distribution module, located on the left forward side of the firewall, to house all relays used throughout the airplane electrical system. In addition, the alternator control unit and the external power connector are housed within the module.

ANNUNCIATOR PANEL

An annunciator panel (with integral toggle switch) is located above the avionics stack and provides caution (amber) and warning (red) messages for selected portions of the airplane systems. The annunciator is designed to flash messages for approximately 10 seconds to gain the attention of the pilot before changing to steady on. The annunciator panel cannot be turned off by the pilot.

(Continued Next Page)

ELECTRICAL SYSTEM (Continued)

ANNUNCIATOR PANEL (Continued)

Inputs to annunciator come from each fuel transmitter, low oil pressure switch, the vacuum transducers and the alternator control unit (ACU). Highly reliable individual LED bulbs illuminate each message. Illumination intensity can be controlled by placing the toggle switch to either the DIM or BRT position.

The annunciator panel can be tested by turning the master switch On and holding the annunciator panel switch in the TST position. All amber and red messages will flash until the switch is released.

NOTE

When the master switch is turned ON, some annunciators will flash for approximately 10 seconds before illuminating steadily. When the annunciator panel switch is toggled up and held in the TST position, all remaining annunciators will flash until the switch is released.

NOTE

When holding the annunciator panel switch in the TST position, with the optional prop de-ice on, the prop de-ice annunciator will change from green to amber and return to green when the switch is released.

MASTER SWITCH

The master switch is a split rocker type switch labeled MASTER, and is ON in the up position and OFF in the down position. The right half of the switch, labeled BAT, controls all electrical power to the airplane. The left half, labeled ALT, controls the alternator.

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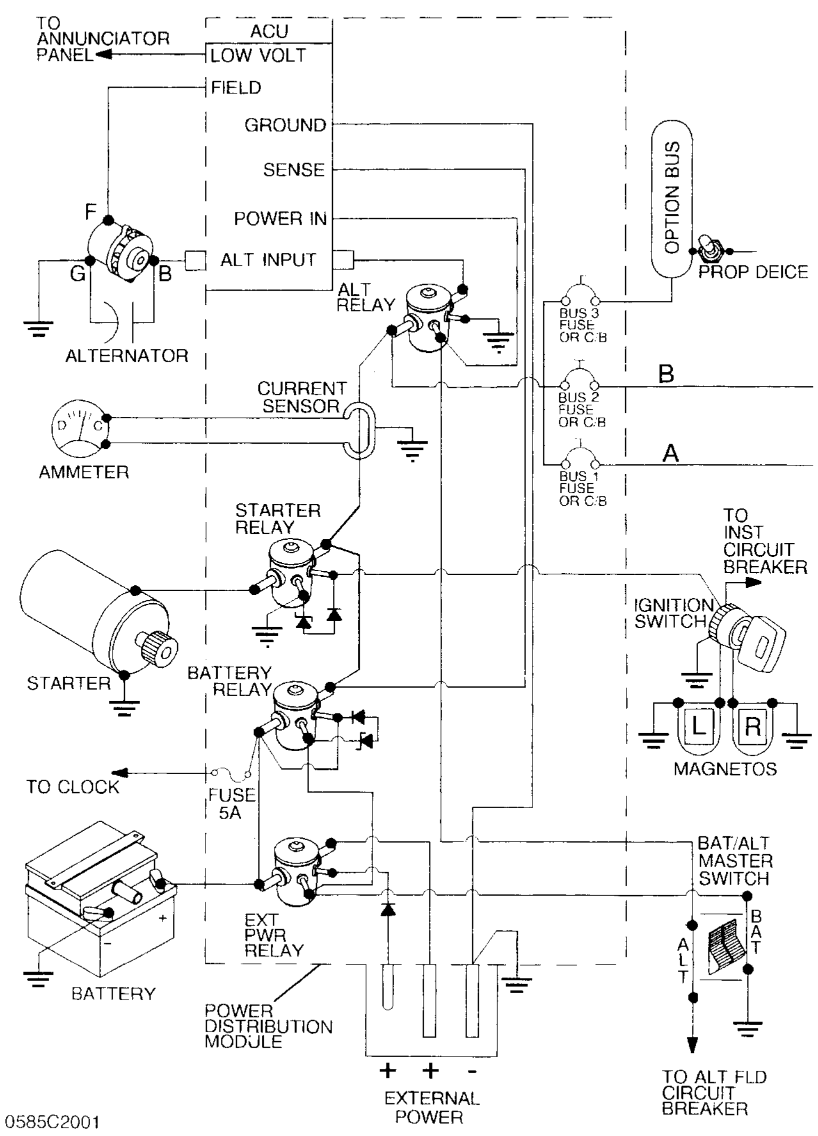

Figure 7-8. Electrical Schematic (Sheet 1 of 2)
Serials T20608001 thru T20608259.

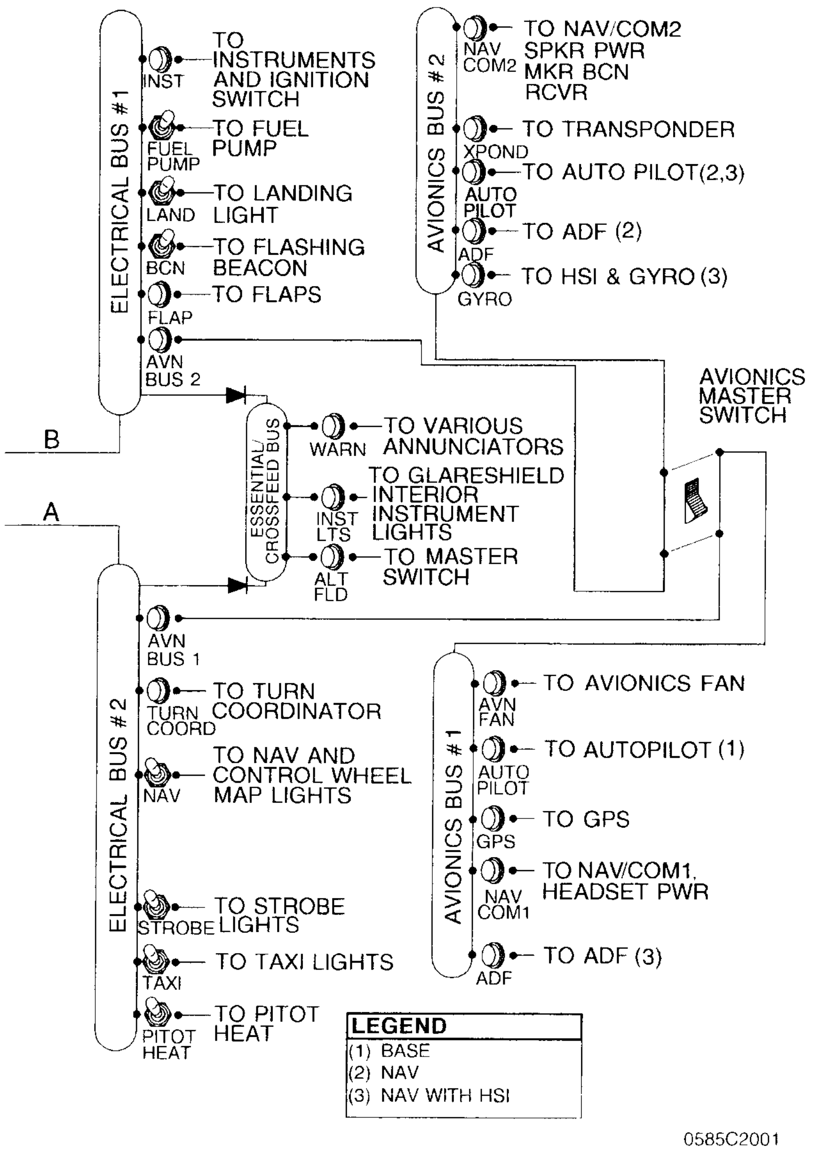

Figure 7-8. Electrical Schematic (Sheet 2)
Serials T20608001 thru T20608259.

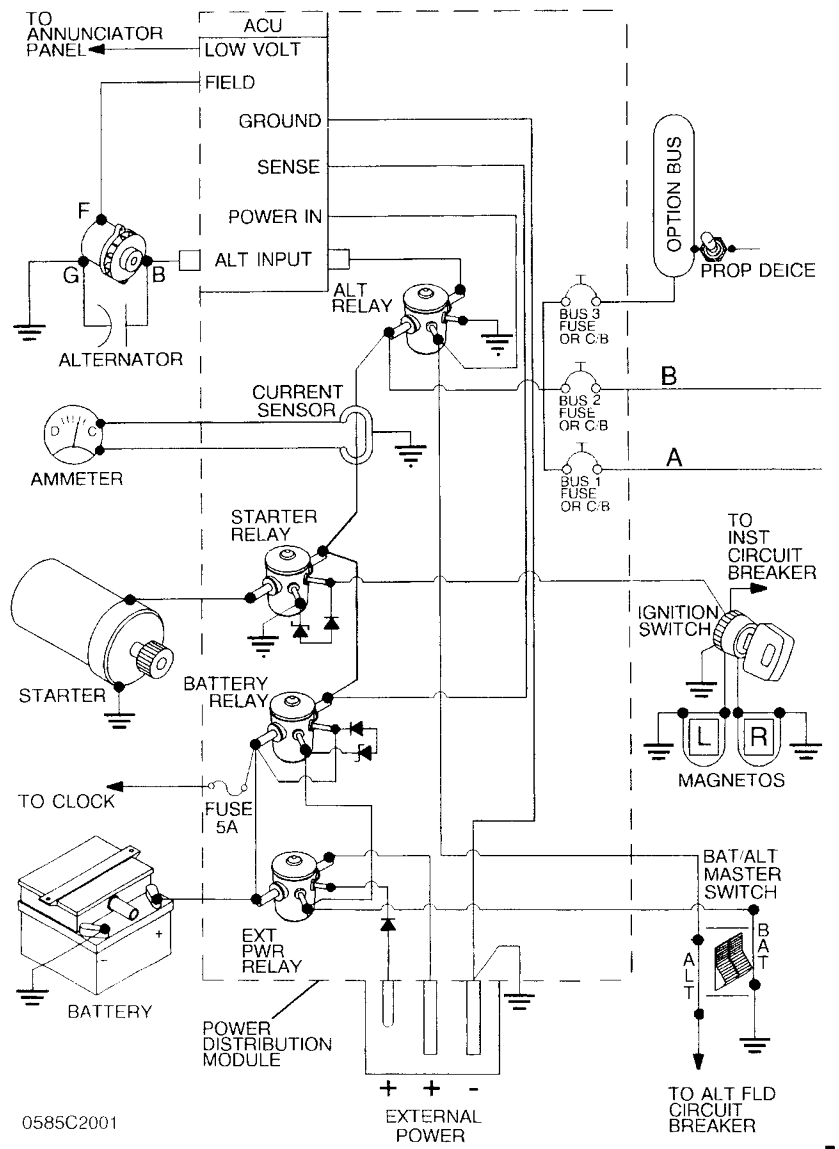

Figure 7-9. Electrical Schematic (Sheet 1 of 2)
Serials T20608260 and on.

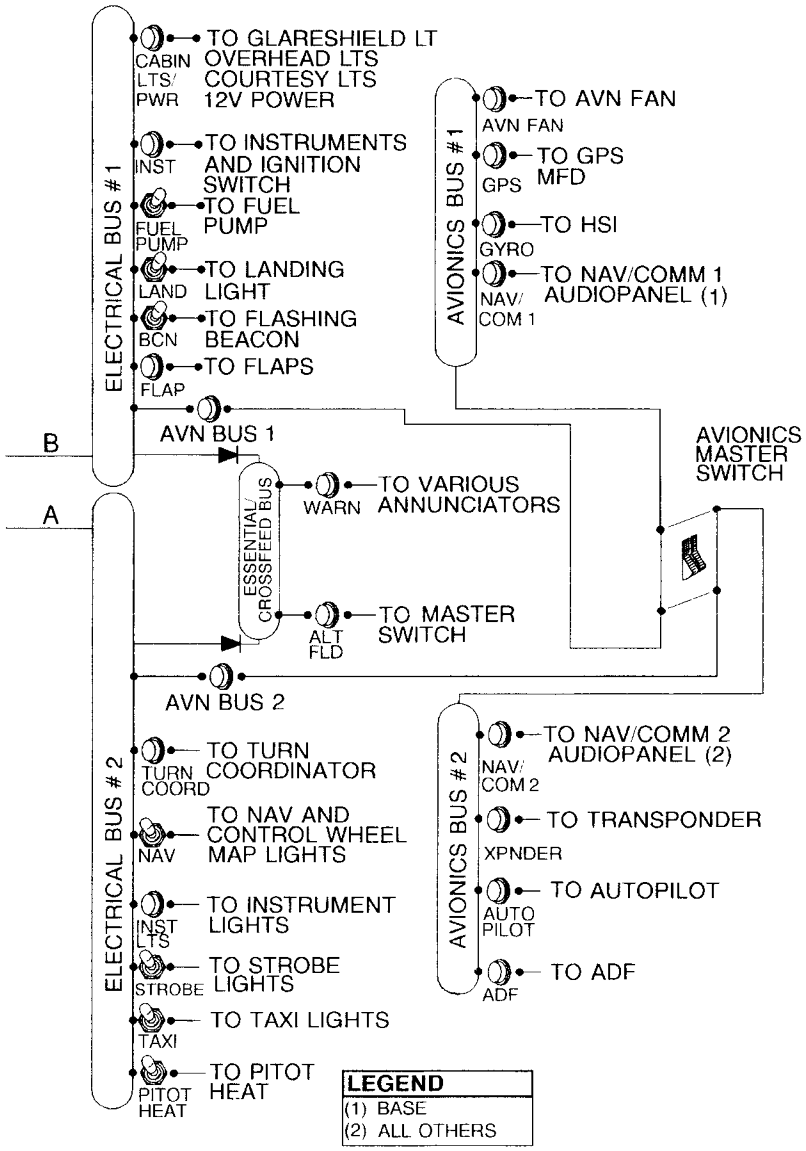

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Figure 7-9. Electrical Schematic (Sheet 2)
Serials T20608260 and on.

ELECTRICAL SYSTEM (Continued)

MASTER SWITCH (Continued)

CAUTION

PRIOR TO TURNING THE MASTER SWITCH ON OR OFF, STARTING THE ENGINE OR APPLYING AN EXTERNAL POWER SOURCE, THE AVIONICS MASTER SWITCH, SHOULD BE TURNED OFF TO PREVENT ANY HARMFUL TRANSIENT VOLTAGE FROM DAMAGING THE AVIONICS EQUIPMENT.

Normally, both sides of the master switch should be used simultaneously; however, the BAT side of the switch could be turned ON separately to check equipment while on the ground. To check or use avionics equipment or radios while on the ground, the avionics master switch must also be turned on. The ALT side of the switch, when placed in the off position, removes the alternator from the electrical system. With this switch in the OFF position, the entire electrical load is placed on the battery. Continued operation with the alternator switch in the OFF position will reduce battery power low enough to open the battery contactor and prevent alternator restart.

AVIONICS MASTER SWITCH

The avionics master switch, labeled AVIONICS MASTER, is located below the control wheel on the pilot's electrical subpanel. The avionics master switch (Refer to Figure 7-9) is a split rocker-type switch; one side controls power from Primary Bus 1 to Avionics Bus 1 while the other side controls power from Primary Bus 2 to Avionics Bus 2.

NOTE

On earlier serial number airplanes (Refer to Figure 7-7), the avionics master switch is a rocker switch that controls power to both Avionics Bus 1 and Avionics Bus 2 simultaneously. Some earlier serial number airplanes certified outside the United States may have the split avionics master switch installed.

(Continued Next Page)

ELECTRICAL SYSTEM (Continued)

AVIONICS MASTER SWITCH (Continued)

No electrical power will be supplied to the avionics equipment with the avionics master switch in the OFF position (regardless of the position of the master switch or the individual equipment switches). The avionics master switch should be placed in the OFF position prior to turning the master switch on or off.

Each avionics bus has a circuit breaker installed between the primary bus and the avionics master switch. In the event of an electrical malfunction, this breaker will trip and take the affected avionics bus off-line.

AMMETER

The vacuum gage/ammeter is located on the lower left side of the instrument panel. It indicates the amount of current, in amperes, from the alternator to the battery or from the battery to the airplane electrical system. When the engine is operating and the master switch is turned on, the ammeter indicates the charging rate applied to the battery. In the event the alternator is not functioning or the electrical load exceeds the output of the alternator, the ammeter indicates the battery discharge rate.

LOW VOLTAGE ANNUNCIATION

The low voltage warning annunciator is incorporated in the annunciator panel and activates any time voltage falls below 24.5 volts. If low voltage is detected, the red annunciator VOLTS will flash for approximately 10 seconds before illuminating steadily. The pilot cannot turn off the annunciator.

In the event an overvoltage condition occurs, the alternator control unit automatically trips the ALT FLD circuit breaker, removing alternator field current and shutting down the alternator. The battery will then supply system current as shown by a discharge rate on the ammeter. Under these conditions, depending on electrical system load, the low voltage warning annunciator will illuminate when system voltage drops below normal.

(Continued Next Page)

ELECTRICAL SYSTEM (Continued)

LOW VOLTAGE ANNUNCIATION (Continued)

The alternator control unit may be reset by resetting the circuit breaker. If the annunciator extinguishes, normal alternator charging has resumed; however, if the annunciator illuminates again, a malfunction has occurred, and the flight should be terminated as soon as practical.

NOTE

Illumination of the low voltage annunciator and ammeter discharge indications may occur during low RPM conditions with an electrical load on the system, such as during a low RPM taxi. Under these conditions, the annunciator will go out at higher RPM.

CIRCUIT BREAKERS AND FUSES

All circuit breakers inside the airplane are of the "push to reset" or "switch/breaker" type. The power distribution module (J-Box) uses either "push to reset" circuit breakers or spade type (automotive style) fuses. One glass type fuse is also used to provide power to the clock.

On aircraft using spade type fuses in the power distribution module (J-Box), a spare fuse is also included. If the spare fuse is used, a replacement spare should be obtained and reinstalled before the next flight.

GROUND SERVICE PLUG RECEPTACLE

A ground service receptacle plug is integral to the power distribution module and allows the use of an external power source for cold weather starting, and during lengthy maintenance work on electrical and avionics equipment. The receptacle is located on the left side of the airplane near the firewall. Access to the receptacle is gained by removing the cover plate.

(Continued Next Page)

ELECTRICAL SYSTEM (Continued)

GROUND SERVICE PLUG RECEPTACLE (Continued)

The ground service plug receptacle incorporates a circuit which will close the battery contactor when external power is applied with the master switch turned on. This circuit is intended as a servicing aid when battery power is too low to close the contactor, and should not be used to avoid performing proper maintenance procedures on a low battery.

NOTE

Use of the ground service plug receptacle for starting an airplane with "dead" battery or charging a "dead" battery in the airplane is not recommended. The battery should be removed from the airplane and serviced in accordance with Maintenance Manual procedures. Failure to observe this precaution could result in loss of electrical power during flight.

NOTE

If no avionics equipment is to be used or worked on, the avionics master switch should be turned off. If maintenance is required on the avionics equipment, it is advisable to utilize a regulated external power source to prevent damage to the avionics equipment by transient voltage. Do not crank or start the engine with the avionics master switch turned on.

NOTE

Just before connecting an external power source (generator type or battery cart), the avionics master switch and the master switch should be turned off.

(Continued Next Page)

ELECTRICAL SYSTEM (Continued)

GROUND SERVICE PLUG RECEPTACLE (Continued)

If there is any question as to the condition of the battery and/or alternator, the following check should be made after engine has been started and external power source has been removed.

1. Master Switch - - OFF.
2. Taxi and Landing Light Switches - - ON.
3. Engine RPM - - REDUCE to idle.
4. Master Switch - - ON (with taxi and landing lights turned on).
5. Engine RPM - - INCREASE to approximately 1500 RPM.
6. Ammeter and Low Voltage Annunciator - - CHECK.

NOTE

If the ammeter does not show a charge or the low voltage warning annunciator does not go out, the battery should be removed from the airplane and properly serviced prior to flight.

LIGHTING SYSTEMS

EXTERIOR LIGHTING

Exterior lighting consists of navigation lights on the wing tips and tip of the stinger, landing/taxi lights located in the left wing leading edge, a flashing beacon mounted on top of the vertical fin, and a strobe light on each wing tip. In addition, two courtesy lights are recessed into the lower surface of each wing and provide illumination for each cabin door area.

The exterior courtesy lights are turned on by pressing the courtesy light switch located in the pilot's overhead console. Pressing the courtesy light switch again will extinguish the lights. The remaining exterior lights are operated by switch/breakers located on the lower left instrument panel. To activate these lights, place switch in the ON position. To deactivate light, place in the OFF position.

(Continued Next Page)

LIGHTING SYSTEMS (Continued)

EXTERIOR LIGHTING (Continued)

NOTE

The strobes and flashing beacon should not be used when flying through clouds or overcast; the flashing light reflected from water droplets or particles in the atmosphere, particularly at night, can produce vertigo and loss of orientation.

INTERIOR LIGHTING

Interior lighting is controlled by a combination of overhead flood lighting, glareshield lighting, pedestal lighting, panel lighting, radio lighting and pilot control wheel lighting.

Flood lighting is accomplished using two lights in the front and two dome lights in the rear. These lights are contained in the overhead console. The two rear lights are turned on and off with push-type switches located near each light and are fixed position lights that provide for general illumination in the rear cabin area. The two front lights are individually dimmable from two knobs located next to the lights, rotating the knob clockwise for maximum brightness. These two lights provide lighting for the pilot and front passenger.

Glareshield lighting is accomplished using a fluorescent light molded into the glareshield. This light is controlled by rotating the GLARESHIELD LT dimmer, located below the pilot's panel. Rotating the dimmer clockwise increases light intensity, and rotating the dimmer counterclockwise decreases light intensity.

(Continued Next Page)

LIGHTING SYSTEMS (Continued)

INTERIOR LIGHTING (Continued)

Pedestal lighting consists of a single, hooded light located above the fuel selector an two lights located above the trim wheels. These lights are controlled by rotating the PEDESTAL LT dimmer, located below the pilot's panel. Rotating the dimmer clockwise increases light intensity, and rotating the dimmer counterclockwise decreases light intensity.

Panel lighting is accomplished using individual lights mounted in each instrument and gauge. These lights are wired in parallel and are controlled by the PANEL LT dimmer, located below the pilot's panel. Rotating the dimmer clockwise increases light intensity, and rotating the dimmer counterclockwise decreases light intensity. Back lighting intensity for radios and instrument lighting for the RH nav indicators, in the pilot's panel, is controlled by the TST (TEST) - BRT (DAY) - DIM (NIGHT) switch. When the switch is in the BRT (DAY) position, this lighting may be off regardless of the RADIO LT dimmer position. Some earlier aircraft will always have this lighting controlled by the RADIO LT dimmer.

Pilot control wheel lighting is accomplished by use of a rheostat and light assembly, located underneath the pilot control wheel yoke. The light provides downward illumination from the bottom of the yoke to the pilot's lap area. Rotating the dimmer clockwise (as viewed from below the wheel) increases light intensity, and rotating the dimmer counterclockwise decreases light intensity.

Regardless of the light system in question, the most probable cause of a light failure is a burned out bulb. However, in the event any of the lighting systems fail to illuminate when turned on, check the appropriate circuit breaker. If the circuit breaker has tripped, and there is no obvious indication of a short circuit (smoke or odor), turn off the light switch of the affected lights, reset the breaker, and turn the switch on again. If the breaker opens again, do not reset it until maintenance has been performed.

CABIN HEATING, VENTILATING AND DEFROSTING SYSTEM

The temperature and volume of airflow into the cabin can be regulated by manipulation of the push-pull CABIN HT and CABIN AIR controls (Refer to Figure 7-8). When partial cabin heat is desired, blending warm and cold air will result in improved ventilation and heat distribution throughout the cabin. Additional outside air for summer ventilation is provided through the heat and vent system by operation of the push-pull AUX CABIN AIR knob. All three control knobs are the double button type with locks to permit intermediate settings.

Front cabin heat and ventilating air is supplied by outlet holes spaced across a cabin manifold just forward of the pilot's and copilot's feet. Rear cabin heat and air is supplied by three ducts from the manifold, one outlet at each front doorpost area at floor level and one extending under the center of the cabin floor to an outlet in the floor behind the pilot and copilot seats. The cabin floor outlet is flush mounted, with a removable airflow diverter. Windshield defrost air is also supplied by a duct from the cabin manifold an outlet on top of the glareshield; therefore, the temperature of the defrosting air is the same as heated cabin air. A rotating control knob, labeled DEFROST, regulates the volume of air to the windshield. Turn the knob clockwise to ON and counterclockwise to OFF. Earlier serial airplanes have a push - pull control to regulate the volume of defrost air.

Additional cabin ventilation can be obtained from separate adjustable ventilators, one near each upper corner of the windshield and one near each forward cabin sidewall area just below the windshield sill area for the pilot and copilot. Four adjustable ventilators are in the cabin ceiling adjacent to the center and rear seat passengers.

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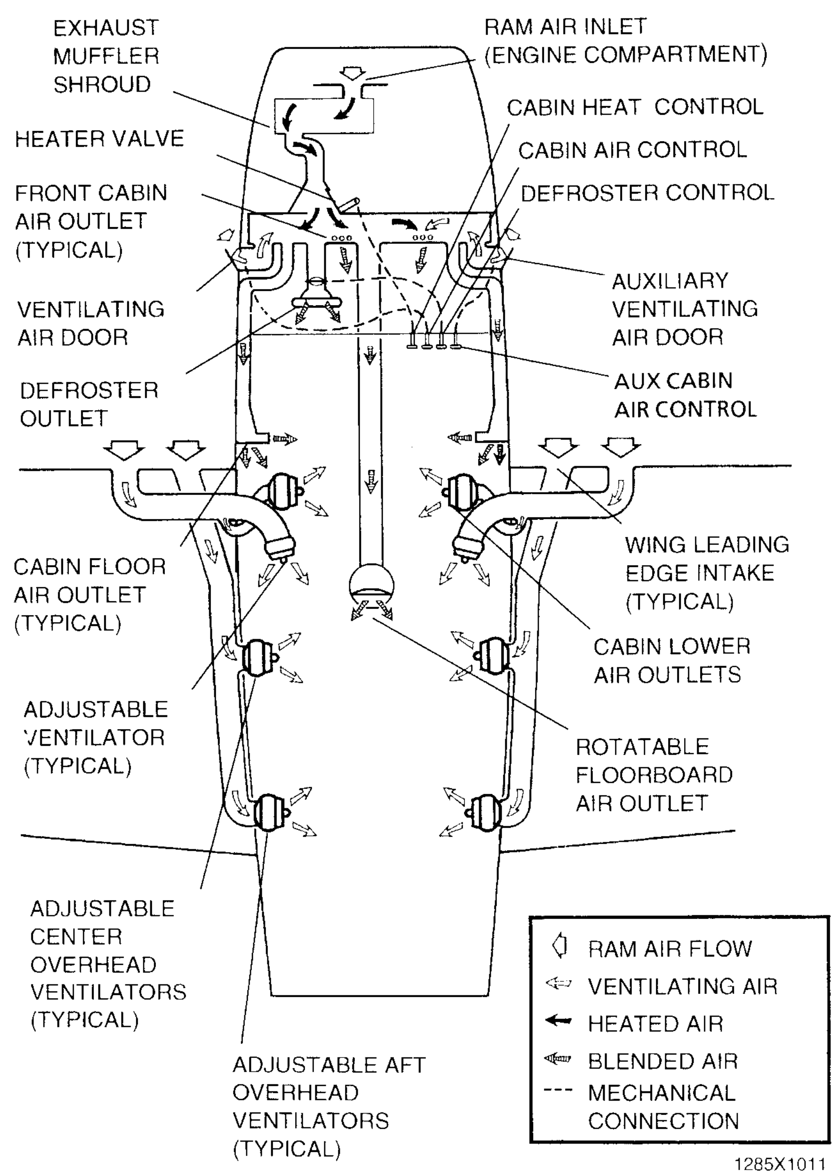

Figure 7-10. Cabin Heating, Ventilating, and Defrosting System

OXYGEN SYSTEM (Continued)

A six-place oxygen system provides the supplementary oxygen necessary for continuous flight at high altitude. In this system, a 76 cubic foot oxygen cylinder, located in the fuselage tailcone, supplies the oxygen. Cylinder pressure is reduced to an operating pressure of 70 PSI by a pressure regulator attached to the cylinder. A shutoff valve is included as part of the regulator assembly. An oxygen cylinder filler valve is located on the left side of the fuselage tailcone (under a cover plate). Cylinder pressure is indicated by a pressure gauge located in the overhead oxygen console above the pilot's and front passenger's seats.

Six oxygen outlets are provided; two in the overhead oxygen console and four in the cabin ceiling just above the side windows (one at each of the rear seating positions). One permanent, microphone-equipped mask is provided for the pilot, and five disposable type masks are provided for the passengers. All masks are the partial-breathing type, equipped with vinyl plastic hoses and flow indicators.

NOTE

The hose provided for the pilot is of a higher flow rate than those for the passengers; it is color-coded with a red band adjacent to the plug-in fitting. The passenger hoses are color-coded with an orange band. If the airplane owner prefers, he may provide higher flow hoses for all passengers. In any case, it is recommended that the pilot use the larger capacity hose. The pilot's mask is equipped with a microphone to facilitate use of the radio while using oxygen. An adapter cord is furnished with the microphone-equipped mask to mate the mask microphone lead to the auxiliary microphone jack located on the left side of the instrument panel.

(Continued Next Page)

OXYGEN SYSTEM (Continued)

To connect the oxygen mask microphone, connect the mask lead to the adapter cord and plug the cord into the auxiliary microphone jack. (If an optional microphone-headset combination has been in use, the microphone lead from this equipment is already plugged into the auxiliary microphone jack. It will be necessary to disconnect this lead from the auxiliary microphone jack so that the adapter cord from the oxygen mask microphone can be plugged into the jack.) A switch is incorporated on the left hand control wheel to operate the microphone.

A remote shutoff valve control, located adjacent to the pilot's oxygen outlet in the overhead oxygen console, is used to shut off the supply of oxygen to the system when not in use. The control is mechanically connected to the shutoff valve at the cylinder. With the exception of the shutoff function, the system is completely automatic and requires no manual regulation for change of altitude.

⚠ WARNING

OIL, GREASE OR OTHER LUBRICANTS IN CONTACT WITH OXYGEN CREATE A SERIOUS FIRE HAZARD, AND SUCH CONTACT MUST BE AVOIDED WHEN HANDLING OXYGEN EQUIPMENT.

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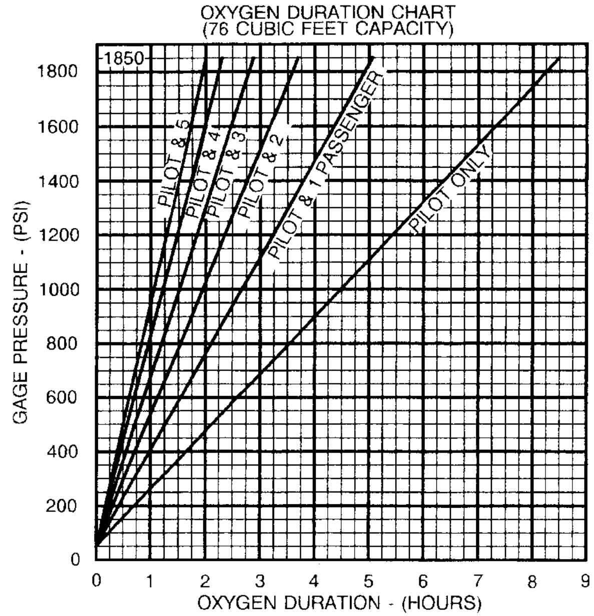

NOTE: THIS CHART IS BASED ON A PILOT WITH A RED COLOR - CODED OXYGEN LINE FITTING AND PASSENGERS WITH ORANGE COLOR - CODED LINE FITTINGS.

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Figure 7-11. Oxygen Duration Chart

OXYGEN SYSTEM (Continued)

The Oxygen Duration Chart (Figure 7-11) should be used in determining the usable duration (in hours) of the oxygen supply in your airplane. The following procedure outlines the method of finding the duration from the chart.

1. Note the available oxygen pressure shown on the pressure gauge.
2. Locate this pressure on the scale on the left side of the chart, then go across the chart horizontally to the right until you intersect the line representing the number of persons making the flight. After intersecting the line, drop down vertically to the bottom of the chart and read the duration in hours given on the scale.
3. As an example of the above procedure, 1800 PSI of pressure will safely sustain the pilot only for 8 hours and 15 minutes. The same pressure will sustain the pilot and three passengers for approximately 2 hours and 50 minutes.

NOTE

The Oxygen Duration Chart is based on a standard configuration oxygen system having one red color-coded hose assembly for the pilot and orange color-coded hoses for the passengers. If red color-coded hoses are provided for pilot and passengers, it will be necessary to compute new oxygen duration figures due to the greater consumption of oxygen with these hoses. This is accomplished by computing the total duration available to the pilot only (from PILOT ONLY line on chart), then dividing this duration by the number of persons (pilot and passengers) using oxygen.

(Continued Next Page)

OXYGEN SYSTEM (Continued)

When ready to use the oxygen system, proceed as follows:

1. Mask and Hose -- SELECT. Adjust mask to face and adjust metallic nose strap for snug mask fit.

⚠ WARNING

PERMIT NO SMOKING WHEN USING OXYGEN. OIL, GREASE, SOAP, LIPSTICK, LIP BALM, AND OTHER FATTY MATERIALS CONSTITUTE A SERIOUS FIRE HAZARD WHEN IN CONTACT WITH OXYGEN. BE SURE HANDS AND CLOTHING ARE OIL FREE BEFORE HANDLING OXYGEN EQUIPMENT.

2. Delivery Hose -- PLUG INTO OUTLET nearest to the seat you are occupying.

NOTE

When the oxygen system is turned on, oxygen will flow continuously at the proper rate of flow for any altitude without any manual adjustments.

3. Oxygen Supply Control Knob -- ON.
4. Face Mask Hose Flow Indicator -- CHECK. Oxygen is flowing if the indicator is being forced toward the mask.
5. Delivery Hose -- UNPLUG from outlet when discontinuing use of oxygen. This automatically stops the flow of oxygen.
6. Oxygen Supply Control Knob -- OFF when oxygen is no longer required.

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OXYGEN SYSTEM (Continued)

For FAA requirements concerning supplemental oxygen, refer to FAR 91.32. Supplemental oxygen should be used by all occupants when cruising above 12,500 feet. It is often advisable to use oxygen at altitudes lower than 12,500 feet under conditions of night flying, fatigue, or periods of physiological or emotional disturbances. Also, habitual and excessive use of tobacco or alcohol will usually necessitate the use of oxygen at less than 10,000 feet.

PITOT-STATIC SYSTEM AND INSTRUMENTS

The pitot-static system supplies dynamic air pressure to the airspeed indicator and static pressure to the airspeed indicator, vertical speed indicator and altimeter. The systems are composed of a heated pitot tube mounted on the lower surface of the left wing, two external static ports on the lower left and right sides of the forward fuselage, an alternate static source valve and the associated plumbing necessary to connect the instruments to the sources.

The heated pitot system consists of a heating element in the pitot tube, a 10-amp switch/breaker labeled PITOT HEAT, and associated wiring. The switch/breaker is located on the lower left side of the instrument panel. When the pitot heat switch is turned on, the element in the pitot tube is heated electrically to maintain proper operation in possible icing conditions.

A static pressure alternate source valve is installed above the throttle, and can be used if the external static source is malfunctioning. This valve supplies static pressure from inside the cabin instead of the external static port.

If erroneous instrument readings are suspected due to water or ice in the pressure lines going to the standard external static pressure source, the alternate static source valve should be pulled on.

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PITOT-STATIC SYSTEM AND INSTRUMENTS
(Continued)

Pressures within the cabin will vary with open heater/vents and windows. Refer to Section 5 for the configuration applicable to the use of the alternate static source and the correction charts.

AIRSPEED INDICATOR

The airspeed indicator is calibrated in knots. It incorporates an internal, rotatable ring which allows true airspeed to be read off the face of the dial. The indicator incorporates windows at the six and twelve o'clock positions. The window at the six o'clock position displays true airspeed, and the window at the twelve o'clock position displays pressure altitude overlayed with a temperature scale.

Limitation and range markings (in KIAS) include the white arc (47 to 100 knots), green arc (59 to 149 knots), yellow arc (149 to 182 knots), and a red line (182 knots).

To find true airspeed, first determine pressure altitude and outside air temperature. Using this data, rotate the lower left knob until pressure altitude aligns with outside air temperature in the twelve o'clock window. True airspeed (corrected for pressure and temperature) can now be read in the six o'clock window. For maximum accuracy the true airspeed should be read opposite the calibration airspeed.

VERTICAL SPEED INDICATOR

The vertical speed indicator depicts airplane rate of climb or descent in feet per minute. The pointer is actuated by atmospheric pressure changes resulting from changes of altitude as supplied by the static source.

ALTIMETER

Airplane altitude is depicted by a barometric type altimeter. A knob near the lower left portion of the indicator provides adjustment of the instrument's barometric scale to the current altimeter setting.

VACUUM SYSTEM AND INSTRUMENTS

The vacuum system (Refer to Figure 7-12) provides vacuum necessary to operate the attitude indicator and directional indicator. The system consists of two engine driven vacuum pumps, two switches for measuring vacuum available through each pump, a vacuum relief valve, a vacuum system air filter, vacuum operated instruments, a vacuum gage, a low vacuum warning on the annunciator, and a manifold with check valves to allow for normal vacuum system operation if one of the vacuum pumps should fail.

ATTITUDE INDICATOR

The attitude indicator is a vacuum/air-driven gyro that gives a visual indication of flight attitude. Bank attitude is presented by a pointer at the top of the indicator relative to the bank scale which has index marks at 10°, 20°, 30°, 60°, and 90° either side of the center mark. Pitch and roll attitudes are presented by a miniature airplane superimposed over a symbolic horizon area divided into two sections by a white horizon bar. The upper "blue sky" area and the lower "ground" area have pitch reference lines useful for pitch attitude control. A knob at the bottom of the instrument is provided for in-flight adjustment of the miniature airplane to the horizon bar for a more accurate flight attitude indication.

DIRECTIONAL INDICATOR

The directional indicator is a vacuum/air - driven gyro that displays airplane heading on a compass card in relation to a fixed simulated airplane image and index. The indicator will precess slightly over a period of time. Therefore, the compass card should be set with the magnetic compass just prior to takeoff and readjusted as required throughout the flight. A knob on the lower left edge of the instrument is used to adjust the compass card to correct for precession. A knob on the lower right edge of the instrument is used to move the heading bug.

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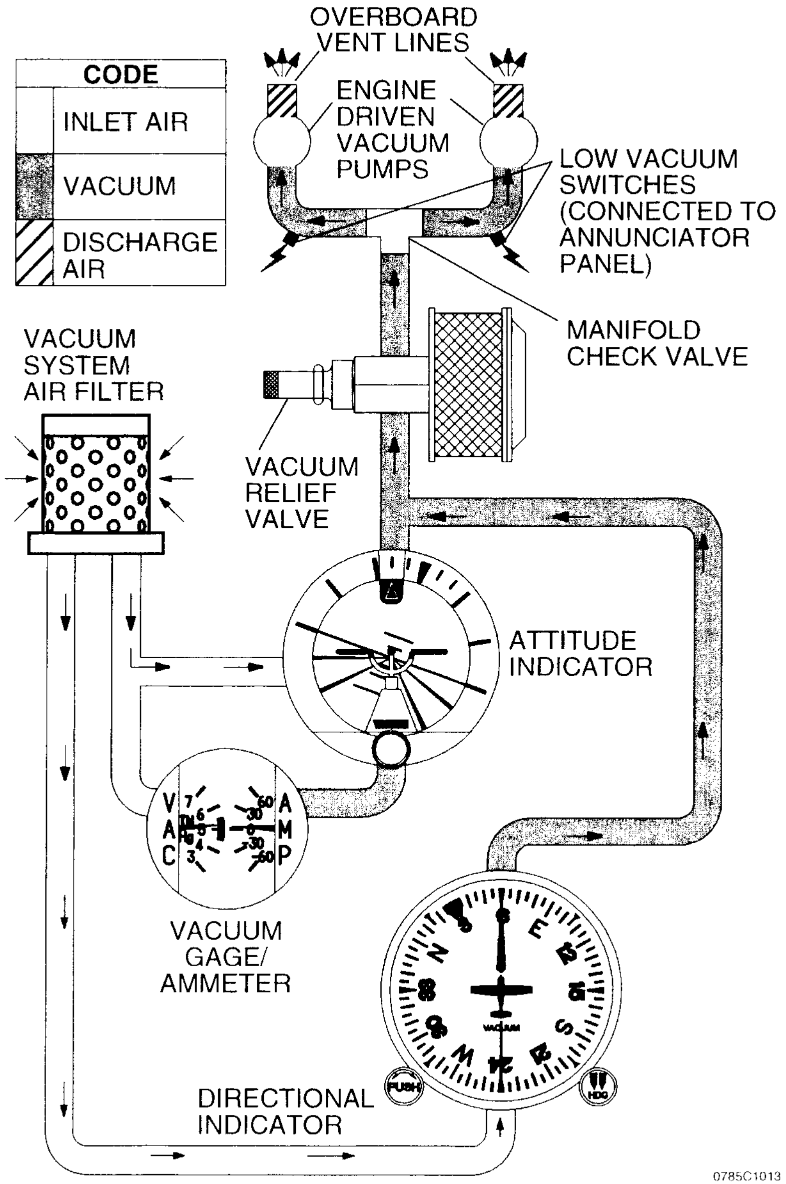

Figure 7-12. Vacuum System Schematic

VACUUM SYSTEM AND INSTRUMENTS (Continued)

VACUUM GAGE

The vacuum gage is part of the vacuum gage/ammeter, located on the lower left corner of the instrument panel. It is calibrated in inches of mercury and indicates vacuum air available for operation of the attitude and directional indicators. During operation at altitudes below 15,000 feet, the desired vacuum range is 4.5 to 5.5 inches of mercury. A vacuum reading out of this range at altitudes below 15,000 feet may indicate a system malfunction or improper adjustment, and in this case, the indicators should not be considered reliable. At 15,000 feet and above, the vacuum gage may indicate below 4.5 in. Hg. and still be adequate for normal vacuum system operation. A minimum vacuum gage reading of 4.5 in. Hg. is acceptable at 15,000 feet; for each additional 5000 foot altitude increment, up to 30,000 feet, a decrease of 0.5 in. Hg. is acceptable.

LOW VACUUM ANNUNCIATION

Each engine driven vacuum pump is plumbed to a common tee, located forward of the firewall. From the tee, a single line runs into the cabin to operate the various vacuum system instruments. This tee contains check valves to prevent back flow into a pump if it fails. Transducers are located just upstream of the tee and measure vacuum output of each pump.

If output of the left pump falls below 3.0 in. Hg., the amber L VAC message will flash on the annunciator panel for approximately 10 seconds before turning steady on. If output of the right pump falls below 3.0 in. Hg., the amber VAC R message will flash on the annunciator panel for approximately 10 seconds before turning steady on. If output of both pumps falls below 3.0 in. Hg., the amber L VAC R message will flash on the annunciator panel for approximately 10 seconds before turning steady on.

CLOCK/O.A.T. INDICATOR

An integrated clock/O.A.T./voltmeter is installed in the upper left side of the instrument panel as standard equipment. For a complete description and operating instructions, refer to the Supplements, Section 9.

STALL WARNING SYSTEM

The airplane is equipped with a vane-type stall warning system, in the leading edge of the left wing, which is electrically connected to a stall warning horn located in the headliner above the left cabin door. A 5-amp push-to-reset circuit breaker labeled WARN, on the right side of the switch and control panel, protects the stall warning system. The vane in the wing senses the change in airflow over the wing, and operates the warning horn at airspeeds between 5 and 10 knots above the stall in all configurations.

The airplane has a heated stall warning system, the vane and sensor unit in the wing leading edge is equipped with a heating element. The heated part of the system is operated and protected by the PITOT HEAT switch/breaker.

The stall warning system should be checked during the preflight inspection by momentarily turning on the master switch and actuating the vane in the wing. The system is operational if the warning horn sounds as the vane is pushed upward.

STANDARD AVIONICS

Standard avionics for the Model T206H airplanes include the following equipment:

Nav/Com Radio with Glide Slope
Indicator Head
Transponder
Audio Panel
Emergency Locator Transmitter (ELT)
Global Positioning System (GPS)
Single Axis Autopilot

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STANDARD AVIONICS (Continued)

For complete operating instructions on the standard and optional avionics systems, refer to the Supplements, Section 9.

AVIONICS SUPPORT EQUIPMENT

Avionics operations are supported by the avionics cooling fan, microphone and headset installations and static discharge wicks.

AVIONICS COOLING FAN

An avionics cooling fan is installed on the left side of the interior firewall. The system utilizes a single electric fan and associated ductwork to force-cool the center stack radios.

Power to the electric fan is supplied through the AVN FAN circuit breaker. The fan operates whenever the master and avionics master switches are ON.

MICROPHONE AND HEADSET INSTALLATIONS

Standard equipment for the airplane includes a handheld microphone, an overhead speaker, two remote-keyed microphone switches on the control wheel, and provisions for boom mic/headsets at each pilot and passenger station.

The handheld microphone contains an integral push-to-talk switch. This microphone is plugged into the center pedestal and is accessible to both the pilot and front passenger. Depressing the push-to-talk switch allows audio transmission on the Com radios.

The overhead speaker is located in the center overhead console. Volume and output for this speaker is controlled through the audio panel.

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AVIONICS SUPPORT EQUIPMENT (Continued)

MICROPHONE AND HEADSET INSTALLATIONS (Continued)

Each control wheel contains a miniature push-to-talk switch. This switch allows the pilot or front passenger to transmit on the Com radios using remote mics.

Each station of the airplane is wired for aviation-style headsets. Mic and headphone jacks are located on each respective arm rest and allow for communications between passengers and pilot. The system is wired so that microphones are all voice-activated. Additional wiring provisions inside the audio panel ensure that only the pilot or front passenger can transmit through the Com radios.

NOTE

To ensure audibility and clarity when transmitting with the handheld microphone, always hold it as closely as possible to the lips, then key the microphone and speak directly into it. Avoid covering opening on back side of microphone for optimum noise canceling.

STATIC DISCHARGERS

Static wicks (static dischargers) are installed at various points throughout the airframe to reduce interference from precipitation static. Under some severe static conditions, loss of radio signals is possible even with static dischargers installed. Whenever possible, avoid known severe precipitation areas to prevent loss of dependable radio signals. If avoidance is impractical, minimize airspeed and anticipate temporary loss of radio signals while in these areas.

Static dischargers lose their effectiveness with age, and therefore, should be checked periodically (at least at every annual inspection) by qualified avionics technicians, etc.

CABIN FEATURES

EMERGENCY LOCATOR TRANSMITTER (ELT)

A remote switch/annunciator is installed on the top center location of the copilot's instrument panel for control of the ELT from the flight crew station. The annunciator, which is in the center of the rocker switch, illuminates when the ELT transmitter is transmitting. The ELT emits an omni-directional signal on the international distress frequencies of 121.5 MHz and 243.0 MHz. General aviation and commercial aircraft, the FAA and CAP monitor 121.5 MHz, and 243.0 Mhz is monitored by the military. For a basic overview of the ELT, refer to the Supplements, Section 9.

CABIN FIRE EXTINGUISHER

A portable Halon 1211 (Bromochlorodifluoromethane) fire extinguisher is installed on the floorboard between the pilot's and copilot's seats where it is accessible in case of fire. The extinguisher has an Underwriters Laboratories classification of 5B:C. The extinguisher should be checked prior to each flight to ensure that its bottle pressure, as indicated by the gauge on the bottle, is within the green arc (approximately 125 psi) and the operating lever lock pin is securely in place.

To operate the fire extinguisher:

1. Loosen retaining clamp(s) and remove extinguisher from bracket.
2. Hold extinguisher upright, pull operating lever lock pin, and press lever while directing the discharge at the base of the fire at the near edge. Progress toward the back of the fire by moving the nozzle rapidly with a side to side sweeping motion.

(Continued Next Page)

CABIN FEATURES (Continued)

CABIN FIRE EXTINGUISHER (Continued)

WARNING

VENTILATE THE CABIN PROMPTLY AFTER SUCCESSFULLY EXTINGUISHING THE FIRE TO REDUCE THE GASES PRODUCED BY THERMAL DECOMPOSITION.

3. Anticipate approximately eight seconds of discharge duration.

Fire extinguishers should be recharged by a qualified fire extinguisher agency after each use. Such agencies are listed under "Fire Extinguisher" in the telephone directory. After recharging, secure the extinguisher to its mounting bracket; do not allow it to lie loose on shelves or seats.