PILOT'S OPERATING HANDBOOK

PIPER CHEROKEE SIX 300

FAA APPROVED IN NORMAL CATEGORY BASED ON CAR 3. THIS HANDBOOK INCLUDES THE MATERIAL REQUIRED TO BE FURNISHED TO THE PILOT BY CAR 3 AND CONSTITUTES THE APPROVED AIRPLANE FLIGHT MANUAL AND MUST BE CARRIED IN THE AIRPLANE AT ALL TIMES.

AIRPLANE SERIAL NO. _____

AIRPLANE REGISTRATION NO. _____

PA-32-300
REPORT: VB-830

FAA APPROVED BY: Ward Evans
WARD EVANS
D.O.A. NO. SO-1
PIPER AIRCRAFT CORPORATION
VERO BEACH, FLORIDA

DATE OF APPROVAL: AUGUST 19, 1976

HANDBOOK PART NO. 761 632

WARNING

EXTREME CARE MUST BE EXERCISED TO LIMIT THE USE OF THIS HANDBOOK TO APPLICABLE AIRCRAFT. THIS HANDBOOK REVISED AS INDICATED BELOW OR SUBSEQUENTLY REVISED IS VALID FOR USE WITH THE AIRPLANE IDENTIFIED ON THE FACE OF THE TITLE PAGE WHEN OFFICIALLY APPROVED. SUBSEQUENT REVISIONS SUPPLIED BY PIPER AIRCRAFT CORPORATION MUST BE PROPERLY INSERTED.

MODEL PA-32-300, CHEROKEE SIX

PILOT'S OPERATING HANDBOOK, REPORT: VB-830 REVISION _____

PIPER AIRCRAFT CORPORATION
APPROVAL SIGNATURE AND STAMP _____

Published by
PUBLICATIONS DEPARTMENT
Piper Aircraft Corporation
Issued: August 19, 1976

APPLICABILITY

Application of this handbook is limited to the specific Piper PA-32-300 model airplane designated by serial number and registration number on the face of the title page of this handbook.

This handbook cannot be used for operational purposes unless kept in a current status.

REVISIONS

The information compiled in the Pilot's Operating Handbook will be kept current by revisions distributed to the airplane owners.

Revision material will consist of information necessary to update the text of the present handbook and/or to add information to cover added airplane equipment.

I. Revisions

Revisions will be distributed whenever necessary as complete page replacements or additions and shall be inserted into the handbook in accordance with the instructions given below:

1. Revision pages will replace only pages with the same page number.
2. Insert all additional pages in proper numerical order within each section.
3. Page numbers followed by a small letter shall be inserted in direct sequence with the same common numbered page.

II. Identification of Revised Material

Revised text and illustrations shall be indicated by a black vertical line along the outside margin of the page, opposite revised, added or deleted material. A line along the outside margin of the page opposite the page number will indicate that an entire page was added.

Black lines will indicate only current revisions with changes and additions to or deletions of existing text and illustrations. Changes in capitalization, spelling, punctuation or the physical location of material on a page will not be identified by symbols.

ORIGINAL PAGES ISSUED

The original pages issued for this handbook prior to revison are given below:

Title, ii through v, 1-1 through 1-14, 2-1 through 2-10, 3-1 through 3-12, 4-1 through 4-16, 5-1 through 5-30, 6-1 through 6-56, 7-1 through 7-24, 8-1 through 8-16, 9-1 through 9-22, 10-1 through 10-2.

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS

Current Revisions to the PA-32-300 Cherokee Six Pilot's Operating Handbook, REPORT: VB-830 issued August 19, 1976.

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 1 - 761 632 (PR770125)	3-4	Revised Open Door procedure.	
	3-12	Revised para. 3.29 info.	
	4-7	Added Caution to para. 4.9; relocated material to page 4-8.	
	4-8	Added relocated material from page 4-7; revised wording in para. 4.9.	
	4-15	Added Note to para. 4.31.	
	6-4	Added A & B values to Fig. 6-3.	
	6-5	Revised weight and balance formula.	
	6-21	Added Weight, Arm and Moment to item 13a.; added item 13b.; changed existing item 13b. to 13c.	
	6-37	Revised item 115 Dwg. 99002-5 to -8, item 117 Dwg. 99003-5 to -8 and item 119 Cert. Basis - STC C6c, C9c, C52c to TSO C6c, C9c, C52c.	
	7-19	Added info to Note in para. 7.27.	Ward Evans
	10-1	Revised 10.3 (c); relocated material to page 10-2.	Ward Evans
	10-2	Added relocated material from page 10-1.	Jan. 25, 1977
Rev. 2 - 761 632 (PR770406)	1-6	Revised item 1.19 (b).	
	2-5	Revised para. 2.29.	
	6-4	Revised Figure 6-3.	Ward Evans
	6-53	Added 79592-2 seat to item 293; added 79592-3 seat to item 295.	Ward Evans
	7-24	Revised Note.	April 6, 1977
Rev. 3-761632 (PR770812)	1-11, 1-12, 1-13, 1-14	Revised para. 1.21, Conversion Factors	
	5-4	Revised footnote figure nos.	
	5-5	Revised item 5.5 (d) and (e) figure nos.	
	5-9	Revised page nos.; revised titles; added pages; added figures.	
	5-21	Revised figure title; added serial nos.	
	5-22	Revised figure title and nos., added serial nos. and relocated existing chart to page 5-24; added new chart (Figure 5-21)	
	5-23	Revised figure no., added serial nos., revised curves and relocated existing chart to page 5-26; added new chart (Figure 5-23)	

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS (cont)

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev.3-761632 (PR770812) (cont.)	5-24	Revised figure no., added serial nos., revised curves and relocated existing chart to page 5-28; added relocated chart from page 5-22.	
	5-25	Revised figure title and no. and relocated existing chart to page 5-30; added new chart (Figure 5-27)	
	5-26	Revised figure title and no. and relocated existing chart to page 5-31; added relocated chart from page 5-23.	
	5-27	Revised figure no. and relocated existing chart to page 5-32; added new chart (Figure 5-31)	
	5-28	Revised figure no. and relocated existing chart to page 5-33; added relocated chart from page 5-24.	
	5-29	Revised figure no. and relocated existing chart to page 5-34; added new chart (Figure 5-35)	
	5-30	Revised figure no. and relocated existing chart to page 5-35; added relocated chart from page 5-25.	
	5-31	Added page (added relocated chart from page 5-26)	
	5-32	Added page (added relocated chart from page 5-27)	
	5-33	Added page (added relocated chart from page 5-28)	
	5-34	Added page (added relocated chart from page 5-29)	
	5-35	Added page (added relocated chart from page 5-30)	
	6-33	Added items 71 and 73.	
	6-45	Added new item 2.21; revised item nos. from 2.21 on; relocated items.	
	6-46	Revised item nos.; added relocated items; added new items; relocated items; removed footnote; revised footnote.	
	6-47	Revised item nos.; added new items; added relocated items; revised items; relocated items; revised footnote.	
	6-48	Revised item nos., added relocated items; added new items; added footnotes.	
	6-49	Revised item nos.; revised items; added item.	
	6-53	Revised item nos.; revised items.	
	6-54	Revised item nos.	
	6-55	Revised item nos.; revised items; added items.	
	7-9	Revised para. 7.15 item 2.	
	7-10	Added switch panel light description to 7.17 electrical system.	
	7-11	Revised Figure 7-11.	

PILOT'S OPERATION HANDBOOK LOG OF REVISIONS (cont)

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 3-761632 (PR770812) (cont.)	7-12	Added switch panel light to Figure 7-13; added cabin courtesy light description to 7.17, electrical system.	
	7-15	Added switch panel light to Figure 7-17; added no. 44 to list.	
	7-17	Added alternate static source information to 7.23, Pitot Static System.	Ward Evans
	7-20	Added baggage light information to 7.29, baggage area.	Ward Evans August 12, 1977
Rev. 4 - 761 632 (PR780921)	1-2	Revised Fig. 1-1	
	1-3	Added new fuel info. and ser. no. effectivity.	
	1-4	Revised standard airplane weight and baggage space info.	
	1-6	Changed the spelling of celcius to celsius.	
	1-8	Revised definition.	
	1-12	Changed conversion values.	
	2-i	Revised index.	
	2-1	Revised weight.	
	2-2	Revised info.	
	2-3	Revised fuel press. info.	
	2-4	Revised title to 2.19.	
	2-5	Added fuel limitation info. and ser. no. effectivity for 2.25.	
	2-6	Added item 2.29.	
	2-8 thru 2-10	Revised placards.	
	4-i	Revised index.	
	4-3, 4-4	Revised 4.5 and relocated material to pg. 4-5.	
	4-5	Added material from pg. 4-4 and relocated material to pg. 4-6.	
	4-6	Added items from pg. 4-5.	
	4-7 thru 4-9	Revised item 4.9 and relocated items 4.11 and 4.13 to pg. 4-10.	
	4-10	Added item 4.11 from pg. 4-8 and item 4.13 from pg. 4-9. Revised para. and relocated items to pg. 4-11.	
	4-11	Added material from pg. 4-10.	
	4-14	Revised paragraph.	
	5-3	Revised item 5.5 (a) (2).	
	5-5	Revised item 5.5 (e) (5).	
	5-9	Revised List of Figures.	
	5-17	Added note.	
	5-21	Revised weight.	
	5-27	Added ser. no. effectivity to Fig. 5-31 and added note.	
	5-26	Added note.	
	5-28	Relocated Fig. 5-33 to pg. 5-28a; added chart, Fig. 5-32 and added note.	

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS (cont)

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 4 - 761 632 (PR780921) (cont)	5-28a	Added pg. (added relocated chart from pg. 5-28) and added note.	
	5-28b	Added pg. (added relocated chart from pg. 5-29); revised ser. no.; and added note.	
	5-29	Relocated Fig. 5-35 to pg. 5-28b (added new chart, Fig. 5-36); and added note.	
	5-30	Revised ser. no. effectivity.	
	5-30a	Added pg. (added new chart, Fig. 5-38).	
	5-30b	Added pg. (added relocated chart from pg. 5-31).	
	5-31	Relocated Fig. 5-39 to pg. 5-30b (added new chart, Fig. 5-40).	
	5-35	Revised tailwind and headwind values.	
	6-i	Revised item letters.	
	6-3	Added ser. no. effectivity to defueling airplane info.	
	6-7	Added ser. no. effectivity to standard empty weight info.	
	6-11, 6-12	Added ser. no. effectivity to weight and balance chart; added arm aft datum change for new fuel system; removed footnote.	
	6-17	Added material, revised nos., and added letters.	
	6-19	Added items, revised numbers and added letters.	
	6-21	Added items, revised nos., added letters and added weight, arm and moment.	
	6-23	Added items.	
	6-25	Added items, revised nos., added letters and added weight, arm and moment to items.	
	6-27	Added items, revised nos., added letters and added weight, arm and moment to items.	
	6-28	Added items.	
	6-29	Revised heading.	
	6-31	Revised heading and added items.	
	6-33	Revised nos., added letter and revised weight, moment and arm to item 121.	
	6-35	Revised nos., added item 135 (c) and deleted Cert. Basis - TC A3SO on all items.	
	6-36	Revised nos. and deleted Cert. Basis - TC A3SO.	
	6-37	Revised nos., deleted item 113, added: 167 (b), 169 (b) & (c); revised 171 and 173 and added letter to 173. Relocated item 123 to pg. 6-38 and items 127 and 129 to pg. 6-39. Deleted items 125 and 131.	
	6-38	Relocated items 133 and 135 to pg. 6-39 and items 137 and 139 to pg. 6-40; added items 175, 179 and 181; revised item no. and item description for item 177 and added letter to item 177.	

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS (cont)

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 4 - 761 632 (PR780921) (cont)	6-39	Revised title; added relocated items, added new items; revised relocated item nos.	
	6-40	Added relocated items; added new items; revised relocated item nos.	
	6-41	Revised title; added relocated items; added new items; revised relocated item nos.	
	6-43	Added relocated items; revised items; relocated items; revised relocated item nos.	
	6-44	Revised items.	
	6-45	Added relocated items; revised items; revised relocated item nos.	
	6-46	Added relocated items; revised nos.; revised items.	
	6-47	Revised item nos.; added relocated items; revised items; relocated items.	
	6-48	Revised item nos.; added relocated items; revised items; relocated items.	
	6-49	Revised item nos.; added relocated items; revised items; relocated items.	
	6-50	Revised item nos.; added relocated items; relocated items.	
	6-51	Revised item nos.; added relocated items; revised items.	
	6-52	Added relocated item.	
	6-53	Revised item nos.; revised items.	
	6-54	Revised item nos.; revised items.	
	6-55	Revised item nos.; revised items; added new items.	
	7-i	Revised index.	
	7-4	Added ser. no. effectivity for Fig. 7-1.	
	7-4a	Added pg. (added Fig. 7-1a).	
	7-4b	Added pg. (added relocated item from pg. 7-5).	
	7-5	Relocated item 7.11 to pg. 7-4b and added relocated fig. from pg. 7-6.	
	7-6	Relocated Fig. 7-3 to pg. 7-5; added relocated fig. and info. from pg. 7-7.	
	7-7	Relocated Fig. 7-5 and item 7.13 to pg. 7-6; added relocated fig. from pg. 7-8.	
	7-8	Relocated Fig. 7-7 to pg. 7-7 (added Fig. 7-7a).	
	7-9	Added ser. no. effectivity to 7.15 Fuel System.	
	7-10	Relocated 7.17 to pg. 7-10b and added new info. to 7.15 Fuel System.	
	7-10a	Added pg. (added new fuel system info.).	
	7-10b	Added pg. (added 7.17 from pgs. 7-10 and 7-12).	
	7-12	Relocated info. to pg. 7-10b and revised Fig. 7-13.	
	7-14	Revised paragraph.	
	7-15	Added ser. no. effectivity for Fig. 7-17.	
	7-16	Relocated Fig. 7-19 to pg. 7-16b.	
	7-16a	Added pg. (added Fig. 7-17a).	

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS (cont)

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 4 - 761 632 (PR780921) (cont.)	7-16b	Added pg. (added relocated fig. from pg. 7-16).	
	7-20	Relocated 7.29, 7.31 and 7.33 to pg. 7-20a. Added info. to 7.27.	
	7-20a	Added pg. (added relocated items from pg. 7-20).	
	7-20b	Added pg. (added relocated items from pgs. 7-21 and 7-22).	
	7-21	Relocated 7.35 to pg. 7-20b and revised Fig. 7-23.	
	7-22	Relocated info. to pg. 7-20b and added relocated item from pg. 7-23.	
	7-23	Relocated 7.39 to pg. 7-22 and added info. from pg. 7-24; added para. 7-41, Radar.	
	7-24	Relocated info. to pg. 7-23.	
	8-11	Revised and relocated info. to pg. 8-12a.	
	8-12	Relocated info. to pg. 8-12a and revised Fig. 8-3.	
	8-12a	Added pg. (added and revised relocated info. from pgs. 8-11 and 8-12).	
	8-12b	Added pg. (added and revised relocated info. from pg. 8-13).	
	8-13	Relocated info. to pg. 8-12b and added relocated info. from pg. 8-14.	
	8-14	Relocated info. to pg. 8-13.	
	9-i	Revised index.	
	9-13	Added serial no. effectivity and revised item in Supplement 4.	
	9-21	Changed Supplement 5 to 6; relocated Supplement 6 to pg. 9-29 and added new Supplement 5.	
	9-22	Relocated info. to pg. 9-30 and added new info.	
	9-23 thru 9-28	Added pgs. (added new Supplement).	
	9-29	Added pg. (added relocated info.).	Ward Evans
	9-30	Added pg. (added relocated info.).	
	10-1	Removed info. and added info. from pg. 10-2.	Ward Evans
	10-2	Removed info. and relocated info. to pg. 10-1.	Sept. 21, 1978
Rev. 5 - 761 632 (PR790201)	1-13	Changed statue to statute.	
	6-1	Revised paragraphs.	
	6-4	Revised value.	
	6-21	Revised arms and moments for item 33.	
	6-25	Revised items 55 and 63.	
	6-33	Revised arm for item 121.	
	6-41	Revised moment for item 213.	Ward Evans
	7-10	Revised paragraph.	
	7-10b	Added note.	Ward Evans
	8-11	Revised item 8.21 (b).	Feb. 1, 1979

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS (cont)

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 6 - 761 632 (PR790413)	6-51	Revised item 347; added new item 348; re-numbered item 348 to 349 and item 349 to 350.	Ward Evans Ward Evans April 13, 1979
	7-i	Revised para. 7.41 pg. no.	
	7-22	Revised para. 7.39 info.	
	7-23	Revised para. 7.39 info.; relocated para. 7.41 to pg. 7-24.	
	7-24	Added para. 7.41 from pg. 7-23.	

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION 1

GENERAL

SECTION 1

GENERAL

1.1 INTRODUCTION

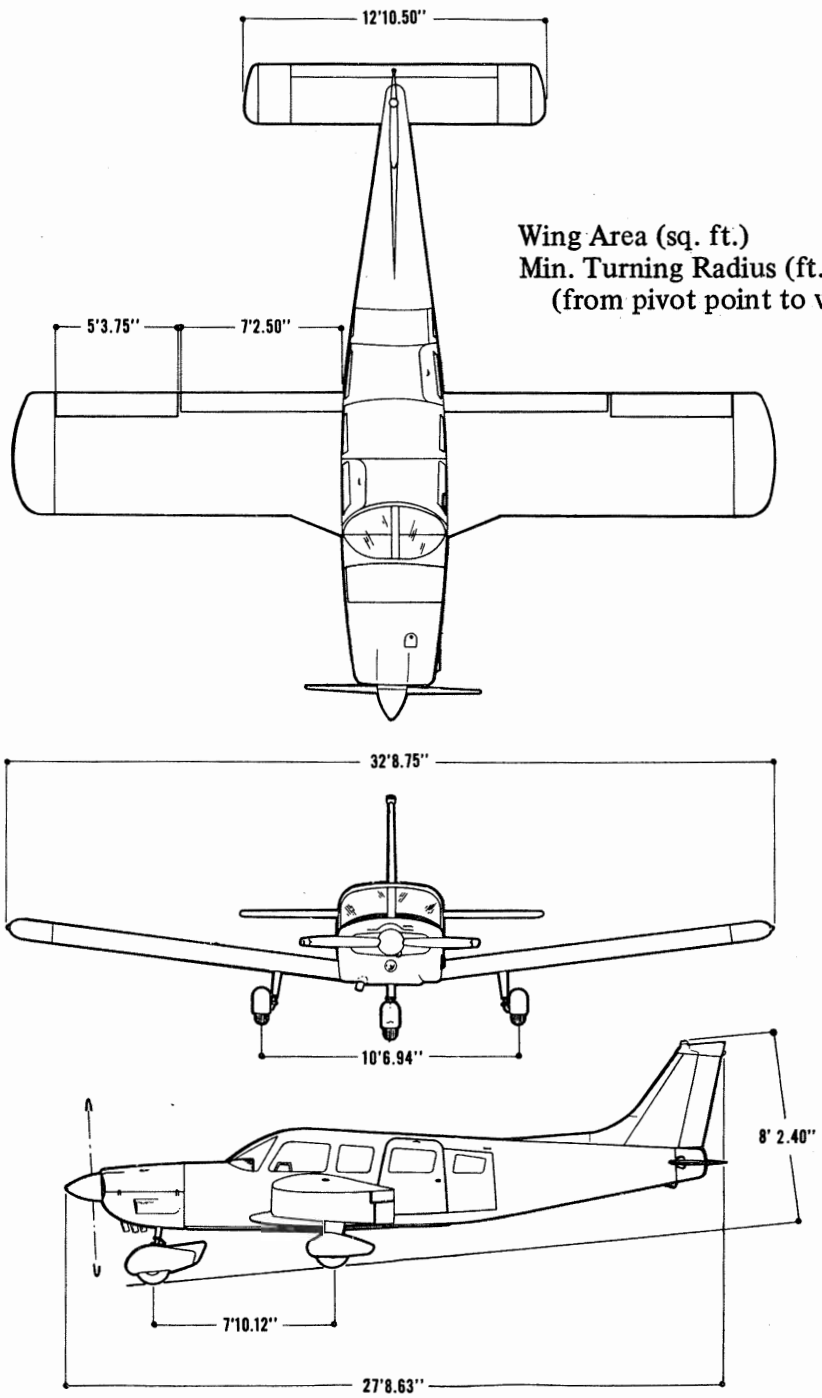
This Pilot's Operating Handbook is designed for maximum utilization as an operating guide for the pilot. It includes the material required to be furnished to the pilot by C.A.R. 3. It also contains supplemental data supplied by the airplane manufacturer.

This handbook is not designed as a substitute for adequate and competent flight instruction, knowledge of current airworthiness directives, applicable federal air regulations or advisory circulars. It is not intended to be a guide for basic flight instruction or a training manual and should not be used for operational purposes unless kept in a current status.

Assurance that the airplane is in an airworthy condition is the responsibility of the owner. The pilot in command is responsible for determining that the airplane is safe for flight. The pilot is also responsible for remaining within the operating limitations as outlined by instrument markings, placards, and this handbook.

Although the arrangement of this handbook is intended to increase its in-flight capabilities, it should not be used solely as an occasional operating reference. The pilot should study the entire handbook to familiarize himself with the limitations, performance, procedures and operational handling characteristics of the airplane before flight.

The handbook has been divided into numbered (arabic) sections each provided with a "finger-tip" tab divider for quick reference. The limitations and emergency procedures have been placed ahead of the normal procedures, performance and other sections to provide easier access to information that may be required in flight. The "Emergency Procedures" Section has been furnished with a red tab divider to present an instant reference to the section. Provisions for expansion of the handbook have been made by the deliberate omission of certain paragraph numbers, figure numbers, item numbers and pages noted as being intentionally left blank.



Wing Area (sq. ft.)	174.5
Min. Turning Radius (ft.) (from pivot point to wing tip)	32

THREE VIEW

Figure 1-1

1.3 ENGINES

(a)	Number of Engines	1
(b)	Engine Manufacturer	Lycoming
(c)	Engine Model Number	IO-540-K1G5
(d)	Rated Horsepower	300
(e)	Rated Speed (rpm)	2700
(f)	Bore (inches)	5.125
(g)	Stroke (inches)	4.375
(h)	Displacement (cubic inches)	541.5
(i)	Compression Ratio	8.7:1
(j)	Engine Type	Six Cylinder, Direct Drive, Horizontally Opposed, Air Cooled

1.5 PROPELLERS

(a)	Number of Propellers	1
(b)	Propeller Manufacturer	Hartzell
(c)	Blade Model	F8475D-4
(d)	Number of Blades	2
(e)	Hub Model	HC-C2YK-1( )F
(f)	Propeller Diameter (inches)	
	(1) Maximum	80
	(2) Minimum	78.5
(g)	Propeller Type	Constant Speed, Hydraulically Actuated

1.7 FUEL

(a)	Fuel Capacity (U.S. gal) (total)	
	S/N 32-7740001 through 32-7840202	84.0
	S/N 32-7940001 and up	98.0
(b)	Usable Fuel (U.S. gal) (total)	
	S/N 32-7740001 through 32-7840202	83.6
	S/N 32-7940001 and up	94.0
(c)	Fuel Grade, Aviation	
	(1) Minimum Octane	100/130 - Green
	(2) Specified Octane	100/130 - Green
	(3) Alternate Fuels	Refer to latest revision of Lycoming Service Instruction 1070.

1.9 OIL

(a)	Oil Capacity (U.S. quarts)	12
(b)	Oil Specification	Refer to latest issue of Lycoming Service Instruction 1014.

(c) Oil Viscosity per Average Ambient Temp. for Starting

	SINGLE	MULTI
(1) Above 60° F	50	40 or 50
(2) 30°F to 90°F	40	40
(3) 0°F to 70°F	30	40 or 20W-30
(4) Below 10°F	20	20W-30

1.11 MAXIMUM WEIGHTS

(a) Maximum Takeoff Weight (lbs)		3400
(b) Maximum Landing Weight (lbs)		3400
	FORWARD	AFT
(c) Maximum Weights in Baggage Compartments	100	100

1.13 STANDARD AIRPLANE WEIGHTS*

(a) Standard Empty Weight (lbs.) Weight of a standard airplane including unusable fuel, full operating fluids and full oil.	
S/N 32-7740001 through 32-7840202	1856
S/N 32-7940001 and up	1905
(b) Maximum Useful Load (lbs.): The difference between the Maximum Takeoff Weight and the Standard Empty Weight.	
S/N 32-7740001 through 32-7840202	1544
S/N 32-7940001 and up	1495

1.15 BAGGAGE SPACE

	FORWARD	AFT
(a) Compartment Volume (cu. ft.)	8.0	17.3
(b) Entry Width (inches)	16.0	48.0
(c) Entry Height (inches)	22.0	26.0

1.17 SPECIFIC LOADINGS

(a) Wing Loading (lbs per sq ft)	19.5
(b) Power Loading (lbs per hp)	11.3

*These values are approximate and vary from one airplane to another. Refer to Figure 6-5 for the Standard Empty Weight value and the Useful Load to be used for C. G. Calculations for the aircraft specified.

1.19 SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

The following definitions are of symbols, abbreviations and terminology used throughout the handbook and those which may be of added operational significance to the pilot.

(a) General Airspeed Terminology and Symbols

CAS	Calibrated Airspeed means the indicated speed of an aircraft, corrected for position and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.
KCAS	Calibrated Airspeed expressed in "Knots."
GS	Ground Speed is the speed of an airplane relative to the ground.
IAS	Indicated Airspeed is the speed of an aircraft as shown on the airspeed indicator when corrected for instrument error. IAS values published in this handbook assume zero instrument error.
KIAS	Indicated Airspeed expressed in "Knots."
M	Mach Number is the ratio of true airspeed to the speed of sound.
TAS	True Airspeed is the airspeed of an airplane relative to undisturbed air which is the CAS corrected for altitude, temperature and compressability.
V_A	Maneuvering Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane.
V_{FE}	Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.
V_{NE}/M_{NE}	Never Exceed Speed or Mach Number is the speed limit that may not be exceeded at any time.
V_{NO}	Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air and then only with caution.
V_S	Stalling Speed or the minimum steady flight speed at which the airplane is controllable.
V_{SO}	Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration.
V_X	Best Angle-of-Climb Speed is the airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance.
V_Y	Best Rate-of-Climb Speed is the airspeed which delivers the greatest gain in altitude in the shortest possible time.

(b) Meteorological Terminology

ISA	International Standard Atmosphere in which: The air is a dry perfect gas; The temperature at sea level is 15° Celsius (59° Fahrenheit); The pressure at sea level is 29.92 inches hg. (1013 mb); The temperature gradient from sea level to the altitude at which the temperature is -56.5°C (-69.7°F) is -0.00198°C (-0.003566°F) per foot and zero above that altitude.
OAT	Outside Air Temperature is the free air static temperature, obtained either from inflight temperature indications or ground meteorological sources, adjusted for instrument error and compressibility effects.
Indicated Pressure Altitude	The number actually read from an altimeter when the barometric subscale has been set to 29.92 inches of mercury (1013 millibars).
Pressure Altitude	Altitude measured from standard sea-level pressure (29.92 in. Hg) by a pressure or barometric altimeter. It is the indicated pressure altitude corrected for position and instrument error. In this handbook, altimeter instrument errors are assumed to be zero.
Station Pressure	Actual atmospheric pressure at field elevation.
Wind	The wind velocities recorded as variables on the charts of this handbook are to be understood as the headwind or tailwind components of the reported winds.

(c) Power Terminology

Takeoff Power	Maximum power permissible for takeoff.
Maximum Continuous Power	Maximum power permissible continuously during flight.
Maximum Climb Power	Maximum power permissible during climb.
Maximum Cruise Power	Maximum power permissible during cruise.

(d) Engine Instruments

EGT Gauge	Exhaust Gas Temperature Gauge

(e) Airplane Performance and Flight Planning Terminology

Climb Gradient	The demonstrated ratio of the change in height during a portion of a climb, to the horizontal distance traversed in the same time interval.
Demonstrated Crosswind Velocity	The demonstrated crosswind velocity is the velocity of the crosswind component for which adequate control of the airplane during takeoff and landing was actually demonstrated during certification tests.
Accelerate-Stop Distance	The distance required to accelerate an airplane to a specified speed and, assuming failure of an engine at the instant that speed is attained, to bring the airplane to a stop.
MEA	Minimum en route IFR altitude.
Route Segment	A part of a route. Each end of that part is identified by: (1) a geographical location; or (2) a point at which a definite radio fix can be established.

(f) Weight and Balance Terminology

Reference Datum	An imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	A location along the airplane fuselage usually given in terms of distance in inches from the reference datum
Arm	The horizontal distance from the reference datum to the center of gravity (C.G.) of an item.
Moment	The product of the weight of an item multiplied by its arm. (Moment divided by a constant is used to simplify balance calculations by reducing the number of digits.)
Center of Gravity (C.G.)	The point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.
C.G. Arm	The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.
C.G. Limits	The extreme center of gravity locations within which the airplane must be operated at a given weight.
Usable Fuel	Fuel available for flight planning.
Unusable Fuel	Fuel remaining after a runout test has been completed in accordance with governmental regulations.
Standard Empty Weight	Weight of a standard airplane including unusable fuel, full operating fluids and full oil.
Basic Empty Weight	Standard empty weight plus optional equipment.
Payload	Weight of occupants, cargo and baggage.
Useful Load	Difference between takeoff weight, or ramp weight if applicable, and basic empty weight.
Maximum Ramp Weight	Maximum weight approved for ground maneuver. (It includes weight of start, taxi and run up fuel.)
Maximum Takeoff Weight	Maximum weight approved for the start of the takeoff run.
Maximum Landing Weight	Maximum weight approved for the landing touchdown.
Maximum Zero Fuel Weight	Maximum weight exclusive of usable fuel.

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

1.21 CONVERSION FACTORS

MULTIPLY	BY	TO OBTAIN
acres	0.4047	ha
	43560	sq. ft.
	0.0015625	sq. mi.
atmospheres (atm)	76	cm Hg
	29.92	in. Hg
	1.0133	bar
	1.033	kg/cm^2
	14.70	lb./sq. in.
	2116	lb./sq. ft.
bars (bar)	0.98692	atm.
	14.503768	lb./sq. in.
British Thermal Unit (BTU)	0.2519958	kg-cal
centimeters (cm)	0.3937	in.
	0.032808	ft.
centimeters of mercury at 0°C (cm Hg)	0.01316	atm
	0.3937	in. Hg
	0.1934	lb./sq. in.
	27.85	lb./sq. ft.
	135.95	kg/m^2
centimeters per second (cm/sec.)	0.032808	ft./sec.
	1.9685	ft./min.
	0.02237	mph
cubic centimeters (cm^3)	0.03381	fl. oz.
	0.06102	cu. in.
	3.531×10^{-5}	cu. ft.
	0.001	l
	2.642×10^{-4}	U.S. gal.
cubic feet (cu.ft.)	28317	cm^3
	0.028317	m^3
	1728	cu. in.
	0.037037	cu. yd.
	7.481	U.S. gal.
	28.32	l
cubic feet per minute (cu. ft./min.)	0.472	l/sec.
	0.028317	m^3/min.

MULTIPLY	BY	TO OBTAIN
cubic inches (cu. in.)	16.39	cm^3
	1.639×10^{-5}	m^3
	5.787×10^{-4}	cu. ft.
	0.5541	fl. oz.
	0.01639	l
	4.329×10^{-3}	U.S. gal.
	0.01732	U.S. qt.
cubic meters (m^3)	61024	cu. in.
	1.308	cu. yd.
	35.3147	cu. ft.
	264.2	U.S. gal.
cubic meters per minute (m^3/min.)	35.3147	cu. ft./min.
cubic yards (cu. yd.)	27	cu. ft.
	0.7646	m^3
	202	U.S. gal.
degrees (arc)	0.01745	radians
degrees per second (deg./sec.)	0.01745	radians/sec.
drams, fluid (dr. fl.)	0.125	fl. oz.
drams, avdp. (dr. avdp.)	0.0625	oz. avdp.
feet (ft.)	30.48	cm
	0.3048	m
	12	in.
	0.33333	yd.
	0.0606061	rod
	1.894×10^{-4}	mi.
	1.645×10^{-4}	NM
feet per minute (ft./min.)	0.01136	mph
	0.01829	km/hr.
	0.508	cm/sec.
	0.00508	m/sec.

MULTIPLY	BY	TO OBTAIN
feet per second (ft./sec.)	0.6818	mph
	1.097	km/hr.
	30.48	cm/sec.
	0.5921	kts.
foot-pounds (ft.-lb.)	0.138255	m-kg
	3.24×10^{-4}	kg-cal
foot-pounds per minute (ft.-lb./min.)	3.030×10^{-5}	hp
foot-pounds per second (ft.-lb./sec.)	1.818×10^{-5}	hp
gallons, Imperial (Imperial gal.)	277.4	cu. in.
	1.201	U.S. gal.
	4.546	l
gallons, U.S. dry (U.S. gal. dry)	268.8	cu. in.
	1.556×10^{-1}	cu. ft.
	1.164	U.S. gal.
	4.405	l
gallons, U.S. liquid (U.S. gal.)	231	cu. in.
	0.1337	cu. ft.
	4.951×10^{-3}	cu. yd.
	3785.4	cm^3
	3.785×10^{-3}	m^3
	3.785	l
	0.83268	Imperial gal.
	128	fl. oz.
gallons per acre (gal./acre)	9.353	l/ha
grams (g)	0.001	kg
	0.3527	oz. avdp.
	2.205×10^{-3}	lb.
grams per centimeter (g/cm)	0.1	kg/m
	6.721×10^{-2}	lb./ft.
	5.601×10^{-3}	lb./in.
grams per cubic centimeter (g/cm^3)	1000	kg/m^3
	0.03613	lb./cu. in.
	62.43	lb./cu. ft.

MULTIPLY	BY	TO OBTAIN
hectares (ha)	2.471	acres
	107639	sq. ft.
	10000	m^2
horsepower (hp)	33000	ft.-lb./min.
	550	ft.-lb./sec.
	76.04	m-kg/sec.
	1.014	metric hp
horsepower, metric	75	m-kg/sec.
	0.9863	hp
inches (in.)	25.40	mm
	2.540	cm
	0.0254	m
	0.08333	ft.
	0.027777	yd.
inches of mercury at 0 °C (in. Hg)	0.033421	atm
	0.4912	lb./sq. in.
	70.73	lb./sq. ft.
	345.3	kg/m^2
	2.540	cm Hg
	25.40	mm Hg
inch-pounds (in.-lb.)	0.011521	m-kg
kilograms (kg)	2.204622	lb.
	35.27	oz. avdp.
	1000	g
kilogram-calories (kg-cal)	3.9683	BTU
	3087	ft.-lb.
	426.9	m-kg
kilograms per cubic meter (kg/m^3)	0.06243	lb./cu. ft.
	0.001	g/cm^3
kilograms per hectare (kg/ha)	0.892	lb./acre
kilograms per square centimeter (kg/cm^2)	0.9678	atm
	28.96	in. Hg
	14.22	lb./sq. in.
	2048	lb./sq. ft.

MULTIPLY	BY	TO OBTAIN
kilograms per square meter (kg/m^2)	2.896×10^{-3}	in. Hg
	1.422×10^{-3}	lb./sq. in.
	0.2048	lb./sq. ft.
kilometers (km)	1×10^{-5}	cm
	3280.8	ft.
	0.6214	mi.
	0.53996	NM
kilometers per hour (km/hr.)	0.9113	ft./sec.
	58.68	ft./min.
	0.53996	kt
	0.6214	mph
	0.27778	m/sec.
	16.67	m/min.
knots (kt)	1	nautical mph
	1.689	ft./sec.
	1.1516	statute mph
	1.852	km/hr.
	51.48	m/sec.
liters (1)	1000	cm^3
	61.02	cu. in.
	0.03531	cu. ft.
	33.814	fl. oz.
	0.264172	U.S. gal.
	0.2200	Imperial gal.
	1.05669	qt.
liters per hectare (l/ha)	13.69	fl. oz./acre
	0.107	gal./acre
liters per second (l/sec.)	2.12	cu. ft./min.
meters (m)	39.37	in.
	3.280840	ft.
	1.0936	yd.
	0.198838	rod
	6.214×10^{-4}	mi.
	5.3996×10^{-4}	NM
meter-kilogram (m-kg)	7.23301	ft.-lb.
	86.798	in.-lb.

MULTIPLY	BY	TO OBTAIN
meters per minute (m/min.)	0.06	km/hr.
meters per second (m/sec.)	3.280840	ft./sec.
	196.8504	ft./min.
	2.237	mph
	3.6	km/hr.
microns	3.937×10^{-5}	in.
miles, statute (mi.)	5280	ft.
	1.6093	km
	1609.3	m
	0.8684	NM
miles per hour (mph)	44.7041	cm/sec.
	4.470×10^{-1}	m/sec.
	1.467	ft./sec.
	88	ft./min.
	1.6093	km/hr.
	0.8684	kt
miles per hour square (m/hr. sq.)	2.151	ft./sec. sq.
millibars	2.953×10^{-2}	in. Hg
millimeters (mm)	0.03937	in.
millimeters of mercury at 0°C (mm Hg)	0.03937	in. Hg
nautical miles (NM)	6080	ft.
	1.1516	statute mi.
	1852	m
	1.852	km
ounces, avdp. (oz. avdp.)	28.35	g
	16	dr. avdp.
ounces, fluid (fl. oz.)	8	dr. fl.
	29.57	cm^3
	1.805	cu. in.
	0.0296	l
	0.0078	U.S. gal.

MULTIPLY	BY	TO OBTAIN
ounces, fluid per acre (fl. oz./ acre)	0.073	l/ha
pounds (lb.)	0.453592	kg
	453.6	g
	3.108×10^{-2}	slug
pounds per acre (lb./acre)	1.121	kg/ha
pounds per cubic foot (lb./cu. ft.)	16.02	kg/m^3
pounds per cubic inch (lb./cu. in.)	1728	lb./cu. ft.
	27.68	g/cm^3
pounds per square foot (lb./sq. ft.)	0.1414	in. Hg
	4.88243	kg/m^2
	4.725×10^{-4}	atm
pounds per square inch (psi or lb./sq. in.)	5.1715	cm Hg
	2.036	in. Hg
	0.06804	atm
	0.0689476	bar
	703.1	kg/m^2
quart, U.S. (qt.)	0.94635	l
	57.749	cu. in.
radians	57.30	deg. (arc)
	0.1592	rev.
radians per second (radians/sec.)	57.30	deg./sec.
	0.1592	rev./sec.
	9.549	rpm
revolutions (rev.)	6.283	radians
revolutions per minute (rpm or rev./min.)	0.1047	radians/sec.
revolutions per second (rev./sec.)	6.283	radians/sec.

MULTIPLY	BY	TO OBTAIN
rod	16.5	ft.
	5.5	yd.
	5.029	m
slug	32.174	lb.
square centimeters (cm^2)	0.1550	sq. in.
	0.001076	sq. ft.
square feet (sq. ft.)	929	cm^2
	0.092903	m^2
	144	sq. in.
	0.1111	sq. yd.
	2.296×10^{-5}	acres
square inches (sq. in.)	6.4516	cm^2
	6.944×10^{-3}	sq. ft.
square kilometers (km^2)	0.3861	sq. mi.
square meters (m^2)	10.76391	sq. ft.
	1.196	sq. yd.
	0.0001	ha
square miles (sq. mi.)	2.590	km^2
	640	acres
square rods (sq. rods)	30.25	sq. yd.
square yards (sq. yd.)	0.8361	m^2
	9	sq. ft.
	0.0330579	sq. rods
yards (yd.)	0.9144	m
	3	ft.
	36	in.
	0.181818	rod

TABLE OF CONTENTS

SECTION 2

LIMITATIONS

SECTION 2

LIMITATIONS

2.1 GENERAL

This section provides the "FAA Approved" operating limitations, instrument markings, color coding and basic placards necessary for the safe operation of the airplane and its systems.

Limitations associated with those optional systems and equipment which require handbook supplements can be found in Section 9 (Supplements).

2.3 AIRSPEED LIMITATIONS

SPEED	KIAS	KCAS
Never Exceed Speed (V_{NE}) - Do not exceed this speed in any operation.	192	184
Maximum Structural Cruising Speed (V_{NO}) - Do not exceed this speed except in smooth air and then only with caution.	149	146
Design Maneuvering Speed (V_A) - Do not make full or abrupt control movements above this speed.		
At 3400 lbs.	131	129
At 2400 lbs.	114	114

CAUTION

Maneuvering speed decreases at lighter weight as the effects of aerodynamic forces become more pronounced. Linear interpolation may be used for intermediate gross weights. Maneuvering speed should not be exceeded while operating in rough air.

Maximum Flaps Extended Speed (V_{FE}) - Do not exceed this speed with the flaps extended.	109	109

2.5 AIRSPEED INDICATOR MARKINGS

MARKING	IAS
Red Radial Line (Never Exceed)	192 KTS
Yellow Arc (Caution Range - Smooth Air Only)	149 KTS to 192 KTS
Green Arc (Normal Operating Range)	54 KTS to 149 KTS
White Arc (Flap Down)	47 KTS to 109 KTS

2.7 POWER PLANT LIMITATIONS

(a)	Number of Engines	1
(b)	Engine Manufacturer	Lycoming
(c)	Engine Model No.	IO-540-K1G5
(d)	Engine Operating Limits	
	(1) Maximum Horsepower	300
	(2) Maximum Rotation Speed (RPM)	2700
	(3) Maximum Oil Temperature	245° F
(e)	Oil Pressure	
	Minimum (red line)	25 PSI
	Maximum (red line)	either 90 PSI or 100 PSI
(f)	Fuel Pressure	
	Minimum (red line)	either 12 PSI or 18 PSI
	Maximum (red line)	40 PSI
(g)	Fuel Grade (minimum octane)	100/130 - Green
(h)	Number of Propellers	1
(i)	Propeller Manufacturer	Hartzell
(j)	Propeller Hub and Blade Model	HC-C2YK-1( )F/F8475D-4
(k)	Propeller Diameter	
	Minimum	78.5 IN.
	Maximum	80 IN.
(l)	Blade Angle Limits	
	Low Pitch Stop	13.5° ± .2°
	High Pitch Stop	34° ± 1°

2.9 POWER PLANT INSTRUMENT MARKINGS

(a)	Tachometer	
	Green Arc (Normal Operating Range)	500 to 2700 RPM
	Red Line (Maximum Continuous Power)	2700 RPM
(b)	Oil Temperature	
	Green Arc (Normal Operating Range)	75° to 245°F
	Red Line (Maximum)	245°F
(c)	Oil Pressure	
	Green Arc (Normal Operating Range)	60 PSI to 90 PSI
	Yellow Arc (Caution Range) (Idle)	either 25 PSI to 60 PSI or 25 PSI to 60 PSI and 90 PSI to 100 PSI
	Red Line (Minimum)	25 PSI
	Red Line (Maximum)	either 90 PSI or 100 PSI
(d)	Fuel Pressure	
	Green Arc (Normal Operating Range)	18 PSI to 40 PSI
	Red Line (Minimum) (idle)	either 12 PSI or 18 PSI
	Red Line (Maximum)	40 PSI
	Yellow Arc (Idle Range)	12 PSI to 18 PSI

2.11 WEIGHT LIMITS

(a)	Maximum Weight	3400 LBS
(b)	Maximum Baggage (100 lbs each compartment)	200 LBS

NOTE

Refer to Section 5 (Performance) for maximum weight as limited by performance.

2.13 CENTER OF GRAVITY LIMITS

Weight Pounds	Forward Limit Inches Aft of Datum	Rearward Limit Inches Aft of Datum
3400	91.4	95.5
3300	89.0	96.2
2900	80.0	96.2
2400	76.0	96.2

NOTES

Straight line variation between points given.

The datum used is 78.4 inches ahead of the wing leading edge at the intersection of the straight and tapered section.

It is the responsibility of the airplane owner and the pilot to insure that the airplane is properly loaded. See Section 6 (Weight and Balance) for proper loading instructions.

2.15 MANEUVER LIMITS

No acrobatic maneuvers including spins approved.

2.17 FLIGHT LOAD FACTORS

(a) Positive Load Factor (Maximum) — 3.8 G
(b) Negative Load Factor (Maximum) — No inverted maneuvers approved

2.19 TYPES OF OPERATION

The airplane is approved for the following operations when equipped in accordance with FAR 91 or FAR 135.

(a) Day V.F.R.
(b) Night V.F.R.
(c) Day I.F.R.
(d) Night I.F.R.
(e) Non Icing

2.21 FUEL LIMITATIONS

(a) Total Capacity

S/N 32-7740001 through 32-7840202	84 U.S. GAL
S/N 32-7940001 and up	98 U.S. GAL

(b) Unusable Fuel

S/N 32-7740001 through 32-7840202	.4 U.S. GAL
The unusable fuel for the above airplanes has been determined as .2 U.S. gallons in each wing.	
S/N 32-7940001 and up	4 U.S. GAL
The unusable fuel for the above airplanes has been determined as 2.0 U.S. gallons in each wing.	

(c) Usable Fuel

S/N 32-7740001 through 32-7840202	83.6 U.S. GAL
The usable fuel for the above airplanes has been determined as 41.8 U.S. gallons in each wing.	
S/N 32-7940001 and up	94 U.S. GAL
The usable fuel for the above airplanes has been determined as 47 U.S. gallons in each wing.	

2.23 FLIGHT WITH REAR CABIN DOOR OR REAR CABIN DOOR AND CARGO DOOR REMOVED

The following limitations must be observed in the operation of this airplane with the rear cabin door or rear cabin door and cargo door removed:

(a) The airplane may be flown with the rear cabin door or rear cabin door and cargo door removed. Flight with the front door removed is not approved.
(b) Maximum speed - 145 KIAS.
(c) No smoking.
(d) All loose articles must be tied down and stowed.
(e) Jumper's static lines must be kept free of pilot's controls and control surfaces.
(f) Operation approved VFR flight conditions only.

2.25 LOADING LIMITATIONS (SERIAL NUMBERS 32-7740001 THROUGH 32-7840202)

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

(a) Fill tip tanks first: use main tanks first.
(b) This airplane must not be operated at gross weights in excess of 3112 pounds unless the weight over 3112 pounds is fuel weight only.
(c) Remove fuel from the main tanks first when required for proper weight and balance.

2.27 NOSE WHEEL FAIRING REMOVED

When the nose wheel fairing is removed, two nose wheel centering springs (part number 67168) must be installed.

2.29 NOISE LEVEL

The noise level of this aircraft is 79.27 d B(A).

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

The above statement not withstanding the noise level stated above has been verified by and approved by the Federal Aviation Administration in noise level test flights conducted in accordance with FAR 36, Noise Standards - Aircraft Type and Airworthiness Certification. This aircraft model is in compliance with all FAR 36 noise standards applicable to this type.

2.31 PLACARDS

In full view of the pilot:

THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS. NO ACROBATIC MANEUVERS, INCLUDING SPINS, APPROVED.

THIS AIRCRAFT APPROVED FOR V.F.R., I.F.R., DAY AND NIGHT NON-ICING FLIGHT WHEN EQUIPPED IN ACCORDANCE WITH FAR 91 OR FAR 135.

In full view of the pilot, the following takeoff and landing check lists will be installed:

TAKEOFF CHECK LIST

Fuel on Proper Tank	Mixture - Set	Flaps - 10° (1st notch)
Electric Fuel Pump - On	Propeller - Set	Trim Tab - Set
Engine Gauges - Checked	Fasten Belts/Harness	Controls - Free
Alternate Air - Closed		Doors - Latched
Seat Backs Erect		Air Conditioner - Off

LANDING CHECK LIST

Seat Backs Erect	Fuel on Proper Tank	Mixture Rich
Fasten Belts/Harness	Electric Fuel Pump - On	Propeller Set
Air Conditioner - Off		Flaps Down (109 KIAS MAX.)

The "AIR CONDITIONER OFF" item in the above takeoff and landing check lists is mandatory for air conditioned aircraft only.

On the instrument panel in full view of the pilot:

MANEUVERING SPEED
131 KIAS AT 3400
LBS. (SEE P.O.H.)

On the instrument panel in full view of the pilot:

DEMONSTRATED CROSSWIND COMPONENT 17 KNOTS

In full view of the pilot: (For operation with the rear door removed)

FOR FLIGHT WITH THE DOOR REMOVED, SEE THE LIMITATIONS AND PROCEDURES SECTIONS OF THE PILOT'S OPERATING HANDBOOK.

On the fuel selector valve cover (serial numbers 32-7740001 through 32-7840202):

ALL WEIGHT IN EXCESS OF 3112
POUNDS MUST BE FUEL WEIGHT ONLY
FILL TIP TANKS FIRST
USE MAIN TANKS FIRST
RESTRICT PASSENGER WEIGHTS OR CARGO
WEIGHT AS REQUIRED FOR COMPLIANCE.

On the instrument panel in full view of the pilot when the AutoFlite II is installed:

OPERATION

TURN AUTOFLITE ON. ADJUST TRIM KNOB FOR MINIMUM HEADING CHANGE: FOR HEADING CHANGE, PRESS DISENGAGE SWITCH ON CONTROL WHEEL, CHANGE HEADING, RELEASE SWITCH. ROTATE TURN KNOB FOR TURN COMMANDS. PUSH TURN KNOB IN TO ENGAGE TRACKER. PUSH TRIM KNOB IN FOR HI SENSITIVITY. LIMITATIONS AUTOFLITE OFF FOR TAKEOFF AND LANDING.

On the instrument panel in full view of the pilot when the supplementary white strobe lights are installed:

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

In full view of the pilot, in the area of the air conditioner controls when the air conditioner is installed:

WARNING - AIR CONDITIONER MUST BE OFF TO INSURE NORMAL TAKEOFF CLIMB PERFORMANCE.

On the inside of the forward baggage compartment:

MAXIMUM BAGGAGE THIS COMPARTMENT 100 LBS.
SEE THE LIMITATIONS SECTION OF THE
PILOT'S OPERATING HANDBOOK.

On aft baggage closeout:

MAXIMUM BAGGAGE THIS COMPARTMENT
100 LBS. NO HEAVY OBJECTS ON HAT
SHELF.

Adjacent to outboard fuel filler caps:

S/N 32-7740001 through 32-7840202

FUEL -100/130 AVIATION GRADE MIN. -
CAPACITY 17 GAL.

Adjacent to inboard fuel filler caps:

S/N 32-7740001 through 32-7840202

FUEL - 100/130 AVIATION GRADE MIN. - MAXIMUM
CAPACITY 25 GAL. CAPACITY TO BOTTOM
OF FILLER NECK INDICATOR 18 GAL.

Adjacent to fuel tank filler caps:

S/N 32-7940001 and up

FUEL - 100/130 AVIATION GRADE - USABLE CAPACITY
47.0 GAL.

On storm window:

DO NOT OPEN ABOVE 129 KIAS.

TABLE OF CONTENTS

SECTION 3

EMERGENCY PROCEDURES

SECTION 3

EMERGENCY PROCEDURES

3.1 GENERAL

The recommended procedures for coping with various types of emergencies and critical situations are provided by this section. All of the required (FAA regulations) emergency procedures and those necessary for the safe operation of the airplane as determined by the operating and design features of the airplane are presented.

Emergency procedures associated with those optional systems and equipment which require handbook supplements are provided by Section 9 (Supplements).

The first portion of this section consists of an abbreviated emergency check list which supplies an action sequence for critical situations with little emphasis on the operation of systems.

The remainder of the section is devoted to amplified emergency procedures containing additional information to provide the pilot with a more complete understanding of the procedures.

These procedures are suggested as the best course of action for coping with the particular condition described, but are not a substitute for sound judgment and common sense. Since emergencies rarely happen in modern aircraft, their occurrrence is usually unexpected and the best corrective action may not always be obvious. Pilots should familiarize themselves with the procedures given in this section and be prepared to take appropriate action should an emergency arise.

Most basic emergency procedures, such as power off landings, are a normal part of pilot training. Although these emergencies are discussed here, this information is not intended to replace such training, but only to provide a source of reference and review, and to provide information on procedures which are not the same for all aircraft. It is suggested that the pilot review standard emergency procedures periodically to remain proficient in them.

THIS PAGE INTENTIONALLY LEFT BLANK

3.3 EMERGENCY PROCEDURES CHECK LIST

ENGINE FIRE DURING START

Starter . . . . . crank engine
Mixture . . . . . idle cut-off
Throttle . . . . . open
Electric fuel pump . . . . . OFF
Fuel selector . . . . . OFF
Abandon if fire continues

ENGINE POWER LOSS DURING TAKEOFF

If sufficient runway remains for a normal landing, land straight ahead.

If area ahead is rough, or if it is necessary to clear obstructions, maintain a safe airspeed and make only a shallow turn if necessary to avoid obstructions. Use of flaps depends upon circumstances. Normally, flaps should be fully extended for touchdown.

If sufficient altitude has been gained to attempt a restart:
Maintain safe airspeed
Fuel selector . . . . . switch to tank containing fuel
Electric fuel pump . . . . . check ON
Mixture . . . . . check RICH
Alternate air . . . . . OPEN
If power is not regained, proceed with power off landing.

ENGINE POWER LOSS IN FLIGHT

Fuel selector . . . . . switch to tank containing fuel
Electric fuel pump . . . . . ON
Mixture . . . . . RICH
Alternate air . . . . . OPEN
Engine gauges . . . . . check for indication of cause of power loss
If no fuel pressure is indicated, check tank selector position to be sure it is on a tank containing fuel.

When power is restored:
Alternate air . . . . . CLOSED
Electric fuel pump . . . . . OFF
If power is not restored prepare for power off landing.
Trim for 87 KIAS

POWER OFF LANDING

Locate suitable field.
Establish spiral pattern.
1000 ft. above field at downwind position for normal landing approach.
When field can easily be reached slow to 80 KIAS for shortest landing.

Touchdowns should normally be made at lowest possible airspeed with full flaps.

When committed to landing:
Ignition . . . . . OFF
Master switch . . . . . OFF
Fuel selector . . . . . OFF
Mixture . . . . . idle cut-off
Seat belt and harness . . . . . tight

FIRE IN FLIGHT

Source of fire . . . . . check

Electrical fire (smoke in cabin):
Master switch . . . . . OFF
Vents . . . . . open
Cabin heat . . . . . OFF
Land as soon as practicable.

Engine fire:
Fuel selector . . . . . OFF
Throttle . . . . . CLOSED
Mixture . . . . . idle cut-off
Electric fuel pump . . . . . check OFF
Heater and defroster . . . . . OFF
Proceed with power off landing procedure.

LOSS OF OIL PRESSURE

Land as soon as possible and investigate cause.
Prepare for power off landing.

LOSS OF FUEL PRESSURE

Electric fuel pump . . . . . .ON
Fuel selector . . . . . check on full tank

HIGH OIL TEMPERATURE

Land at nearest airport and investigate the problem.
Prepare for power off landing.

ALTERNATOR FAILURE

Verify failure
Reduce electrical load as much as possible.
Alternator circuit breakers . . . . . check
Alt switch . . . . . OFF (for 1 second), then on
If no output:
Alt switch . . . . . .OFF

Reduce electrical load and land as soon as practical.

PROPELLER OVERSPEED

Throttle . . . . . retard
Oil pressure . . . . . check
Prop control . . . . . full DECREASE rpm, then set if any control available
Airspeed . . . . . .reduce
Throttle . . . . . as required to remain below 2700 rpm

SPIN RECOVERY

Throttle . . . . . idle
Ailerons . . . . . neutral
Rudder . . . . . .full opposite to direction of rotation
Control wheel . . . . . .full forward
Rudder . . . . . neutral (when rotation stops)
Control wheel . . . . . .as required to smoothly regain level flight altitude

OPEN DOOR

If both upper and side latches are open, the door will trail slightly open and airspeeds will be reduced slightly.

To close the door in flight:
Slow airplane to 87 KIAS
Cabin vents . . . . . .close
Storm window . . . . . .open

If upper latch is open . . . . . .latch
If side latch is open . . . . . pull on armrest while moving latch handle to latched position

If both latches are open . . . . . .latch side latch then top latch

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

3.5 AMPLIFIED EMERGENCY PROCEDURES (GENERAL)

The following paragraphs are presented to supply additional information for the purpose of providing the pilot with a more complete understanding of the recommended course of action and probable cause of an emergency situation.

3.7 ENGINE FIRE DURING START

Engine fires during start are usually the result of overpriming. The first attempt to extinguish the fire is to try to start the engine and draw the excess fuel back into the induction system.

If a fire is present before the engine has started, move the mixture control to idle cut-off, open the throttle and crank the engine. This is an attempt to draw the fire back into the engine.

If the engine has started, continue operating to try to pull the fire into the engine.

In either case (above), if fire continues more than a few seconds, the fire should be extinguished by the best available external means.

The fuel selector valves should be "OFF" and the mixture at idle cut-off if an external fire extinguishing method is to be used.

3.9 ENGINE POWER LOSS DURING TAKEOFF

The proper action to be taken if loss of power occurs during takeoff will depend on the circumstances of the particular situation.

If sufficient runway remains to complete a normal landing, land straight ahead.

If the area ahead is rough, or if it is necessary to clear obstructions, maintain a safe airspeed and maneuver gently to avoid obstacles, making only shallow turns if necessary. Use of flaps depends upon circumstances. Normally, flaps should be fully extended for touchdown.

If sufficient altitude has been gained to attempt a restart, maintain a safe airspeed and switch the fuel selector to another tank containing fuel. Check the electric fuel pump to insure that it is "ON" and that the mixture is "RICH." The alternate air should be "OPEN."

If engine failure was caused by fuel exhaustion, power will not be regained after switching fuel tanks until the empty fuel lines are filled. This may require up to ten seconds.

If power is not regained, proceed with the Power Off Landing procedure (refer to the emergency check list and paragraph 3.13).

3.11 ENGINE POWER LOSS IN FLIGHT

Complete engine power loss is usually caused by fuel flow interruption and power will be restored shortly after fuel flow is restored. If power loss occurs at a low altitude, the first step is to prepare for an emergency landing (refer to paragraph 3.13). An airspeed of at least 87 KIAS should be maintained.

If altitude permits, switch the fuel selector to another tank containing fuel and turn the electric fuel pump "ON." Move the mixture control to "RICH" and the alternate air to "OPEN." Check the engine gauges for an indication of the cause of the power loss. If no fuel pressure is indicated, check the tank selector position to be sure it is on a tank containing fuel.

When power is restored move the alternate air to the "CLOSED" position and turn "OFF" the electric fuel pump.

If the preceding steps do not restore power, prepare for an emergency landing.

If time permits, turn the ignition switch to "L" then to "R" then back to "BOTH." Move the throttle and mixture control levers to different settings. This may restore power if the problem is too rich or too lean a mixture or if there is a partial fuel system restriction. Try other fuel tanks. Water in the fuel could take some time to be used up, and allowing the engine to windmill may restore power. If power loss is due to water, fuel pressure indications will be normal.

If engine failure was caused by fuel exhaustion power will not be restored after switching fuel tanks until the empty fuel lines are filled. This may require up to ten seconds.

If power is not regained, proceed with the Power Off Landing procedure (refer to the emergency check list and paragraph 3.13).

3.13 POWER OFF LANDING

If loss of power occurs at altitude, trim the aircraft for best gliding angle (87 KIAS, Air Cond. off) and look for a suitable field. If measures taken to restore power are not effective, and if time permits, check your charts for airports in the immediate vicinity; it may be possible to land at one if you have sufficient altitude. At best gliding angle, with the engine windmilling, and the propeller control in full "DECREASE rpm," the aircraft will travel approximately 1.5 miles for each thousand feet of altitude. If possible, notify the FAA by radio of your difficulty and intentions. If another pilot or passenger is aboard, let him help.

When you have located a suitable field, establish a spiral pattern around this field. Try to be at 1000 feet above the field at the downwind position, to make a normal landing approach. When the field can easily be reached, slow to 80 KIAS with flaps down for the shortest landing. Excess altitude may be lost by widening your pattern, using flaps or slipping, or a combination of these.

Touchdown should normally be made at the lowest possible airspeed.

When committed to landing, close the throttle control and shut "OFF" the master and ignition switches. Flaps may be used as desired. Turn the fuel selector valve to "OFF" and move the mixture to idle cut-off. The seat belts and shoulder harness (if installed) should be tightened. Touchdown should be normally made at the lowest possible airspeed.

3.15 FIRE IN FLIGHT

The presence of fire is noted through smoke, smell and heat in the cabin. It is essential that the source of the fire be promptly identified through instrument readings, character of the smoke, or other indications since the action to be taken differs somewhat in each case.

Check for the source of the fire first.

If an electrical fire is indicated (smoke in the cabin), the master switch should be turned "OFF." The cabin vents should be opened and the cabin heat turned "OFF." A landing should be made as soon as possible.

If an engine fire is present, switch the fuel selector to "OFF" and close the throttle. The mixture should be at idle cut-off. Turn the electric fuel pump "OFF." In all cases, the heater and defroster should be "OFF." If radio communication is not required select master switch "OFF." If the terrain permits, a landing should be made immediately.

NOTE

The possibility of an engine fire in flight is extremely remote. The procedure given is general and pilot judgment should be the determining factor for action in such an emergency.

3.17 LOSS OF OIL PRESSURE

Loss of oil pressure may be either partial or complete. A partial loss of oil pressure usually indicates a malfunction in the oil pressure regulating system, and a landing should be made as soon as possible to investigate the cause and prevent engine damage.

A complete loss of oil pressure indication may signify oil exhaustion or may be the result of a faulty gauge. In either case, proceed toward the nearest airport, and be prepared for a forced landing. If the problem is not a pressure gauge malfunction, the engine may stop suddenly. Maintain altitude until such time as a dead stick landing can be accomplished. Don't change power settings unnecessarily, as this may hasten complete power loss.

Depending on the circumstances, it may be advisable to make an off airport landing while power is still available, particularly if other indications of actual oil pressure loss, such as sudden increases in temperatures, or oil smoke, are apparent, and an airport is not close.

If engine stoppage occurs, proceed with Power Off Landing.

3.19 LOSS OF FUEL PRESSURE

If loss of fuel pressure occurs, turn "ON" the electric fuel pump and check that the fuel selector is on a full tank.

If the problem is not an empty tank, land as soon as practical and have the engine-driven fuel pump and fuel system checked.

3.21 HIGH OIL TEMPERATURE

An abnormally high oil temperature indication may be caused by a low oil level, an obstruction in the oil cooler, damaged or improper baffle seals, a defective gauge, or other causes. Land as soon as practical at an appropriate airport and have the cause investigated.

A steady, rapid rise in oil temperature is a sign of trouble. Land at the nearest airport and let a mechanic investigate the problem. Watch the oil pressure gauge for an accompanying loss of pressure.

3.23 ALTERNATOR FAILURE

Loss of alternator output is detected through zero reading on the ammeter. Before executing the following procedure, insure that the reading is zero and not merely low by actuating an electrically powered device, such as the landing light. If no increase in the ammeter reading is noted, alternator failure can be assumed.

The electrical load should be reduced as much as possible. Check the alternator circuit breakers for a popped circuit.

The next step is to attempt to reset the overvoltage relay. This is accomplished by moving the "ALT" switch to "OFF" for one second and then to "ON." If the trouble was caused by a momentary overvoltage condition (16.5 volts and up) this procedure should return the ammeter to a normal reading.

If the ammeter continues to indicate "O" output, or if the alternator will not remain reset, turn off the "ALT" switch, maintain minimum electrical load and land as soon as practical. All electrical load is being supplied by the battery.

3.25 PROPELLER OVERSPEED

Propeller overspeed is caused by a malfunction in the propeller governor or low oil pressure which allows the propeller blades to rotate to full low pitch.

If propeller overspeed should occur, retard the throttle and check the oil pressure. The propeller control should be moved to full "DECREASE rpm" and then set if any control is available. Airspeed should be reduced and throttle used to maintain 2700 RPM.

3.27 SPIN RECOVERY

Intentional spins are prohibited in this airplane. If a spin is inadvertently entered, immediately move the throttle to idle and the ailerons to neutral.

Full rudder should then be applied opposite to the direction of rotation followed by control wheel full forward. When the rotation stops, neutralize the rudder and ease back on the control wheel as required to smoothly regain a level flight attitude.

3.29 OPEN DOOR

The cabin door on the Cherokee is double latched, so the chances of its springing open in flight at both the top and side are remote. However, should you forget the upper latch, or not fully engage the side latch, the door may spring partially open. This will usually happen at takeoff or soon afterward. A partially open door will not affect normal flight characteristics, and a normal landing can be made with the door open.

If both upper and side latches are open, the door will trail slightly open, and airspeed will be reduced slightly.

To close the door in flight, slow the airplane to 87 KIAS, close the cabin vents and open the storm window. If the top latch is open, latch it. If the side latch is open, pull on the armrest while moving the latch handle to the latched position. If both latches are open, close the side latch then the top latch.

3.31 ENGINE ROUGHNESS

Engine roughness may be caused by dirt in the injector nozzles, induction system icing, or ignition problems.

First adjust the mixture for maximum smoothness. The engine will run rough if the mixture is too rich or too lean.

Move the alternate air to "OPEN" and then turn "ON" the electric fuel pump.

Switch the fuel selector to another tank to see if fuel contamination is the problem.

Check the engine gauges for abnormal readings. If any gauge readings are abnormal proceed accordingly.

The magneto switch should then be moved to "L" then "R," then back to "BOTH." If operation is satisfactory on either magneto, proceed on that magneto at reduced power with full "RICH" mixture to a landing at the first available airport.

If roughness persists, prepare for a precautionary landing at pilot's discretion.

TABLE OF CONTENTS

SECTION 4

NORMAL PROCEDURES

SECTION 4

NORMAL PROCEDURES

4.1 GENERAL

This section clearly describes the recommended procedures for the conduct of normal operations for the Cherokee Six. All of the required (FAA regulations) procedures and those necessary for the safe operation of the airplane as determined by the operating and design features of the airplane are presented.

Normal procedures associated with those optional systems and equipment which require handbook supplements are provided by Section 9 (Supplements).

These procedures are provided to present a source of reference and review and to supply information on procedures which are not the same for all aircraft. Pilots should familiarize themselves with the procedures given in this section in order to become proficient in the normal operations of the airplane.

The first portion of this section consists of a short form check list which supplies an action sequence for normal operations with little emphasis on the operation of the systems.

The remainder of the section is devoted to amplified normal procedures which provide detailed information and explanations of the procedures and how to perform them. This portion of the section is not intended for use as an in-flight reference due to the lenthly explanations. The short form check list should be used for this purpose.

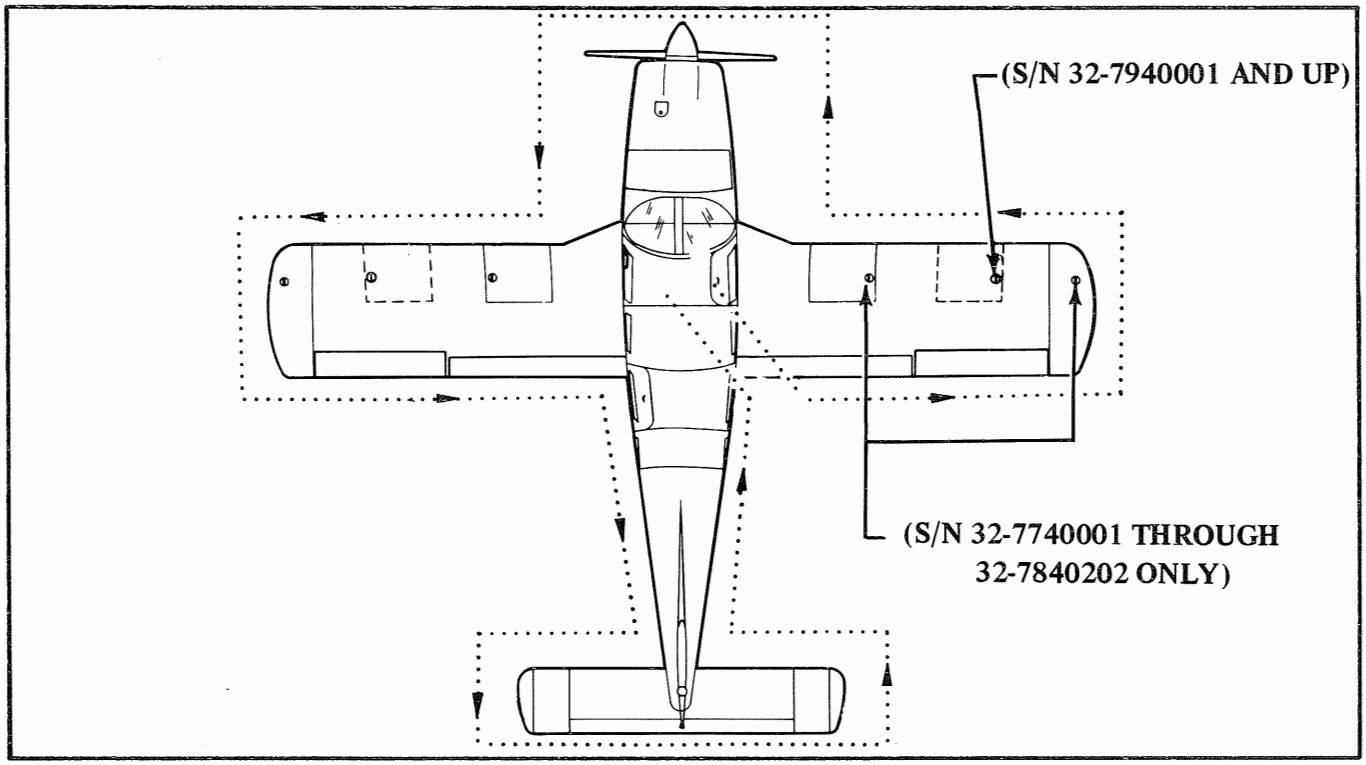
4.3 AIRSPEEDS FOR SAFE OPERATIONS

The following airspeeds are those which are significant to the safe operation of the airplane. These figures are for standard airplanes flown at gross weight under standard conditions at sea level.

Performance for a specific airplane may vary from published figures depending upon the equipment installed, the condition of the engine, airplane and equipment, atmospheric conditions and piloting technique.

(a)	Best Rate of Climb Speed	89 KIAS
(b)	Best Angle of Climb Speed	79 KIAS
(c)	Turbulent Air Operating Speed (See Subsection 2.3)	131 KIAS
(d)	Maximum Flap Speed	109 KIAS
(e)	Landing Final Approach Speed (Flaps 40°)	80 KIAS
(f)	Maximum Demonstrated Crosswind Velocity	17 KTS

THIS PAGE INTENTIONALLY LEFT BLANK



WALK-AROUND

Figure 4-1

4.5 NORMAL PROCEDURES CHECK LIST

PREFLIGHT CHECK

COCKPIT

Control wheel ..... release restraints
Parking brake ..... set
All switches ..... OFF
Mixture ..... IDLE CUT-OFF
Master switch ..... ON
Fuel gauges ..... check
Annunciator panel ..... check
Master switch ..... OFF
Primary flight controls .....proper operation
Flap control .....proper operation
Trim control ..... neutral
Windows .....check clean
Required papers ..... on board
Tow bar and baggage ... stowed properly and secure

RIGHT WING

Surface condition ..... check
Flap and hinges ..... check
Aileron and hinges ..... check
Wing tip and lights ..... check
Fuel tank .....check supply visually - secure cap
Fuel vent opening ..... unobstructed
Fuel tank sumps .....drain
Fuel quantity gauge (late models only) ..... check
Tie down and chocks.....remove
Main gear strut .....proper inflation (4.5 in.)
Tire ..... check
Brake block and disc ..... check
Fresh air inlet ..... clear

NOSE SECTION

Cowling ..... check
Windows ..... clean
General condition ..... check
Fuel strainer drain ..... place container under
Forward baggage door ..... close and secure
Propeller and spinner ..... check for nicks
Alternator belt ..... check tension
Air inlets ..... clear
Chocks ..... remove
Nose wheel strut ..... check proper inflation (3.25 in.)
Nose wheel tire ..... check
Oil ..... check quantity
Dipstick ..... properly seated
Oil check door ..... close and secure
Landing light ..... check

LEFT WING

Fresh air inlet ..... check
Chocks and tie down ..... remove
Main gear strut ..... proper inflation (3.25 in.)
Tire ..... check
Brake block disc ..... check
Fuel tank sumps ..... drain
Fuel vent ..... clear
Fuel quantity gauge ..... check
Fuel tank ..... check supply visually - secure cap
Pitot ..... remove cover - holes clear
Wing tip and lights ..... check
Surface conditions ..... check
Aileron and hinges ..... check
Flap and hinges ..... check

EMPENNAGE

Antennas ..... check
General condition ..... check
Baggage ..... check
Tail lights ..... check
Elevator ..... check
Rudder ..... check
Tie down ..... remove

MISCELLANEOUS

Fuel strainer ..... drain
Master switch ..... ON
Pitot heat switch ..... ON
Interior lighting ..... ON and check
Exterior lighting switches ..... ON and check
Fuel strainer drain ..... visually check contents of container and dispose-valve secure
Pitot ..... check-warm
Stall warning horn ..... check
All lighting switches ..... OFF
Pitot heat switch ..... OFF
Master switch ..... OFF
Passengers ..... board
All doors ..... close and secure
Seat belts and harness ..... fastened-check inertia reel

BEFORE STARTING ENGINE

Brakes ..... set
Propeller ..... full INCREASE rpm
Fuel selector ..... desired tank

STARTING ENGINE WHEN COLD

Throttle ..... 1/2" open
Master switch ..... ON
Electric fuel pump ..... ON
Mixture ..... prime - then idle cut-off
Starter ..... engage
Mixture ..... full RICH
Throttle ..... adjust
Oil pressure ..... check

STARTING ENGINE WHEN HOT

Throttle ..... 1/2" open
Master switch ..... ON
Electric fuel pump ..... ON
Mixture ..... idle cut-off
Starter ..... engage
Mixture ..... advance
Throttle ..... adjust
Oil pressure ..... check

STARTING ENGINE WHEN FLOODED

Throttle . . . . . open full
Master switch . . . . . .ON
Electric fuel pump . . . . . .OFF
Mixture . . . . . idle cut-off
Starter . . . . . .engage
Mixture . . . . . advance
Throttle . . . . . retard
Oil pressure . . . . . check

STARTING WITH EXTERNAL POWER SOURCE

Master switch . . . . . .OFF
All electrical equipment . . . . . .OFF
Terminals . . . . . connect
External power plug . . . . . .insert in fuselage
Proceed with normal start
Throttle . . . . . .lowest possible RPM
External power plug . . . . . disconnect from fuselage
Master switch . . . . . .ON - check ammeter
Oil pressure . . . . . check

WARM-UP

Throttle . . . . . 1000 to 1200 RPM

TAXIING

Chocks . . . . . .removed
Taxi area . . . . . .clear
Throttle . . . . . apply slowly
Prop . . . . . .high RPM
Brakes . . . . . check
Steering . . . . . check

GROUND CHECK

Propeller . . . . . full INCREASE
Throttle . . . . . 2000 RPM
Magnetos . . . . . .max. drop 175 RPM -max. diff. 50 RPM
Vacuum . . . . . 5.0" Hg. ± .1
Oil temp . . . . . check
Oil pressure . . . . . check
Air conditioner . . . . . check
Annunciator panel . . . . . .press-to-test
Propeller . . . . . exercise - then full INCREASE
Alternate air . . . . . check
Engine is warm for takeoff when throttle can be opened without engine faltering.
Electric fuel pump . . . . . .OFF
Fuel pressure . . . . . check
Throttle . . . . . retard

BEFORE TAKEOFF

Master switch . . . . . .ON
Flight instruments . . . . . check
Fuel selector . . . . . .proper tank
Electric fuel pump . . . . . .ON
Engine gauges . . . . . check
Alternate air . . . . . CLOSED
Seat backs . . . . . .erect
Mixture . . . . . set
Prop . . . . . set
Belts/harness . . . . . .fastened
Empty seats . . . . . seat belts snugly fastened
Flaps . . . . . set 10°
Trim tab . . . . . set
Controls . . . . . free
Doors . . . . . latched
Air conditioner . . . . . .OFF

TAKEOFF

NORMAL

Flaps . . . . . set 10°
Tab . . . . . set
Accelerate to 55 to 62 KIAS
Control wheel . . . . . back pressure to rotate to climb attitude

SHORT FIELD, OBSTACLE CLEARANCE

Flaps . . . . . 25° (second notch)
Accelerate to 55 to 62 KIAS depending on aircraft weight
Control wheel . . . . . back pressure to rotate to climb attitude
After breaking ground, accelerate to 79 KIAS and climb past obstacle.
Accelerate to best rate of climb speed - 89 KIAS and slowly retract the flaps.

SHORT FIELD, NO OBSTACLE

Flaps . . . . . 25° (second notch)
Accelerate to 55 to 62 KIAS depending upon aircraft weight.
Control wheel . . . . . back pressure to rotate to climb attitude
Accelerate to best rate of climb speed - 89 KIAS and slowly retract the flaps while climbing out.

SOFT FIELD, OBSTACLE CLEARANCE

Flaps . . . . . 25° (second notch)
Accelerate; pull nose wheel off as soon as possible.
Control wheel . . . . . lift off at lowest possible airspeed
Just above the ground, accelerate to best angle of climb speed - 79 KIAS and climb past obstacle.
Continue climb while accelerating to best rate of climb speed - 89 KIAS.
Flaps . . . . . .retract slowly

SOFT FIELD, NO OBSTACLE

Flaps . . . . . 25° (second notch)
Accelerate; pull nose wheel off as soon as possible.
Control wheel . . . . . lift off at lowest possible airspeed
Just above the ground, accelerate to best rate of climb speed - 89 KIAS and climb out.
Flaps . . . . . .retract slowly

CLIMB

Best rate (3400 lb) . . . . . 89 KIAS
Best angle (3400 lb) . . . . . 79 KIAS
En route . . . . . .100 KIAS
Electric fuel pump . . . . . OFF at desired altitude

CRUISING

Reference performance charts, Avco-Lycoming Operator's Manual and power setting table.
Normal max. cruise power. 75%
Power . . . . . set per power table
Mixture . . . . . adjust

APPROACH AND LANDING

Fuel selector . . . . . .proper tank
Seat backs . . . . . .erect
Belts/harness . . . . . fasten
Electric fuel pump . . . . . .ON
Mixture . . . . . .set
Propeller . . . . . .set
Flaps . . . . . down - 109 KIAS max
Air conditioner . . . . . .OFF
Trim to 80 KIAS

STOPPING ENGINE

Flaps . . . . . .retract
Electric fuel pump . . . . . .OFF
Air conditioner . . . . . .OFF
Radios . . . . . .OFF
Propeller . . . . . full INCREASE
Throttle . . . . . .full aft
Mixture . . . . . .idle cut-off
Magnetos . . . . . .OFF
Master switch . . . . . .OFF

PARKING

Parking brake . . . . . .set
Control wheel . . . . . secured with belts
Flaps . . . . . .full up
Wheel chocks . . . . . in place
Tie downs . . . . . .secure

4.7 AMPLIFIED NORMAL PROCEDURES (GENERAL)

The following paragraphs are provided to supply detailed information and explanations of the normal procedures necessary for the safe operation of the airplane.

4.9 PREFLIGHT CHECK

The airplane should be given a thorough preflight and walk-around check. The preflight should include a check of the airplane's operational status, computation of weight and C. G. limits, takeoff and landing distances, and in-flight performance. A weather breifing should be obtained for the intended flight path and any other factors relating to safe flight should be checked before takeoff.

CAUTION

The flap position should be noted before boarding the airplane. The flaps must be placed in the UP position before they will lock and support weight on the step.

COCKPIT

Upon entering the cockpit, release the seat belts securing the control wheel. Check that all switches are turned "OFF" and the mixture control is in the IDLE CUT-OFF position. Turn "ON" the master switch and check the fuel quantity gauges for sufficient quantity. Check the annunciator panel - all lights should be "ON". Turn "OFF" master switch and begin preliminary control systems check by moving the wheel through its full travel. Move the flap handle through its full travel and adjust the trim control to neutral. The completion of the initial cockpit check is accomplished by checking the windows for cleanliness and cracks and be sure all the required airplane papers are on board. Prior to beginning the walk-around stow all baggage and the tow bar.

RIGHT WING

Begin the walk-around at the trailing edge of the right wing by checking the wing surface, aileron, flap and hinges for damage and operational interference. The wing and control surfaces should be free of ice, mud or snow and other extraneous substances. Static wicks should be firmly attached and in good condition. Check the wing tip and lights for damage. Visually inspect the fuel tank for quantity and color of fuel. Be sure to secure the cap properly. Check the fuel indicator gauge (only on serial numbers 32-7940001 and up). Each inboard tank is furnished with an external fuel quantity indicator to assist the pilot in determining fuel quantities of less than 25 gallons. The fuel vent should be clear of obstructions.

Drain the two fuel sumps on the underside of the right wing to remove water and/or sediment. The fuel system should be drained daily prior to the first flight and after refueling to avoid the accumulation of water and/or sediment. Each fuel tank is equipped with an individual quick drain located at the lower inboard rear corner of the tank. The fuel strainer and a system quick drain valve are located in the fuselage at the lowest point of the fuel system. It is important that the system quick drain be the last portion of the fuel system to be drained. (See "Miscellaneous" in the check list for appropriate procedure.)

CAUTION

When draining any amount of fuel, care should be taken to insure there is no fire hazard before starting engine.

A complete check of the landing gear is conducted by examining the main gear shock strut for proper inflation. There should be 4.5 inches of strut exposure under a normal static load. Check the tire for cuts and wear and insure proper inflation. Make a visual check of the brake blocks for wear or damage and check for any fluid leaks in the strut and brake area. Check fresh air inlet for obstructions.

NOSE SECTION

Continue from the right wing forward around the nose section of the airplane. The cowling should be checked for security and proper seating, the windows should clean and not cracked, and the general condition of the nose should appear sound. Check the security of the forward baggage compartment contents and close and lock the door.

Place a container under the fuel system quick drain valve located under the fuselage.

The propeller blades and spinner should be free of cracks, nicks, dents, or other defects. Check the tension of the alternator belt and be sure the air inlets are clear. Remove the chocks from the nose wheel and examine the landing gear. The gear strut should be inflated to show about 3.25 inches of strut exposure under a normal static load. Check the tire for cuts and wear and insure proper inflation. No leakage of fluids should be present. The landing light should be clean and intact. Oil quantity can be checked by opening the access port on top of the nacelle and removing the combination oil cap/dipstick. After the oil is checked, be sure the cap is secure.

LEFT WING

Continuing aft around the left wing, the air inlet should be checked for obstructions and the tie down and chocks should be removed. A complete check of the landing gear is conducted by examining the main gear shock strut for proper inflation. There should be 4.5 inches of strut exposure under a normal static load. Check tire for cuts and wear and insure proper inflation. Make a visual check of the brake blocks for wear or damage and check for any fluid leaks on the strut or brake block area.

Drain the two fuel sumps on the underside of the left wing to remove water and/or sediment. The fuel system should be drained daily prior to the first flight and after refueling to avoid the accumulation of water and/or sediment. (See RIGHT WING for further description of fuel system.)

CAUTION

When draining any amount of fuel, care should be taken to insure there is no fire hazard before starting engine.

The fuel vent should be checked for obstructions and the fuel quantity gauge (only on serial numbers 32-7940001 and up) on the wing should be checked. Visually inspect the fuel tank for quantity and color of fuel. Be sure to secure the cap properly. If the pitot is covered, be sure to remove the cover and inspect the pitot opening for obstructions. Check the wing tip and lights for damage and the static wicks for attachment and condition. Check the wing surface, aileron, flap and hinges for damage and operational inteference. The wing surface and control surfaces should be free of ice, mud or snow and other extraneous substances.

EMPENNAGE

Check the condition of any antennas located on the fuselage. All surfaces of the empennage should be examined for damage and operational interference. Fairings and access covers should be attached properly. Check the baggage to be sure it is stowed properly. Check that the lights on the tail are clean and intact. The elevator and rudder should be operational and free from interference of any type. Check the condition of the tabs and insure that all hinges and push rods are sound and operational. If the tail has been tied down, remove the tie down rope.

MISCELLANEOUS

Enter the cockpit and drain the fuel strainer by pressing down on the lever located on the right hand side of the cabin, below the forward edge of center seat. For airplanes with serial numbers 32-7740001 through 32-7840202, the fuel selector should be positioned in the following sequence while draining the strainer: "OFF," "LEFT TIP," "LEFT MAIN," "RIGHT MAIN" and "RIGHT TIP." For airplanes with serial numbers 32-7940001 and up, the fuel selector should be positioned in the following sequence while draining the strainer: "OFF," "LEFT" and "RIGHT." This is done to insure that the fuel in the lines between each tank outlet and the fuel strainer is drained, as well as the fuel in the fuel strainer. When the fuel tanks are full, it will take approximately six seconds to drain all the fuel in one of the lines from a tank to the fuel strainer. If the fuel tanks are less than full, it will take a few seconds longer. After draining the fuel strainer, check for leakage at the drain under the aircraft with the fuel selector on a tank position.

Turn the master switch "ON" and begin checking the interior lights by turning "ON" the necessary switches. After the interior lights are checked, turn "ON" the pitot heat switch and the exterior light switches. Next perform a walk-around check on the exterior lights and examine and dispose of the contents in the container placed under the fuel strainer drain.

Check the stall warning horn by moving the lift detector slightly up. Check the heated pitot head for proper heating.

CAUTION

Care should be taken when an operational check of the heated pitot head is being performed. The unit becomes very hot. Ground operation should be limited to three minutes maximum to avoid damaging the heating elements.

When all passengers are on board, the pilot should check the cabin doors for proper closing and latching procedures. The rear door should be closed and the overhead latch button turned to the "LOCK" position. The front door should be gently pulled shut, the door handle firmly latched and the overhead latch button turned to the "LOCK" position. All passengers should fasten their seat belts and shoulder harnesses. Check the inertia reel by pulling sharply on the strap. Seat belts on empty seats should be snugly fastened.

4.11 BEFORE STARTING ENGINE

Before starting the engine the brakes should be set "ON" and the propeller lever moved to the full "INCREASE" RPM position. The fuel selector should then be moved to the fullest tank.

4.13 STARTING ENGINE

(a) Starting Engine When Cold

Open the throttle lever approximately 1/2 inch. Turn "ON" the master switch and the electric fuel pump. Move the mixture control to full "RICH" until an indication is noted on the fuel flow meter. The engine is now primed.

Move the mixture control to idle cut-off and engage the starter by rotating the magneto switch clockwise. When the engine fires, release the magneto switch, advance the mixture control to full "RICH" and move the throttle to the desired setting.

If the engine does not fire within five to ten seconds, disengage the starter and reprime.

(b) Starting Engine When Hot

Open the throttle approximately 1/2 inch. Turn "ON" the master switch and the electric fuel pump. Move the mixture control lever to idle cut-off and engage the starter by rotating the magneto switch clockwise. When the engine fires, release the magneto switch, advance the mixture and move the throttle to the desired setting.

(c) Starting Engine When Flooded

The throttle lever should be full "OPEN". Turn "ON" the master switch and turn "OFF" the emergnecy fuel pump. Move the mixture control lever to idle cut-off and engage the starter by rotating the magneto switch clockwise. When the engine fires, release the magneto switch, advance the mixture and retard the throttle.

(d) Starting Engine With External Power Source

An optional feature called the Piper External Power (PEP) allows the operator to use an external battery to crank the engine without having to gain access to the airplane's battery.

Turn the master switch OFF and turn all electrical equipment OFF. Connect the RED lead of the PEP kit jumper cable to the POSITIVE (+) terminal of an external 12-volt battery and the BLACK lead to the NEGATIVE (-) terminal. Insert the plug of the jumper cable into the socket located on the fuselage. Note that when the plug is inserted, the electrical system is ON. Proceed with the normal starting technique.

After the engine has started, reduce power to the lowest possible RPM, to reduce sparking, and disconnect the jumper cable from the aircraft. Turn the master switch ON and check the alternator ammeter for an indication of output. DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT.

NOTE

For all normal operations using the PEP jumper cables, the master switch should be OFF, but it is possible to use the ship's battery in parallel by turning the master switch ON. This will give longer cranking capabilities, but will not increase the amperage. CAUTION: Care should be exercised because if the ship's battery has been depleted, the external power supply can be reduced to the level of the ship's battery. This can be tested by turning the master switch ON momentarily while the starter is engaged. If cranking speed increases, the ship's battery is at a higher level than the external power supply.

When the engine is firing evenly, advance the throttle to 800 RPM. If oil pressure is not indicated within thirty seconds, stop the engine and determine the trouble. In cold weather it will take a few seconds longer to get an oil pressure indication. If the engine has failed to start, refer to the Lycoming Operating Handbook, Engine Troubles and Their Remedies.

Starter manufacturers recommend that cranking periods be limited to thirty seconds with a two minute rest between cranking periods. Longer cranking periods will shorten the life of the starter.

4.15 WARM-UP

Warm-up the engine at 1000 to 1200 RPM. Avoid prolonged idling at low RPM, as this practice may result in fouled spark plugs.

Takeoff may be made as soon as the ground check is completed, provided that the throttle may be opened fully without backfiring or skipping, and without a reduction in engine oil pressure.

Do not operate the engine at high RPM when running up or taxiing over ground containing loose stones, gravel or any loose material that may cause damage to the propeller blades.

4.17 TAXIING

Before attempting to taxi the airplane, ground personnel should be instructed and approved by a qualified person authorized by the owner. Ascertain that the propeller back blast and taxi areas are clear.

Power should be applied slowly to start the taxi roll. Taxi a few feet forward and apply the brakes to determine their effectiveness. Taxi with the propeller set in low pitch, high RPM setting. While taxiing, make slight turns to ascertain the effectiveness of the steering.

Observe wing clearances when taxiing near buildings or other stationary objects. If possible, station an observer outside the airplane.

Avoid holes and ruts when taxiing over uneven ground.

Do not operate the engine at high RPM when running up or taxiing over ground containing loose stones, gravel or any loose material that may cause damage to the propeller blades.

4.19 GROUND CHECK

The magnetos should be checked at 2000 RPM with the propeller set at high RPM. Drop off on either magneto should not exceed 175 RPM and the difference between the magnetos should not exceed 50 RPM. Operation on one magneto should not exceed 10 seconds.

Check the vacuum gauge; the indicator should read 5.0" $\pm$ .1" Hg at 2000 RPM.

Check the annunciator panel lights with the press-to-test button. Also check the air conditioner and the alternate air.

The propeller control should be moved through its complete range to check for proper operation, and then placed in full "INCREASE" rpm for takeoff. To obtain maximum rpm, push the pedestal mounted control fully forward on the instrument panel. Do not allow a drop of more than 500 RPM during this check. In cold weather the propeller control should be cycled from high to low RPM at least three times before takeoff to make sure that warm engine oil has circulated.

The electric fuel pump should be turned "OFF" after starting or during warm-up to make sure that the engine driven pump is operating. Prior to takeoff the electric pump should be turned ON again to prevent loss of power during takeoff should the engine driven pump fail. Check both oil temperature and oil pressure. The temperature may be low for some time if the engine is being run for the first time of the day. The engine is warm enough for takeoff when the throttle can be opened without the engine faltering.

4.21 BEFORE TAKEOFF

All aspects of each particular takeoff should be considered prior to executing the takeoff procedure.

If the airplane is to be operated with the rear cabin door removed, it is recommended that all passengers wear parachutes.

After all aspects of the takeoff are considered, a pretakeoff check procedure must be performed.

Turn "ON" the master switch and check and set all of the flight instruments as required. Check the fuel selector to make sure it is on the proper tank (fullest). Turn "ON" the electric fuel pump and check the engine gauges. The alternate air should be in the "CLOSED" position.

All seat backs should be erect.

The mixture and propeller control levers should be set and the seat belts and shoulder harness fastened. Fasten the seat belts snugly around the empty seats.

Exercise and set the flaps and trim tab. Insure proper flight control movement and response.

All doors should be properly secured and latched.

On air conditioned models, the air conditioner must be "OFF" to insure normal takeoff performance.

4.23 TAKEOFF

The normal takeoff technique is conventional for the Cherokee Six. The tab should be set slightly aft of neutral, with the exact setting determined by the loading of the airplane. Allow the airplane to accelerate to 55 to 62 KIAS depending on the weight of the aircraft and ease back on the control wheel to rotate to climb attitude. Takeoffs are normally made with the flaps extended 10° (first notch).

Short Field, Obstacle Clearance:

Lower flaps to 25° (second notch), accelerate aircraft to 55 to 62 KIAS and ease back on the wheel to rotate. After breaking ground, accelerate to best angle of climb speed, 79 KIAS, and climb past obstacle. Continue climb and accelerate to best rate of climb speed, 89 KIAS, and slowly retract the flaps.

Short Field, No Obstacle:

Lower flaps to 25° (second notch), accelerate aircraft to 55 to 62 KIAS and ease back on the wheel to rotate. After breaking ground, accelerate to best rate of climb speed, 89 KIAS, and slowly retract the flaps while climbing out.

Soft Field, Obstacle Clearance:

Lower flaps to 25° (second notch), accelerate aircraft, pull nose gear off as soon as possible and lift off at lowest possible airspeed. Accelerate just above the ground to best angle of climb speed, 79 KIAS, to climb past obstacle clearance height. Continue climb while accelerating to best rate of climb speed, 89 KIAS, and slowly retract the flaps.

Soft Field, No Obstacle:

Lower flaps to 25° (second notch), accelerate aircraft, pull nose gear off as soon as possible and lift off at lowest possible airspeed. Accelerate just above the ground to best rate of climb speed, 89 KIAS, and climb out while slowly retracting the flaps.

4.25 CLIMB

The best rate of climb at gross weight will be obtained at 89 KIAS. The best angle of climb may be obtained at 79 KIAS. At lighter than gross weight these speeds are reduced somewhat*. For climbing en route, a speed of 100 KIAS is recommended. This will produce better forward speed and increased visibility over the nose during the climb.

When reaching the desired altitude, the electric fuel pump may be turned off.

*To obtain the performance presented in the Performance Section of this handbook, full power (full throttle and 2700 RPM) must be used.

4.27 CRUISING

The cruising speed of the Cherokee Six is determined by many factors, including power setting, altitude, temperature, loading and equipment installed in the airplane.

The normal maximum cruising power is 75% of the rated horsepower of the engine. When selecting cruising RPM below 2300, limiting manifold pressure for continuous operation, as specified by the appropriate "Avco-Lycoming Operator's Manual," should be observed.

To obtain the desired power, set the manifold pressure and RPM according to the power setting table in this manual.

Use of the mixture control in cruising flight reduces fuel consumption significantly, especially at higher altitudes. The mixture should be leaned during cruising operation above 5000 ft. altitude and at pilot's discretion at lower altitudes when 75% power or less is being used. If any doubt exists as to the amount of power being used, the mixture should be in the full "RICH" position for all operations under 5000 feet.

To lean the mixture, disengage the lock and pull the mixture control until the engine becomes rough, indicating that the lean mixture limit has been reached in the leaner cylinders. Then enrich the mixture by pushing the control towards the instrument panel until engine operation becomes smooth. The fuel flow meter will give a close approximation of the fuel being consumed. The low side of the power setting, as shown on the fuel flow meter, indicates best economy for that percent of power while the high side indicates best power.

If the airplane is equipped with the optional exhaust gas temperature (EGT) gauge, a more accurate means of leaning is available to the pilot. For this procedure, refer to the "Avco-Lycoming Operator's Manual."

For airplanes with serial numbers 32-7740001 through 32-7840202 lateral trim is best maintained by using fuel alternately from each main tank, and when these are nearly exhausted, from each tip tank. It is recommended that one main tank be used for one hour after takeoff, the other main tank used until nearly exhausted, then return to the first main tank. When nearly exhausted, turn to one tip tank and alternate at one-half hour intervals to maintain lateral trim.

For airplanes with serial numbers 32-7940001 and up, lateral trim is best maintained by using fuel alternately from each tank at one hour intervals.

Always remember that the electric fuel pump should be turned "ON" before switching tanks, and should be left on for a short period thereafter. To preclude making a hasty selection, and to provide continuity of flow, the selector should be changed to another tank before fuel is exhausted from the tank in use. The electric fuel pump should be normally "OFF" so that any malfunction of the engine driven fuel pump is immediately apparent. If signs of fuel starvation should occur at any time during flight, fuel exhaustion should be suspected, at which time the fuel selector should be immediately positioned to a full tank and the electric fuel pump switched to the "ON" position. Fuel tank selection at low altitude is not recommended, since little recovery time is available in the event of an error in tank selection. When switching tanks, make sure that the selector drops into a detent and is lined up with the desired tank.

4.29 APPROACH AND LANDING

Check to insure the fuel selector is on the proper (fullest) tank and that the seat backs are erect. The seat belts and shoulder harness should be fastened and the inertia reel checked.

Turn "ON" the electric fuel pump and turn "OFF" the air conditioner. The mixture should be set in the full "RICH" position and the propeller at full "INCREASE" rpm to facilitate ample power for an emergency go-around.

The airplane should be trimmed to a final approach speed of 80 KIAS with flaps extended. The flaps can be lowered at speeds up to 109 KIAS, if desired.

The amount of flap used during landings and the speed of the aircraft at contact with the runway should be varied according to the landing surface and conditions of wind and airplane loading. It is generally good practice to contact the ground at the minimum possible safe speed consistent with existing conditions.

Normally, the best technique for short and slow landings is to use full flap and enough power to maintain the desired airspeed and approach flight path. Mixture should be full "RICH," fuel on the fullest tank, and electric fuel pump "ON." Reduce the speed during the flareout and contact the ground close to the stalling speed (47 to 54 KIAS). After ground contact hold the nose wheel off as long as possible. As the airplane slows down, gently lower the nose and apply the brakes. Braking is most effective when flaps are raised and back pressure is applied to the control wheel, putting most of the aircraft weight on the main wheels. In high wind conditions, particularly in strong crosswinds, it may be desirable to approach the ground at higher than normal speeds with partial or no flaps.

4.31 STOPPING ENGINE

At the pilot's discretion, the flaps should be raised and the electric fuel pump turned "OFF."

NOTE

The flaps must be placed in the "UP" position for the flap step to support weight. Passengers should be cautioned accordingly.

The air conditioner and radios should be turned "OFF," the propeller set in the full "INCREASE" position, and the engine stopped by disengaging the mixture control lock and pulling the mixture control back to idle cut-off. The throttle should be left full aft to avoid engine vibration while stopping. Then the magneto and master switches must be turned "OFF."

4.33 PARKING

If necessary, the airplane should be moved on the ground with the aid of the nose wheel tow bar provided with each airplane and secured behind the rear seats. The parking brake should be set. The aileron and stabilator controls should be secured by looping the safety belt through the control wheel and pulling it snug. The flaps are locked when in the "UP" position and should be left retracted.

Tie downs can be secured to rings provided under each wing and to the tail skid. The rudder is held in position by its connections to the nose wheel steering and normally does not have to be secured.

4.35 STALLS

The stall characteristics of the Cherokee Six are conventional. An approaching stall is indicated by a stall warning horn which is activated between five and ten knots above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall.

The gross weight stalling speed of the Cherokee Six with power off and full flaps is 47 KIAS. With the flaps up this speed is increased 7 KTS. Loss of altitude during stalls can be as great as 350 feet, depending on configuration and power.

NOTE

The stall warning system is inoperative with the master switch "OFF."

During preflight, the stall warning system should be checked by turning the master switch "ON," lifting the detector and checking to determine if the horn is actuated. The master switch should be returned to the "OFF" position after the check is complete.

4.37 TURBULENT AIR OPERATION

In keeping with good operating practice used in all aircraft, it is recommended that when turbulent air is encountered or expected, the airspeed be reduced to maneuvering speed to reduce the structural loads caused by gusts and to allow for inadvertent speed build-ups which may occur as a result of the turbulence or of distractions caused by the conditions.

4.39 WEIGHT AND BALANCE

It is the responsibility of the owner and pilot to determine that the airplane remains within the allowable weight vs. center of gravity envelope while in flight.

For weight and balance data, refer to Section 6 (Weight and Balance).

TABLE OF CONTENTS

SECTION 5

PERFORMANCE

SECTION 5

PERFORMANCE

5.1 GENERAL

All of the required (FAA regulations) and complementary performance information applicable to the Cherokee Six is provided by this section.

Performance information associated with those optional systems and equipment which require handbook supplements is provided by Section 9 (Supplements).

5.3 INTRODUCTION TO PERFORMANCE AND FLIGHT PLANNING

The performance information presented in this section is based on measured Flight Test Data corrected to I.C.A.O. standard day conditions and analytically expanded for the various parameters of weight, altitude, temperature, etc.

The performance charts are unfactored and do not make any allowance for varying degrees of pilot proficiency or mechanical deterioration of the aircraft. This performance, however, can be duplicated by following the stated procedures in a properly maintained airplane.

Effects of conditions not considered on the charts must be evaluated by the pilot, such as the effect of soft or grass runway surface on takeoff and landing performance, or the effect of winds aloft on cruise and range performance. Endurance can be grossly affected by improper leaning procedures, and inflight fuel flow and quantity checks are recommended.

REMEMBER! To get chart performance, follow the chart procedures.

The information provided by paragraph 5.5 (Flight Planning Example) outlines a detailed flight plan using the performance charts in this section. Each chart includes its own example to show how it is used.

THIS PAGE INTENTIONALLY LEFT BLANK

5.5 FLIGHT PLANNING EXAMPLE

(a) Aircraft Loading

The first step in planning our flight is to calculate the airplane weight and center of gravity by utilizing the information provided by Section 6 (Weight and Balance) of this handbook.

The basic empty weight for the airplane as delivered from the factory has been entered in Figure 6-5. If any alterations to the airplane have been made effecting weight and balance, reference to the aircraft logbook and Weight and Balance Record (Figure 6-7) should be made to determine the current basic empty weight of the airplane.

Make use of the Weight and Balance Loading Form (Figure 6-11) and the C.G. Range and Weight graph (Figure 6-15) to determine the total weight of the airplane and the center of gravity position.

After proper utilization of the information provided we have found the following weights for consideration in our flight planning example.

The landing weight cannot be determined until the weight of the fuel to be used has been established [refer to item (g)(1)] .

(1)	Basic Empty Weight	1954.8 lbs.
(2)	Occupants	1020 lbs.
(3)	Baggage and Cargo	100 lbs.
(4)	Fuel (6 lb./gal. x 54)	324 lbs.
(5)	Takeoff Weight	3398.8 lbs.
(6)	Landing Weight (a)(5) minus (g)(1), (3398.8 lbs. minus 213.6 lbs.)	3185.2 lbs.

Our takeoff weight is below the maximum of 3400 lbs. and our weight and balance calculations have determined our C.G. position within the approved limits.

(b) Takeoff and Landing

Now that we have determined our aircraft loading, we must consider all aspects of our takeoff and landing.

All of the existing conditions at the departure and destination airport must be acquired, evaluated and maintained throughout the flight.

Apply the departure airport conditions and takeoff weight to the appropriate Takeoff Performance graph (Figures 5-5, 5-7, 5-9 and 5-11) to determine the length of runway necessary for the takeoff and/or the barrier distance.

The landing distance calculations are performed in the same manner using the existing conditions at the destination airport and, when established, the landing weight.

The conditions and calculations for our example flight are listed below. The takeoff and landing distances required for our example flight have fallen well below the available runway lengths.

		Departure Airport	Destination Airport
(1)	Pressure Altitude	1000 ft.	3000 ft.
(2)	Temperature	70°F	60°F
(3)	Wind Component	0 KTS	15 KTS Hdwind
(4)	Runway Length Available	3600 ft.	7600 ft.
(5)	Runway Required		
	Ground Roll	1275 ft.*	560 ft.**
	Total	1900 ft.*	840 ft.***

NOTE

The remainder of the performance charts used in this flight plan example assume a no wind condition. The effect of winds aloft must be considered by the pilot when computing climb, cruise and descent performance.

(c) Climb

The next step in our flight plan is to determine the necessary climb segment components.

The desired cruise pressure altitude and corresponding cruise outside air temperature values are the first variables to be considered in determining the climb components from the Time, Distance, and Fuel to Climb graph (Figure 5-15). After the time, distance and fuel for the cruise pressure altitude and outside air temperature values have been established, apply the existing conditions at the departure field to graph (Figure 5-15). Now, subtract the values obtained from the graph for the field of departure conditions from those for the cruise pressure altitude.

The remaining values are the true time, distance and fuel components for the climb segment of the flight plan corrected for field pressure altitude and temperature.

The following values were determined from the above instructions in our flight planning example:

(1)	Cruise Pressure Altitude	7000 ft.
(2)	Cruise OAT	45°F
(3)	Time to Climb (9.0 min. minus 1.5 min.)	7.5 min.
(4)	Distance to Climb (15.5 nautical miles minus 3.0 nautical miles)	12.5 nautical miles
(5)	Fuel to Climb (3.5 gal. minus 0.5 gal.)	3.0 gal.

*reference Figure 5-5
**reference Figure 5-47
***reference Figure 5-45

(d) Descent

The descent data will be determined prior to the cruise data to provide the descent distance for establishing the total cruise distance.

Utilizing the cruise pressure altitude and OAT we determine the basic time, distance and fuel for descent (Figure 5-41). These figures must be adjusted for the field pressure altitude and temperature at the destination airport. To find the necessary adjustment values, use the existing pressure altitude and temperature conditions at the destination airport as variables to find the time, distance and fuel values from the graph (Figure 5-41). Now, subtract the values obtained from the field conditions from the values obtained from the cruise conditions to find the true time, distance and fuel values needed for the flight plan.

The values obtained by proper utilization of the graphs for the descent segment of our example are shown below.

(1)	Time to Descend (15.5 min. minus 8.0 min.)	7.5 min.
(2)	Distance to Descend (39 nautical miles minus 19 nautical miles)	20 nautical miles
(3)	Fuel to Descend (4.5 gal. minus 2.5 gal.)	2.0 gal.

(e) Cruise

Using the total distance to be traveled during the flight, subtract the previously calculated distance to climb and distance to descend to establish the total cruise distance. Refer to the appropriate Avco Lycoming Operator's Manual and the Power Setting Table (Figure 5-17) when selecting the cruise power setting. The established pressure altitude and temperature values and the selected cruise power should now be utilized to determine the true airspeed from the appropriate Cruise Performance graph (Figure 5-19, 5-21, 5-23, 5-25 or 5-27).

Calculate the cruise fuel flow for the cruise power setting from the information provided by the Avco Lycoming Operator's Manual.

The cruise time is found by dividing the cruise distance by the cruise speed and the cruise fuel is found by multiplying the cruise fuel flow by the cruise time.

The cruise calculations established for the cruise segment of our flight planning example are as follows:

(1)	Total Distance	300 nautical miles
(2)	Cruise Distance (e)(1) minus (c)(4) minus (d)(2), (300 nautical miles minus 12.5 nautical miles minus 20 nautical miles)	267.5 nautical miles
(3)	Cruise Power	65% rated power
(4)	Cruise Speed	139 KTS TAS*
(5)	Cruise Fuel Consumption	16.1 GPH
(6)	Cruise Time (e)(2) divided by (e)(4), (267.5 nautical miles divided by 139 KTS)	1.9 hrs. (1 hr., 54 min.)
(7)	Cruise Fuel (e)(5) multiplied by (e)(6), (16.1 GPH multiplied by 1.9 hrs.)	30.6 gal.

*reference Figure 5-19

(f) Total Flight Time

The total flight time is determined by adding the time to climb, the time to descend and the cruise time. Remember! The time values taken from the climb and descent graphs are in minutes and must be converted to hours before adding them to the cruise time.

The following flight time is required for our flight planning example.

(1) Total Flight Time
(c)(3) plus (d)(1) plus (e)(6), (.125 hrs. plus .125 hrs. plus 1.9 hrs.)
(7.5 min. plus 7.5 min. plus 1 hr., 54 min.) 2.15 hrs. (2 hrs.,9 min.)

(g) Total Fuel Required

Determine the total fuel required by adding the fuel to climb, the fuel to descend and the cruise fuel. When the total fuel (in gallons) is determined, multiply this value by 6 lb./gal. to determine the total fuel weight used for the flight.

The total fuel calculations for our example flight plan are shown below.

(1) Total Fuel Required
(c)(5) plus (d)(3) plus (e)(7), (3.0 gal. plus 2.0 gal. plus 30.6 gal.) 35.6 gal.
(35.6 gal. multiplied by 6 lb./gal.) 213.6 lbs.

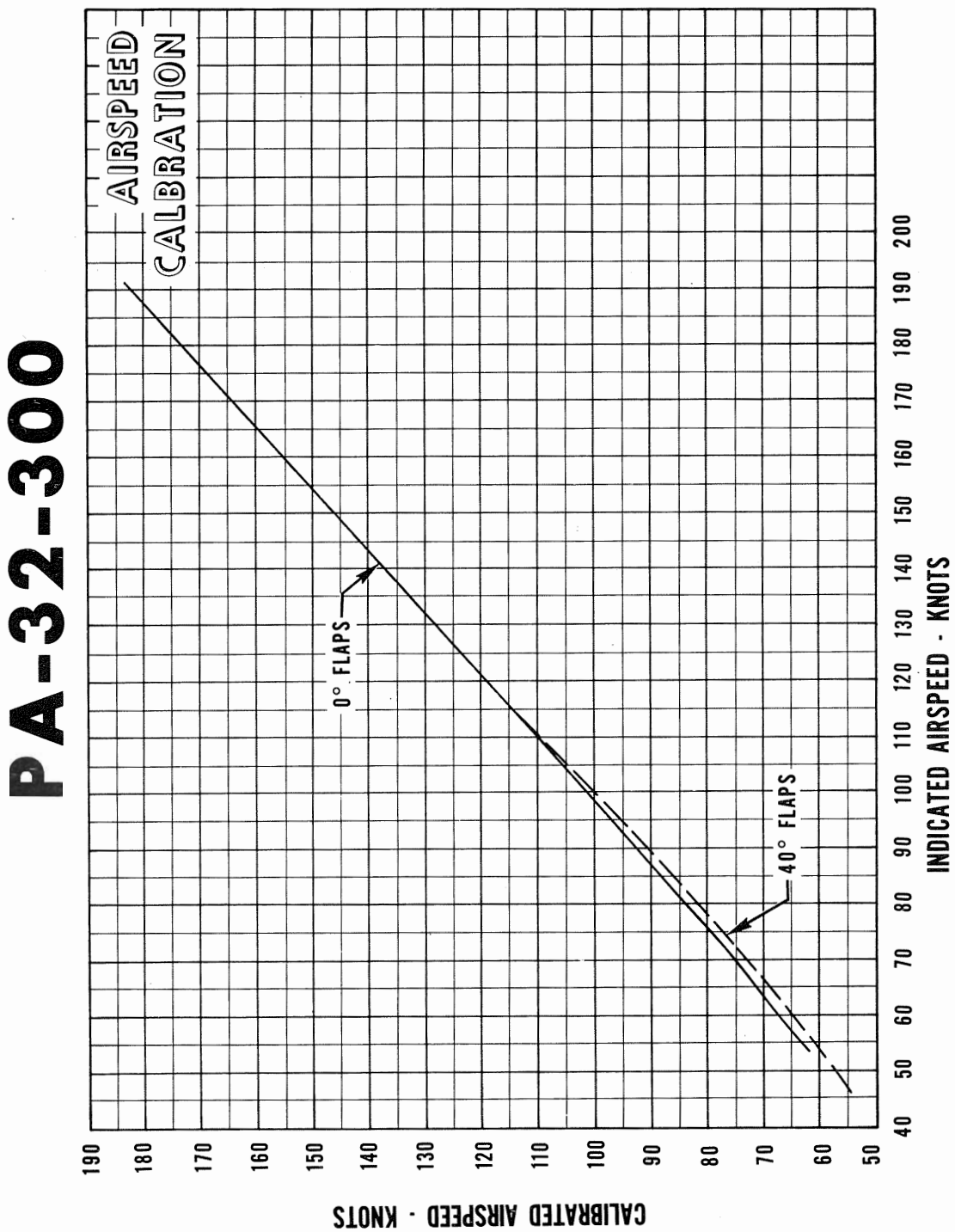
THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

5.7 PERFORMANCE GRAPHS

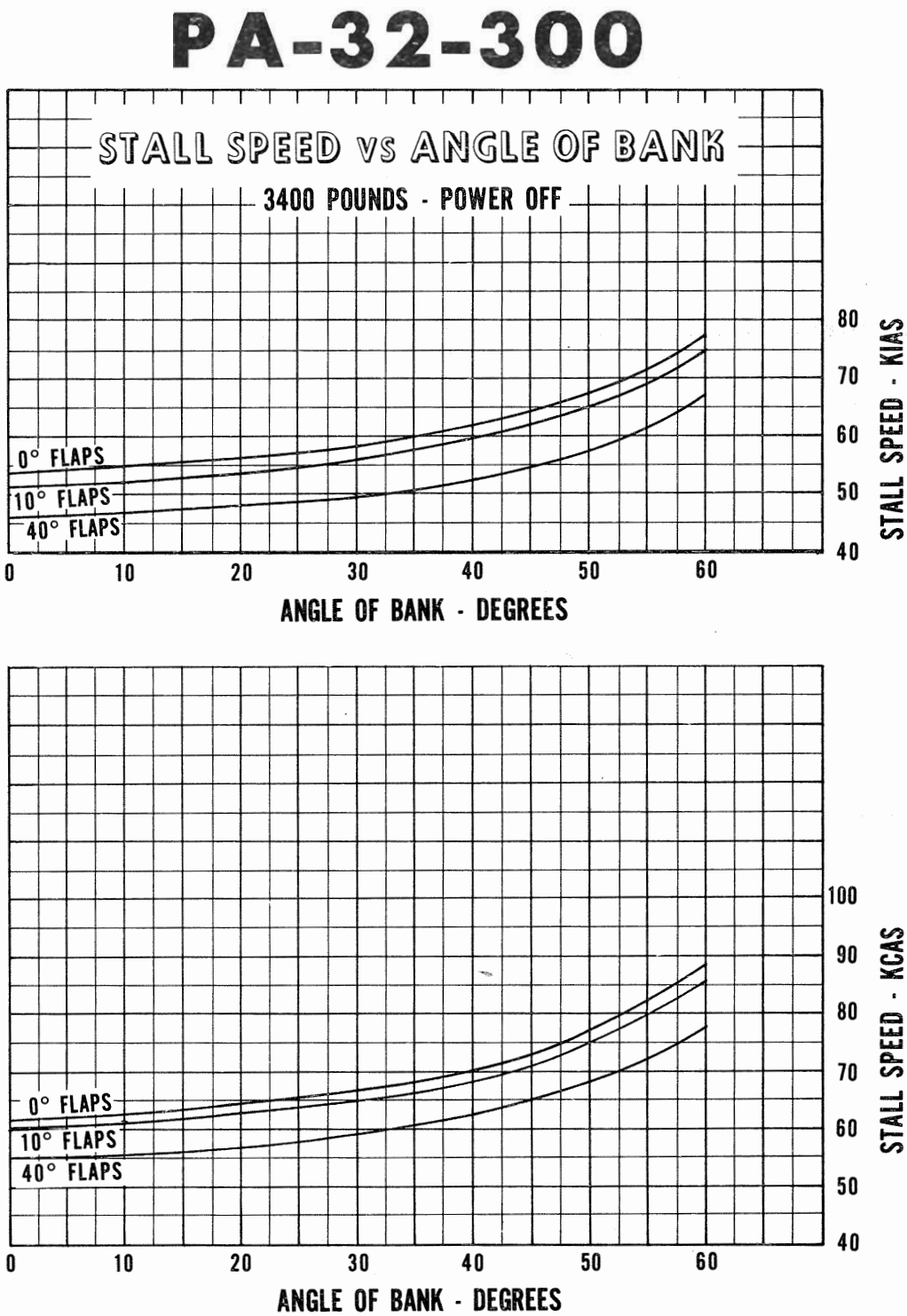
LIST OF FIGURES

THIS PAGE INTENTIONALLY LEFT BLANK



AIRSPEED CALIBRATION

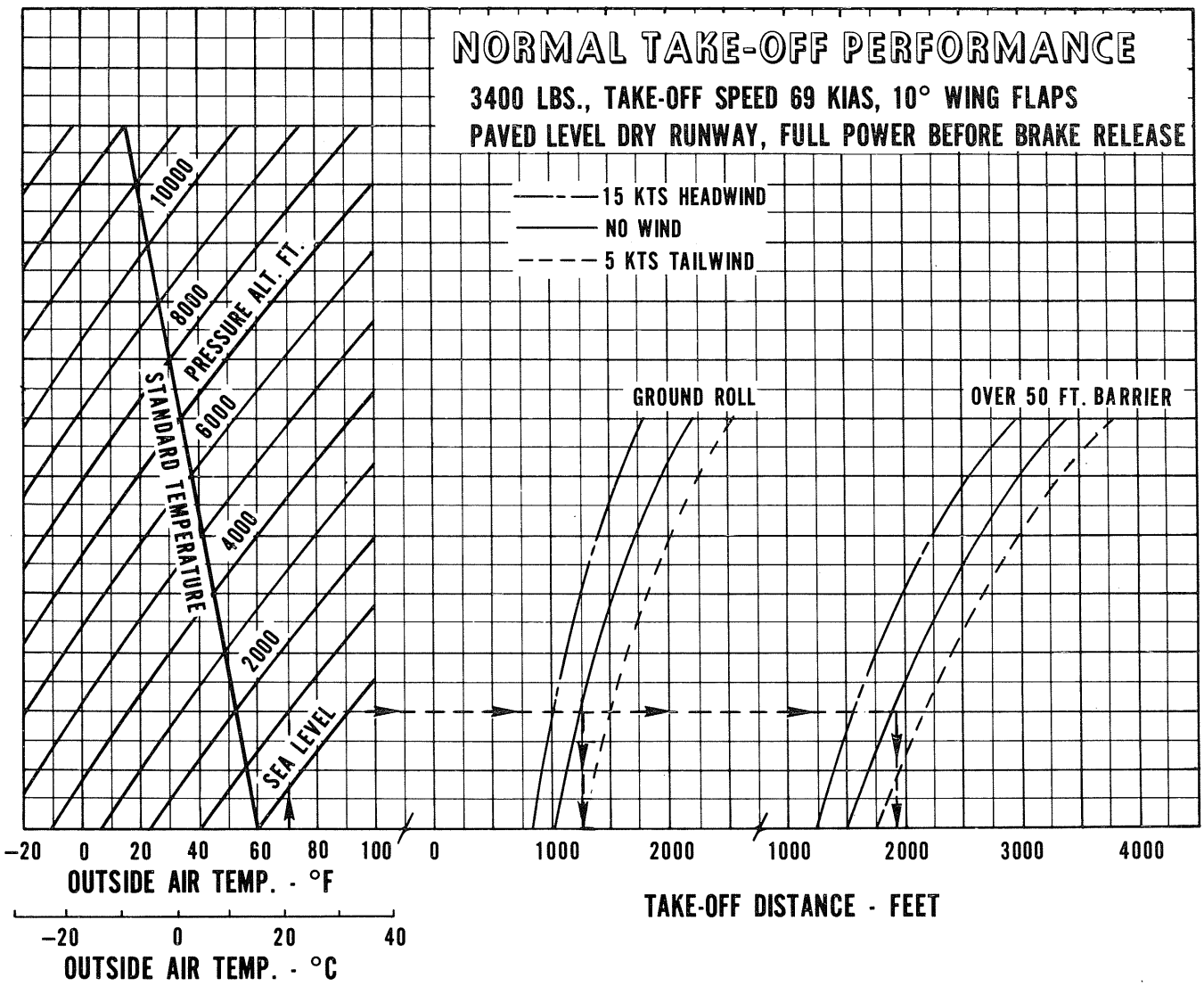
Figure 5-1



STALL SPEED VS ANGLE OF BANK

Figure 5-3

PA-32-300

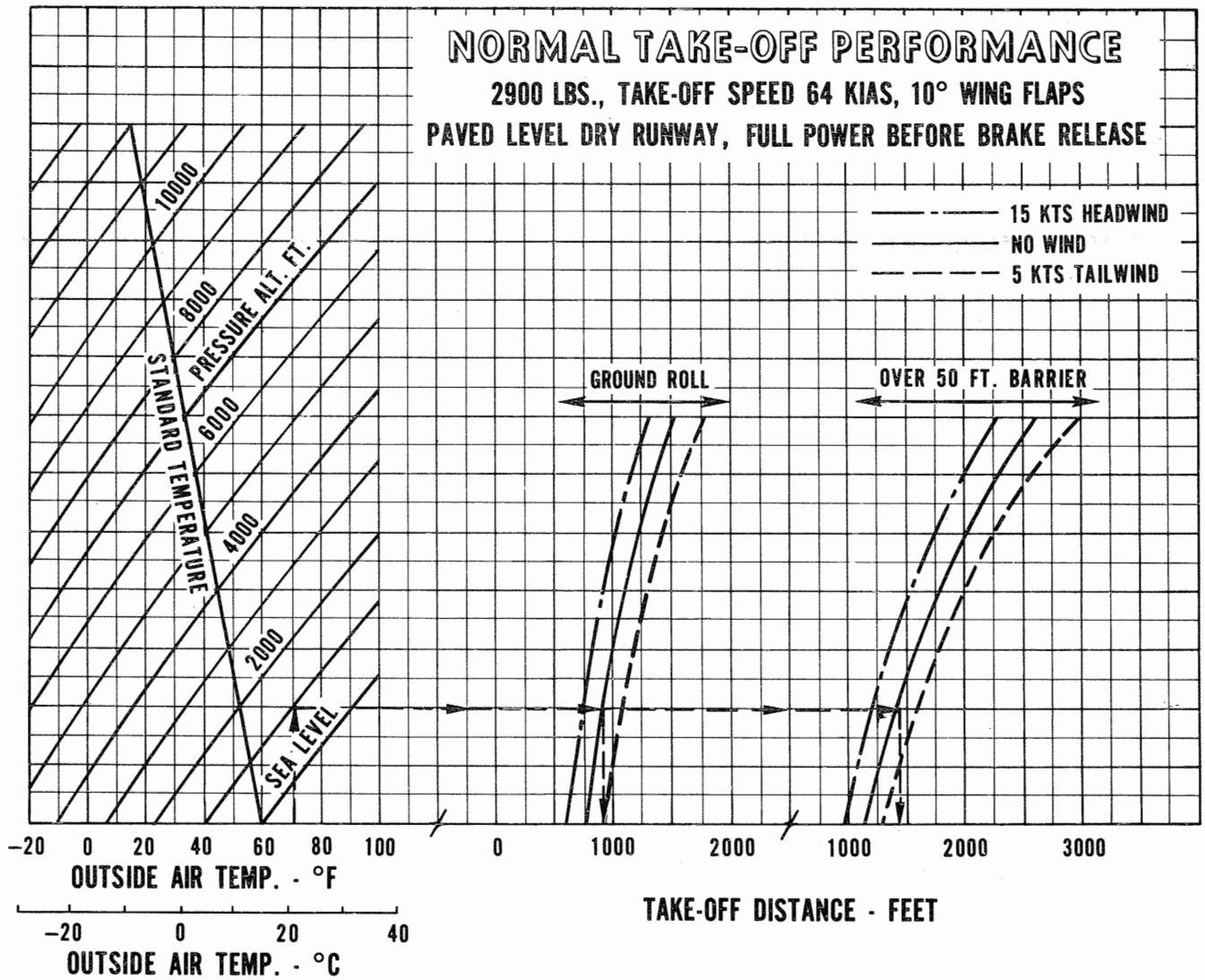


Example:
OAT: 70° F
Airport pressure altitude: 1000 ft.
Gross weight: 3399 lbs.
Wind component: 0 knots
Ground roll: 1250 ft.
Distance over 50 ft. barrier: 1900 ft.

NORMAL TAKEOFF PERFORMANCE (3400 LBS.)

Figure 5-5

PA-32-300

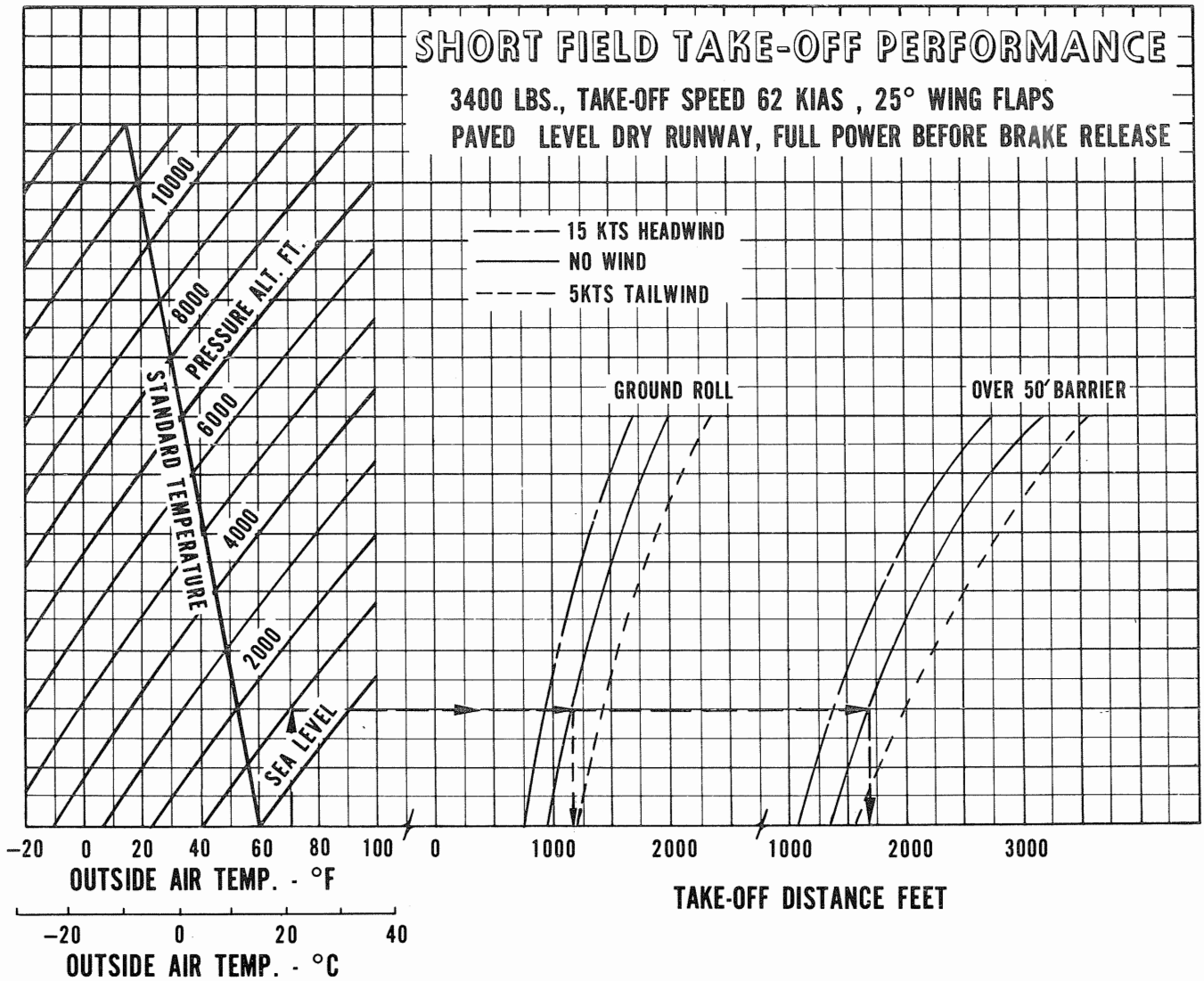


Example:
OAT: 70° F
Airport pressure altitude: 1000 ft.
Gross weight: 2900 lbs.
Wind component: 0 knots
Ground roll: 900 ft.
Distance over 50 ft. barrier: 1400 ft.

NORMAL TAKEOFF PERFORMANCE (2900 LBS.)

Figure 5-7

PA-32-300

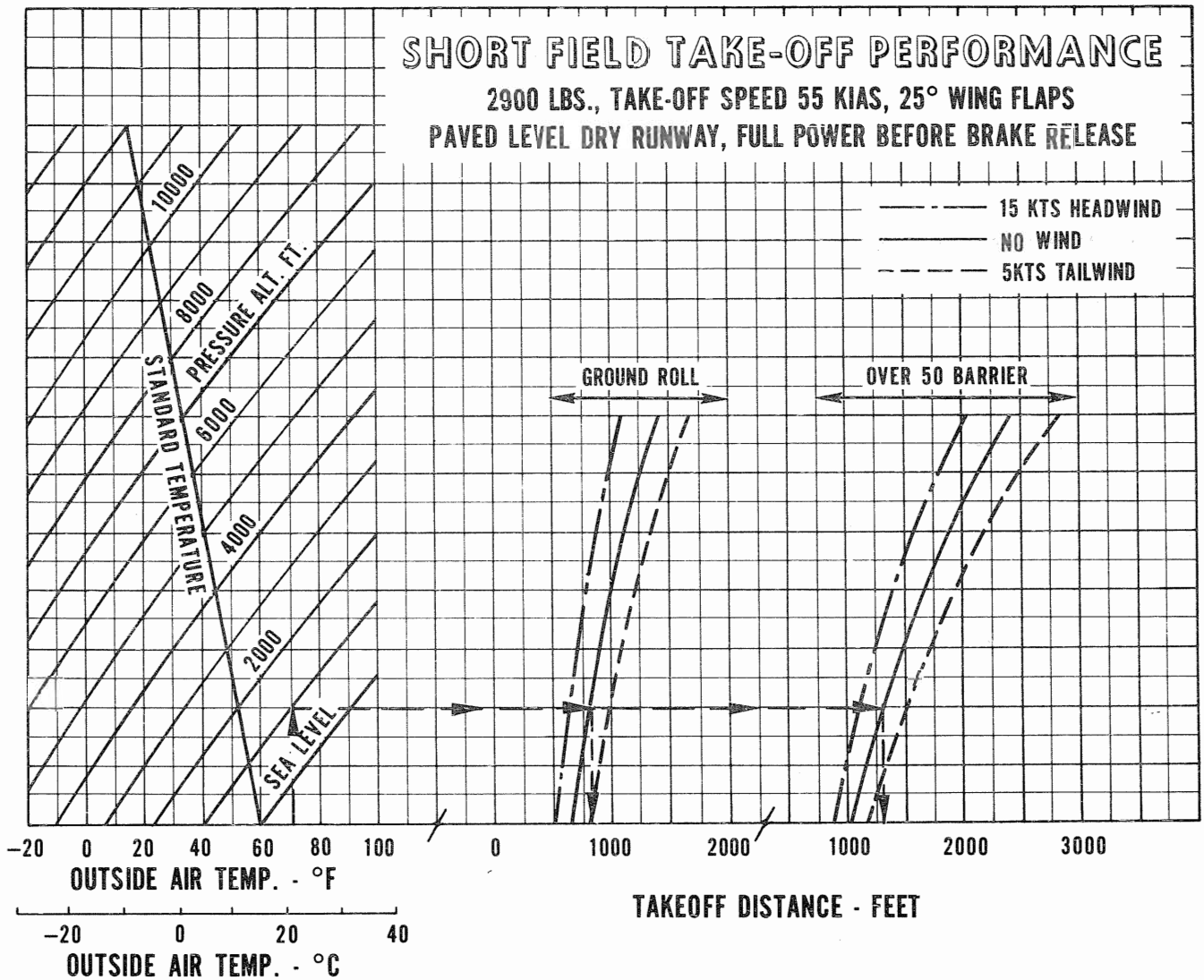


Example:
OAT: 70° F
Airport pressure altitude: 1000 ft.
Gross weight: 3400 lbs.
Wind component: 0 knots
Ground roll: 1200 ft.
Distance over 50 ft. barrier: 1700 ft.

SHORT FIELD TAKEOFF PERFORMANCE (3400 LBS.)

Figure 5-9

PA-32-300

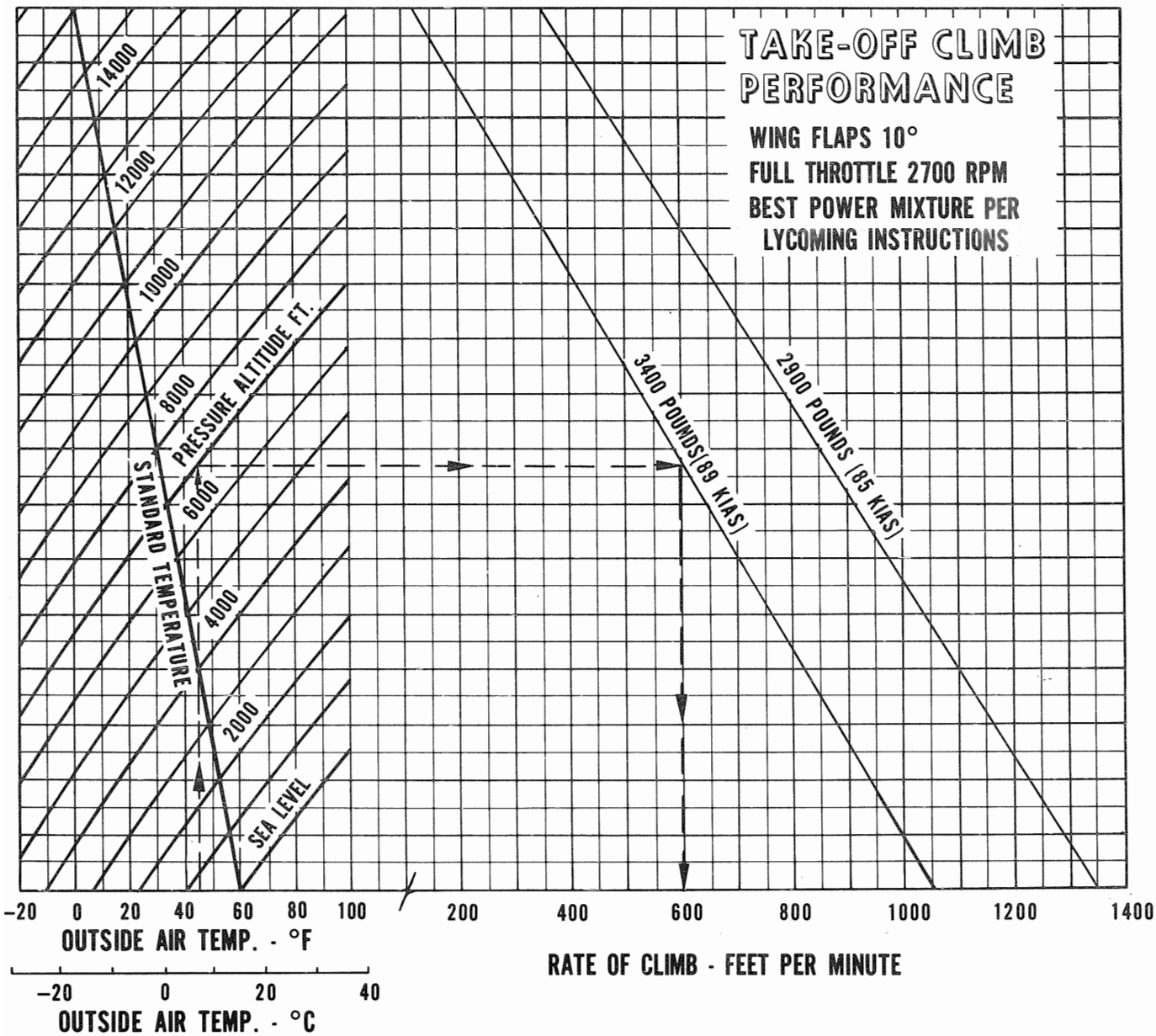


Example:
OAT: 70° F
Airport pressure altitude: 1000 ft.
Gross weight: 2900 lbs.
Wind component: 0 knots
Ground roll: 800 ft.
Distance over 50 ft. barrier: 1300 ft.

SHORT FIELD TAKEOFF PERFORMANCE (2900 LBS.)

Figure 5-11

PA-32-300



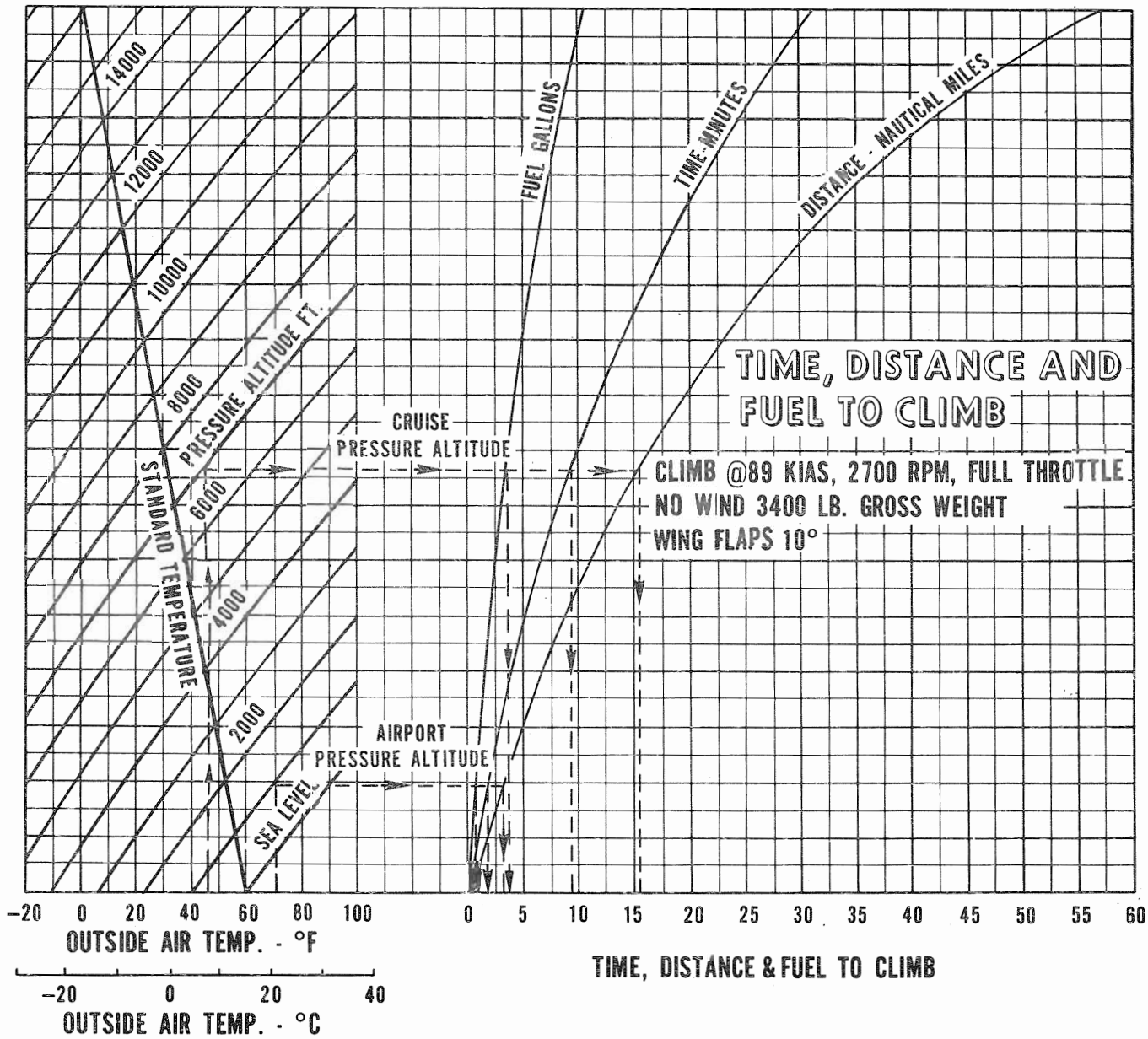
Example:
Climb pressure altitude: 7000 ft.
OAT: 45° F
Gross weight: 3400 lbs.
Rate of climb: 600 F.P.M.

Note: On serial numbers 32-7840001 and up, reduce rate of climb by 27 F.P.M. when the wheel fairings are removed.

TAKEOFF CLIMB PERFORMANCE

Figure 5-13

PA-32-300



Example:

Departure airport pressure altitude: 1000 ft.
Departure airport temperature: 70°F
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45°F
Time to climb: (9 min. minus 1.5 min.) = 7.5 min.
Distance to climb: (15.5 miles minus 3 miles) = 12.5 miles
Fuel to climb: (3.5 gal. minus .5 gal.) = 3.0 gal.

TIME, DISTANCE AND FUEL TO CLIMB

Figure 5-15

Power Setting Table - Lycoming Model IO-540-K,-L,-M Series, 300 HP Engine

Press. Alt Feet	Std Alt Temp °F	165 HP – 55% Rated RPM AND MAN. PRESS. 2100	2200	2300	2400	195 HP – 65% Rated RPM AND MAN. PRESS. 2100	2200	2300	2400	225 HP – 75% Rated RPM AND MAN. PRESS. 2200	2300	2400	Press. Alt Feet
SL	59	22.5	21.8	21.2	20.7	25.6	24.7	23.8	23.2	27.6	26.6	25.8	SL
1,000	55	22.3	21.6	21.0	20.5	25.3	24.4	23.5	22.9	27.3	26.3	25.5	1,000
2,000	52	22.1	21.4	20.7	20.2	25.1	24.2	23.3	22.7	27.1	26.1	25.2	2,000
3,000	48	21.9	21.2	20.5	20.0	24.8	23.9	23.0	22.5	26.8	25.8	24.9	3,000
4,000	45	21.7	21.0	20.3	19.8	24.6	23.7	22.8	22.2	26.5	25.6	24.6	4,000
5,000	41	21.5	20.8	20.1	19.6	24.3	23.5	22.5	22.0	–	25.3	24.4	5,000
6,000	38	21.3	20.6	19.8	19.3	24.0	23.2	22.3	21.7	–	25.0	24.1	6,000
7,000	34	21.0	20.4	19.6	19.1	23.7	22.9	22.0	21.5	–	–	23.8	7,000
8,000	31	20.8	20.2	19.4	18.9	–	22.5	21.8	21.2				8,000
9,000	27	20.6	20.0	19.2	18.6	–	–	21.5	21.0				9,000
10,000	23	20.4	19.8	19.0	18.4	–	–	21.2	20.7				10,000
11,000	19	20.2	19.6	18.7	18.2	–	–	–	20.4				11,000
12,000	16	20.0	19.4	18.5	18.0								12,000
13,000	12	–	19.2	18.3	17.7								13,000
14,000	9	–	–	18.0	17.3								14,000
15,000	5	–	–	–	16.9								15,000

To maintain constant power, correct manifold pressure approximately 0.18" Hg for each 10° F variation in induction air temperature from standard altitude temperature. Add manifold pressure for air temperature above standard; subtract for temperature below standard.

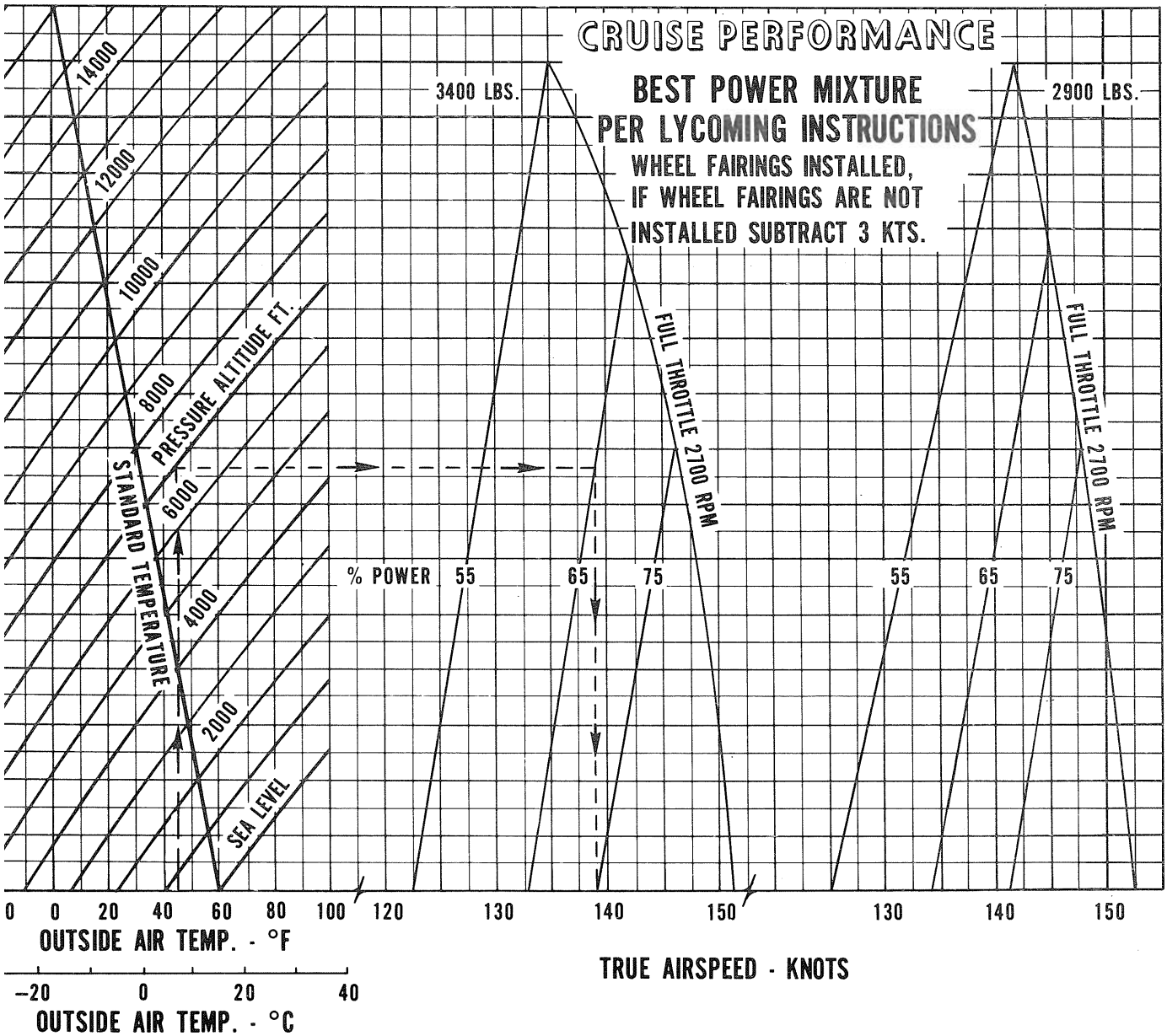
NOTE: Full throttle manifold pressure values may not be obtainable when atmospheric conditions are non-standard.

POWER SETTING TABLE

Figure 5-17

THIS PAGE INTENTIONALLY LEFT BLANK

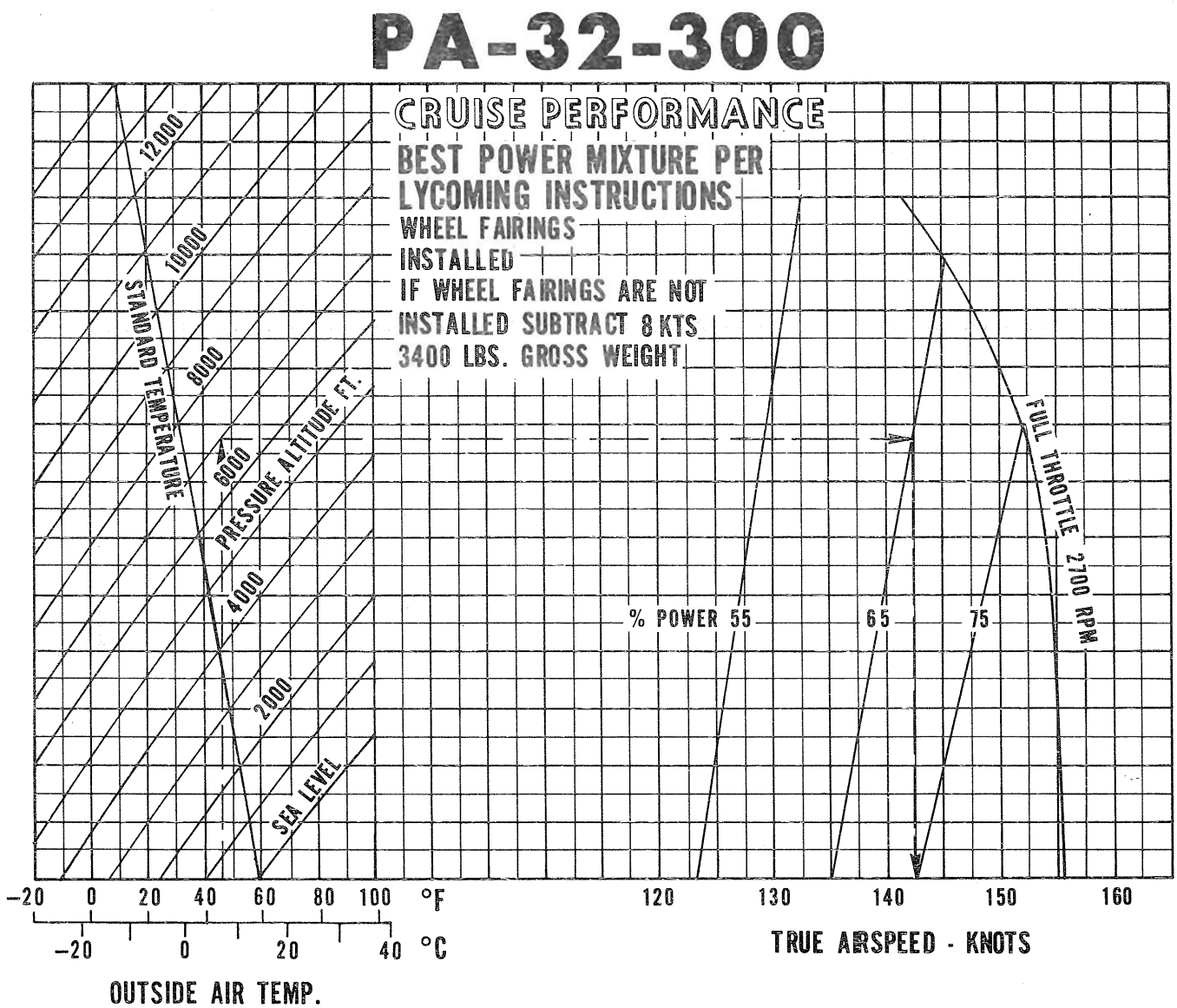
PA-32-300



Example:
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45°F
Gross weight: 3400 lbs.
Power: 65%
True airspeed: 139 knots

CRUISE PERFORMANCE - BEST POWER (3400 LBS., 2900 LBS.)
(SERIAL NUMBERS 32-7740001 THROUGH 32-7740113)

Figure 5-19

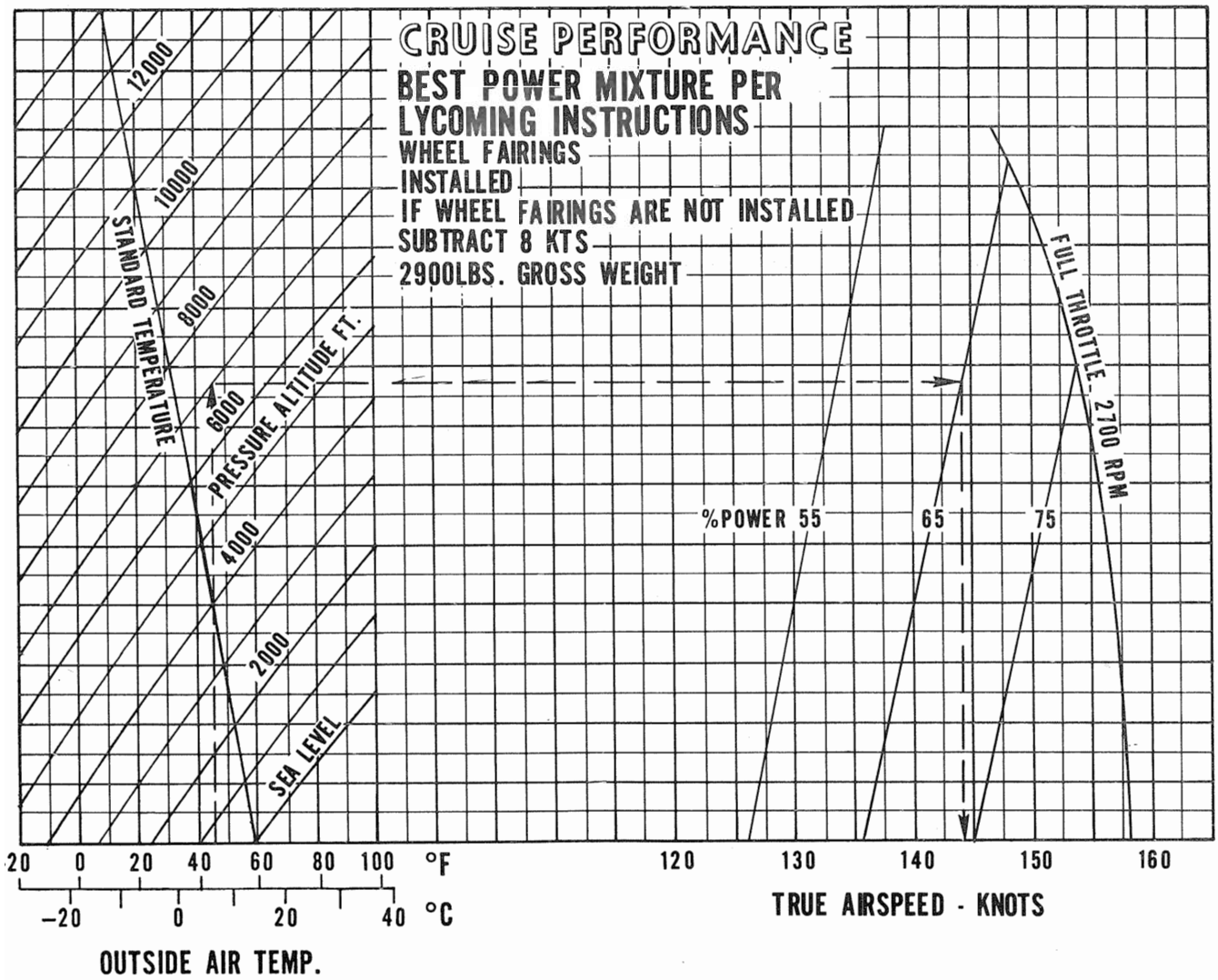


Example:
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45° F
Gross weight: 3400 lbs.
Power: 65%
True airspeed: 142.5 knots

CRUISE PERFORMANCE - BEST POWER (3400 LBS.) (SERIAL NOS. 32-7840001 AND UP)

Figure 5-21

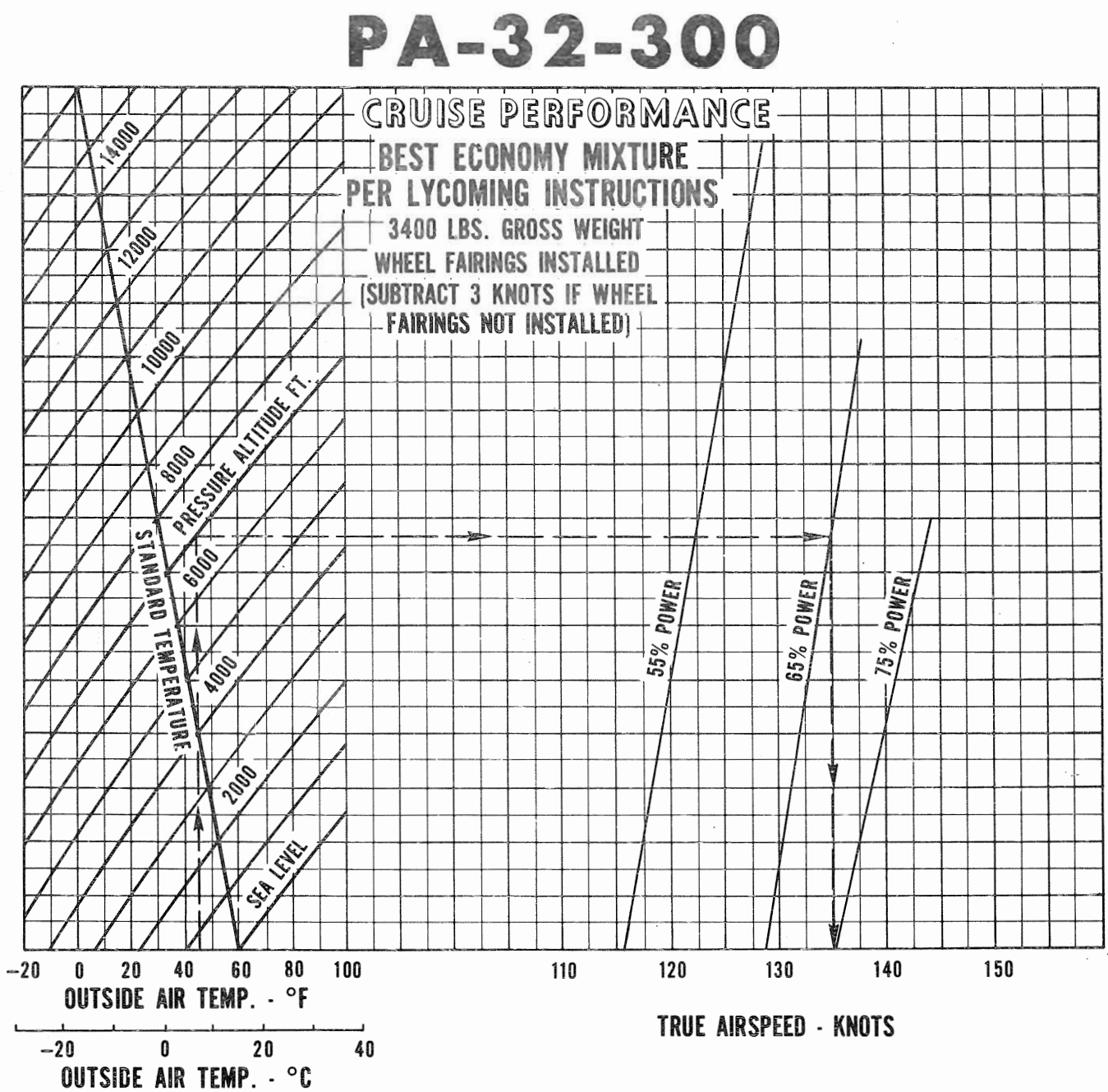
PA-32-300



Example:
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45 ° F
Gross weight: 2900 lbs.
Power: 65%
True airspeed: 143.5 knots

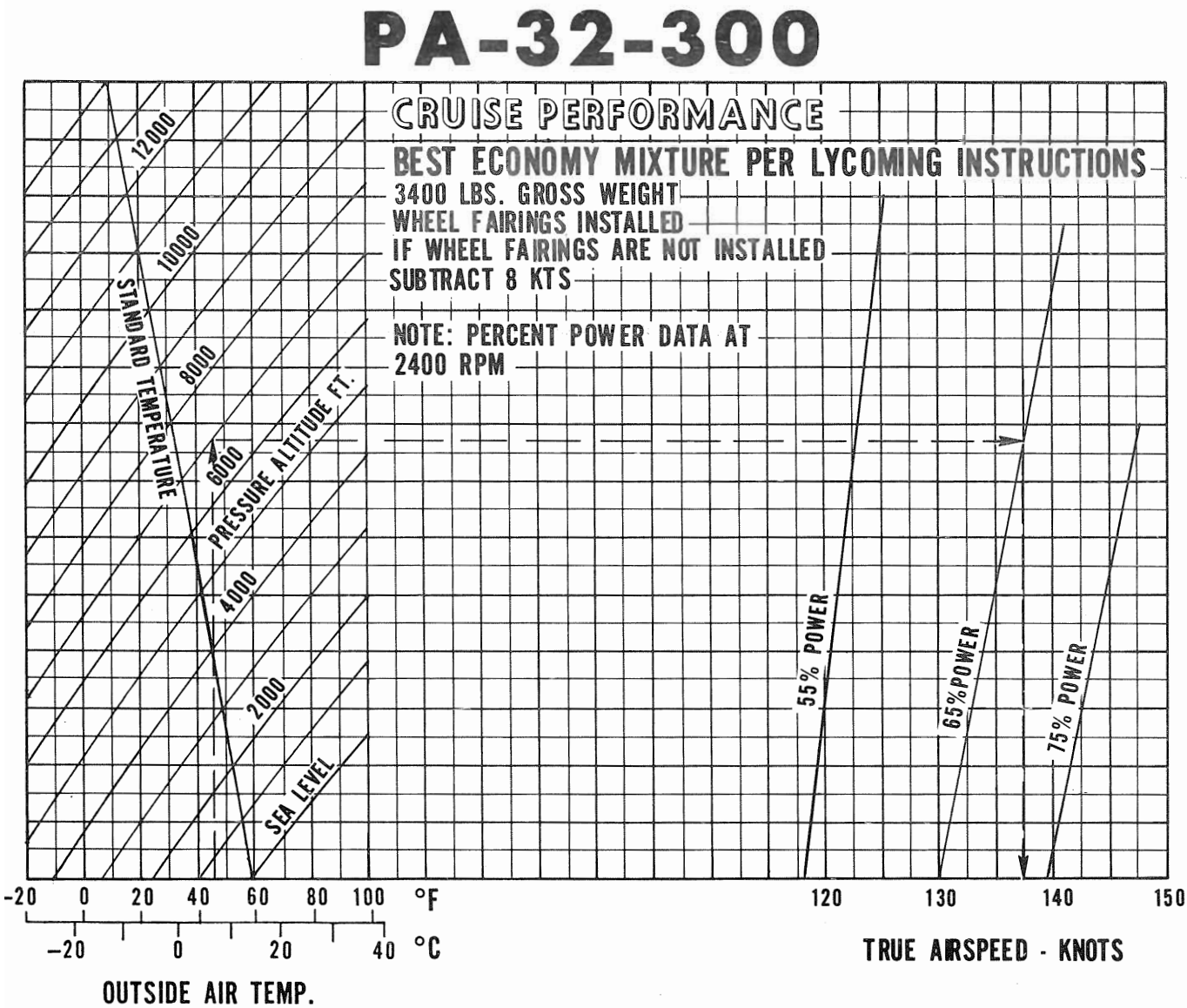
CRUISE PERFORMANCE - BEST POWER (2900 LBS) (SERIAL NOS. 32-7840001 AND UP)

Figure 5-23



Example:
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45°F
Power: 65%
True airspeed: 135 knots

CRUISE PERFORMANCE - BEST ECONOMY (SERIAL NOS. 32-7740001 THROUGH 32-7740113)
Figure 5-25

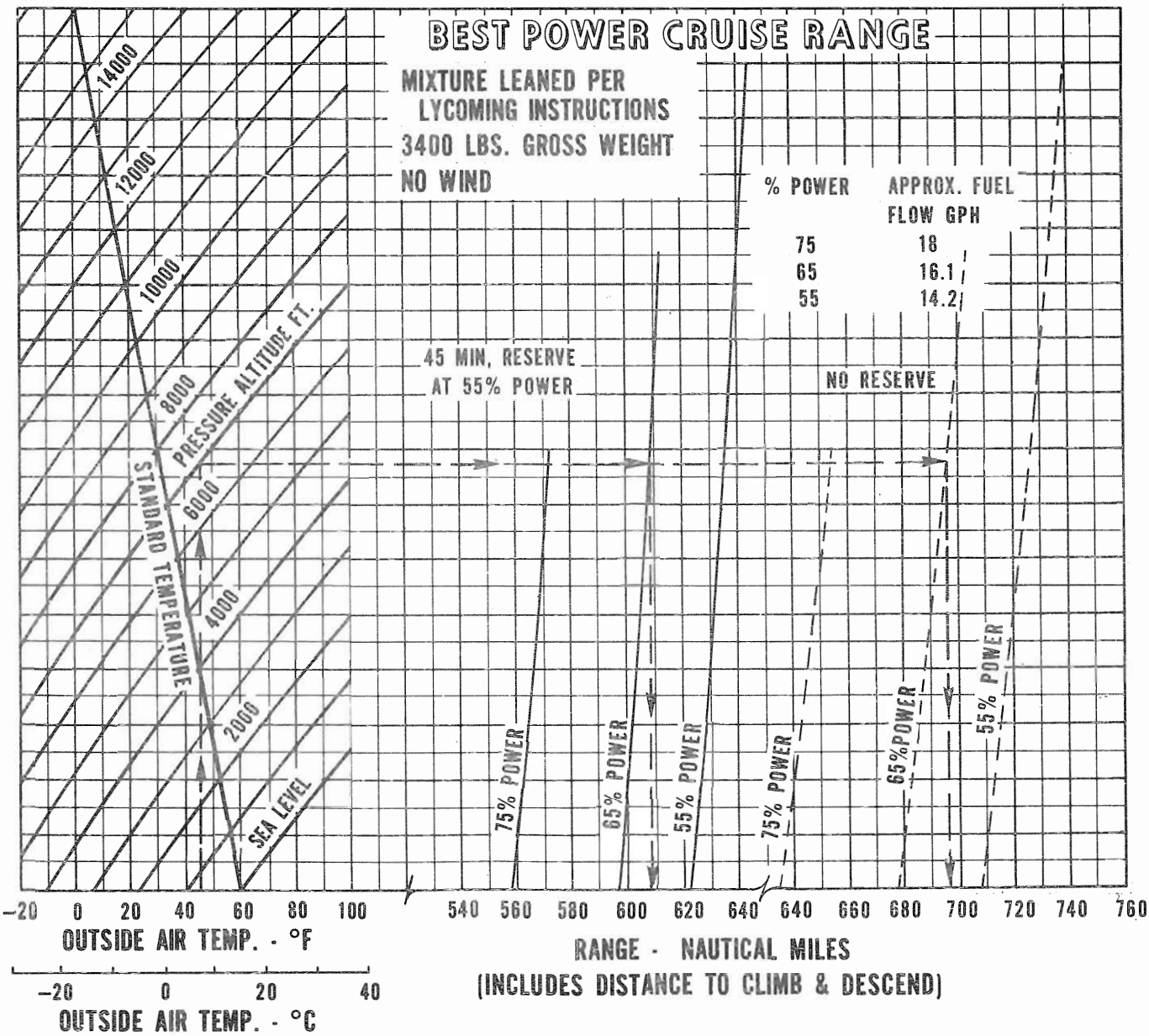


Example:
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45 ° F
Power: 65%
True airspeed: 137.5 knots

CRUISE PERFORMANCE - BEST ECONOMY (SERIAL NOS. 32-7840001 AND UP)

Figure 5-27

PA-32-300



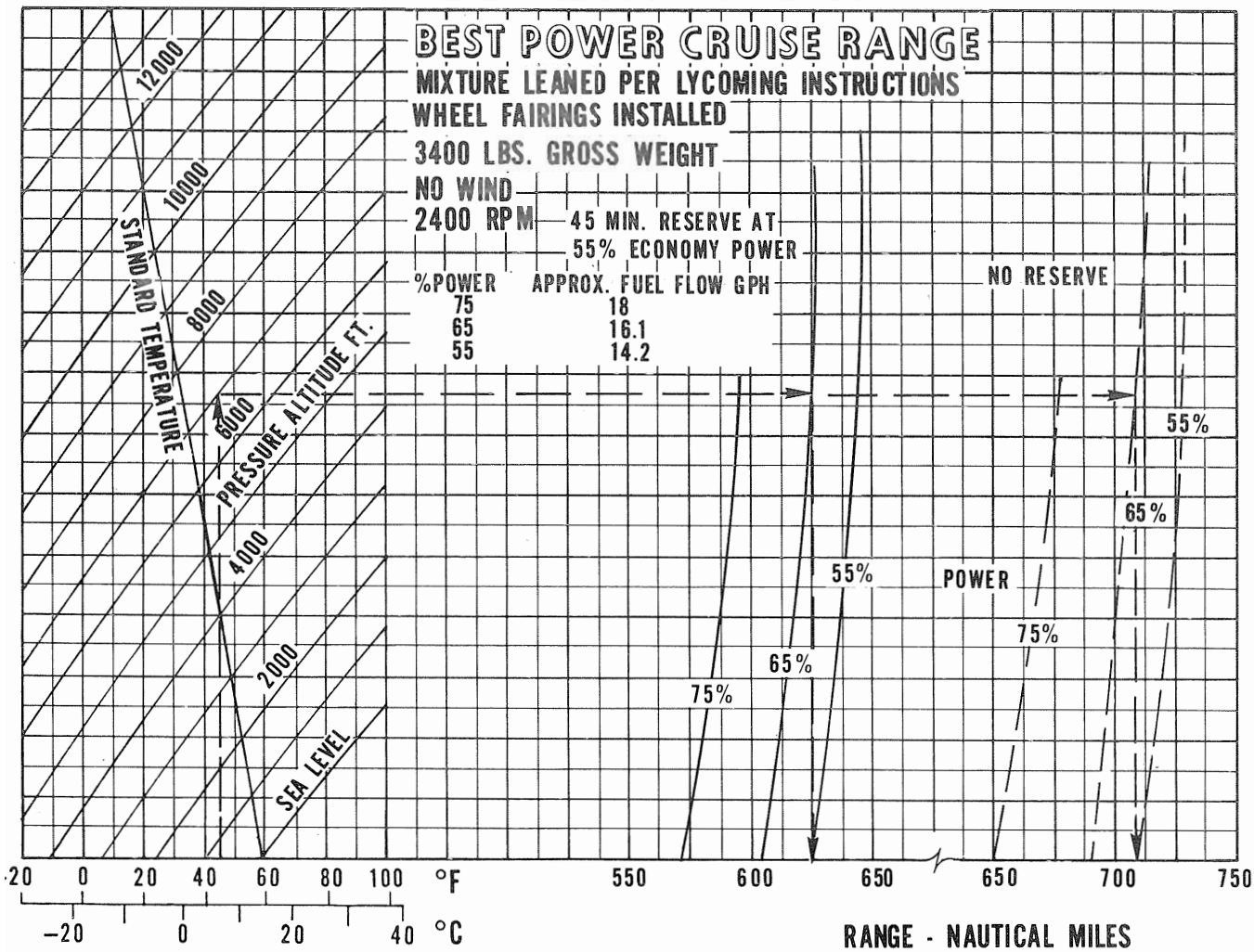
Example:
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45°F
Power: 65%
Range (with reserve): 608 nautical miles
Range (no reserve): 696 nautical miles

Note: Range may be reduced by up to 3% if wheel fairings are not installed.

BEST POWER CRUISE RANGE (SERIAL NOS. 32-7740001 THROUGH 32-7740113)

Figure 5-29

PA-32-300

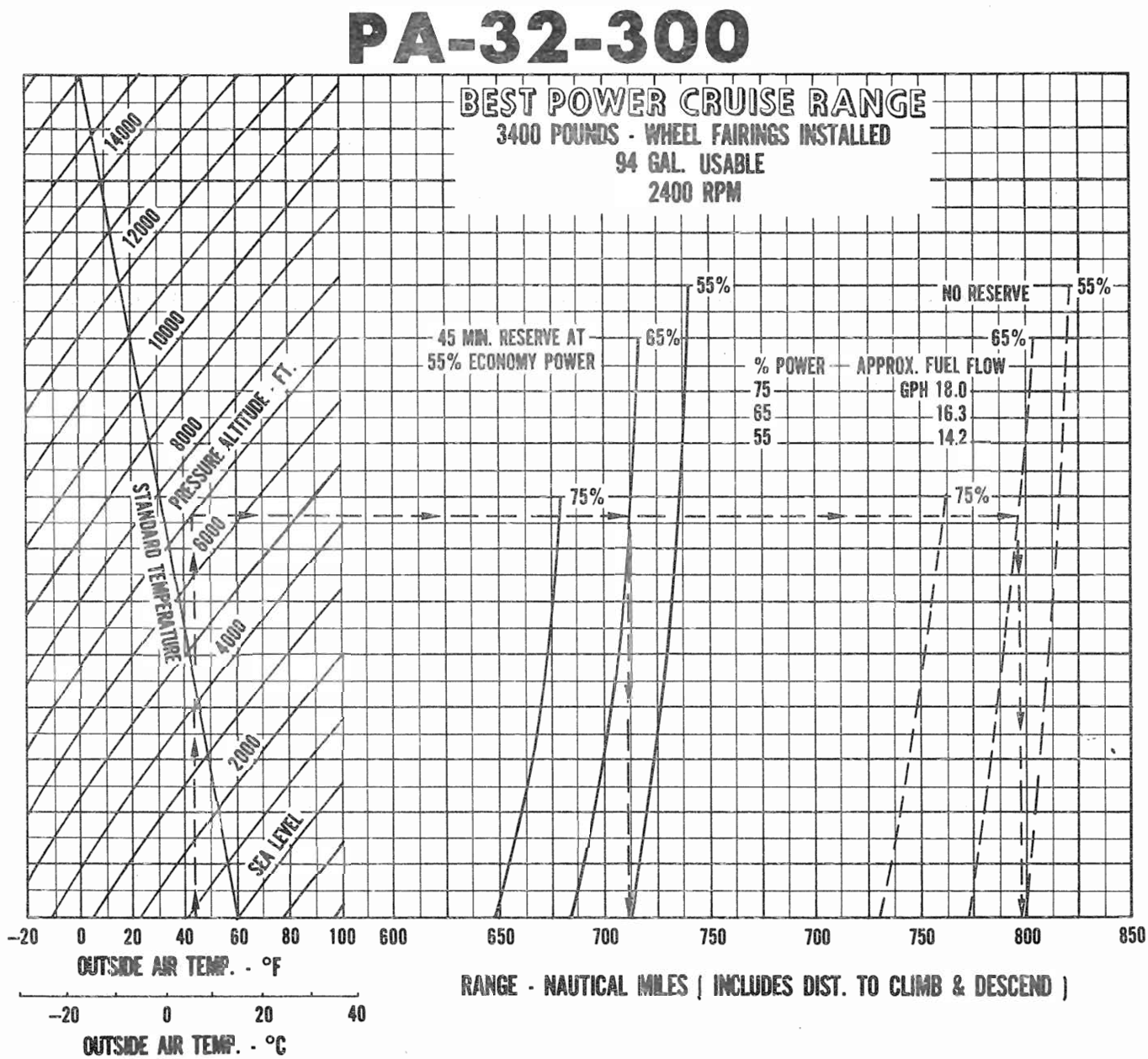


Example:
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45° F
Power: 65%
Range (with reserve): 625 nautical miles
Range (no reserve): 710 nautical miles

Note: Range may be reduced by up to 7% if wheel fairings are not installed.

BEST POWER CRUISE RANGE (SERIAL NOS. 32-7840001 THROUGH 32-7840202)

Figure 5-31

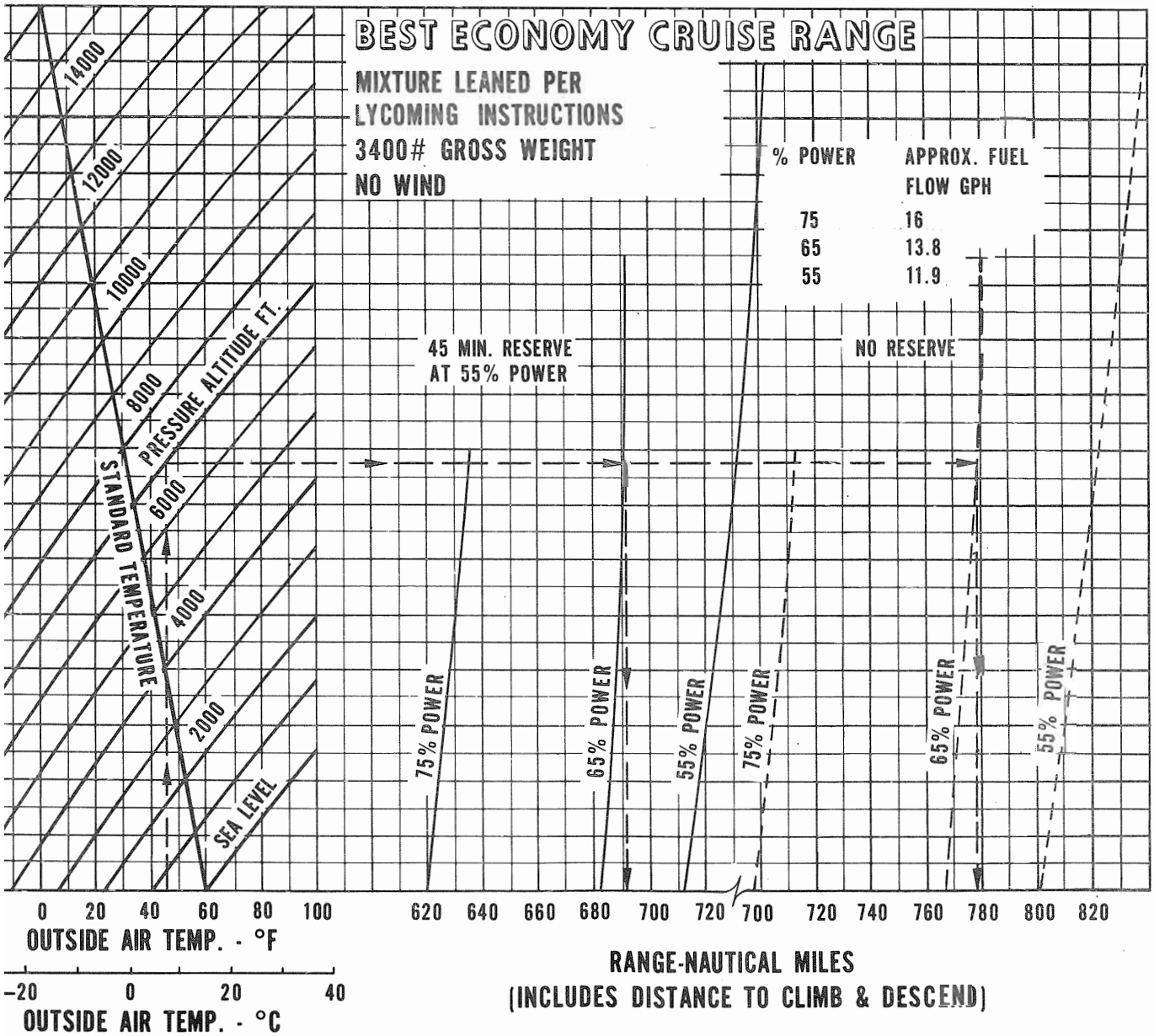


Note: Range may be reduced by up to 7% if wheel fairings are not installed.

BEST POWER CRUISE RANGE (SERIAL NOS. 32-7940001 AND UP)

Figure 5-32

PA-32-300



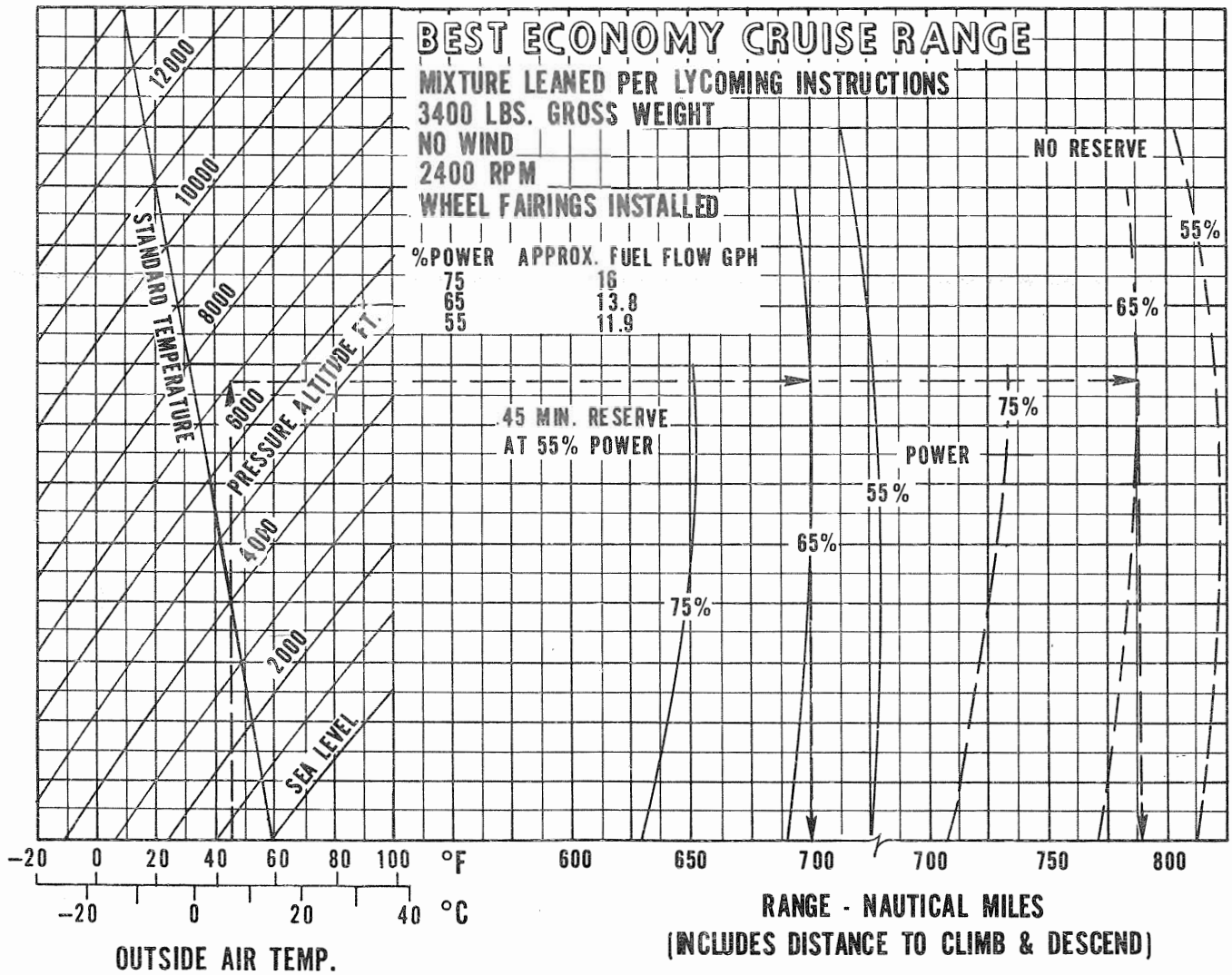
Example:
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45° F
Power: 65%
Range (with reserve): 691 nautical miles
Range (no reserve): 777 nautical miles

Note: Range may be reduced by up to 3% if wheel fairings are not installed.

BEST ECONOMY CRUISE RANGE (SERIAL NOS. 32-7740001 THROUGH 32-7740113)

Figure 5-33

PA-32-300

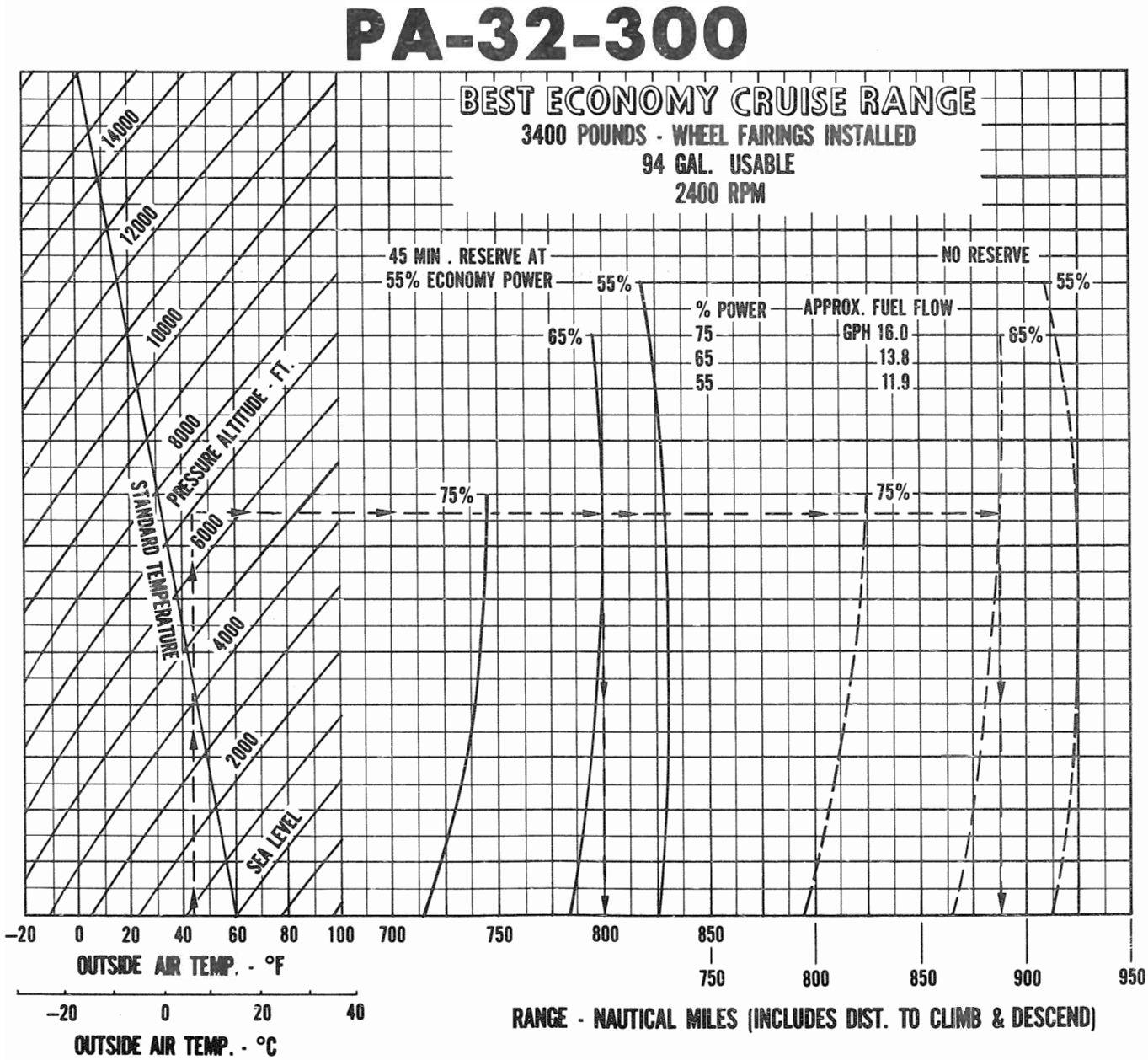


Example:
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45 ° F
Power: 65%
Range (with reserve): 700 nautical miles
Range (no reserve): 790 nautical miles

Note: Range may be reduced by up to 7% if wheel fairings are not installed.

BEST ECONOMY CRUISE RANGE (SERIAL NOS. 32-7840001 THROUGH 32-7840202)

Figure 5-35

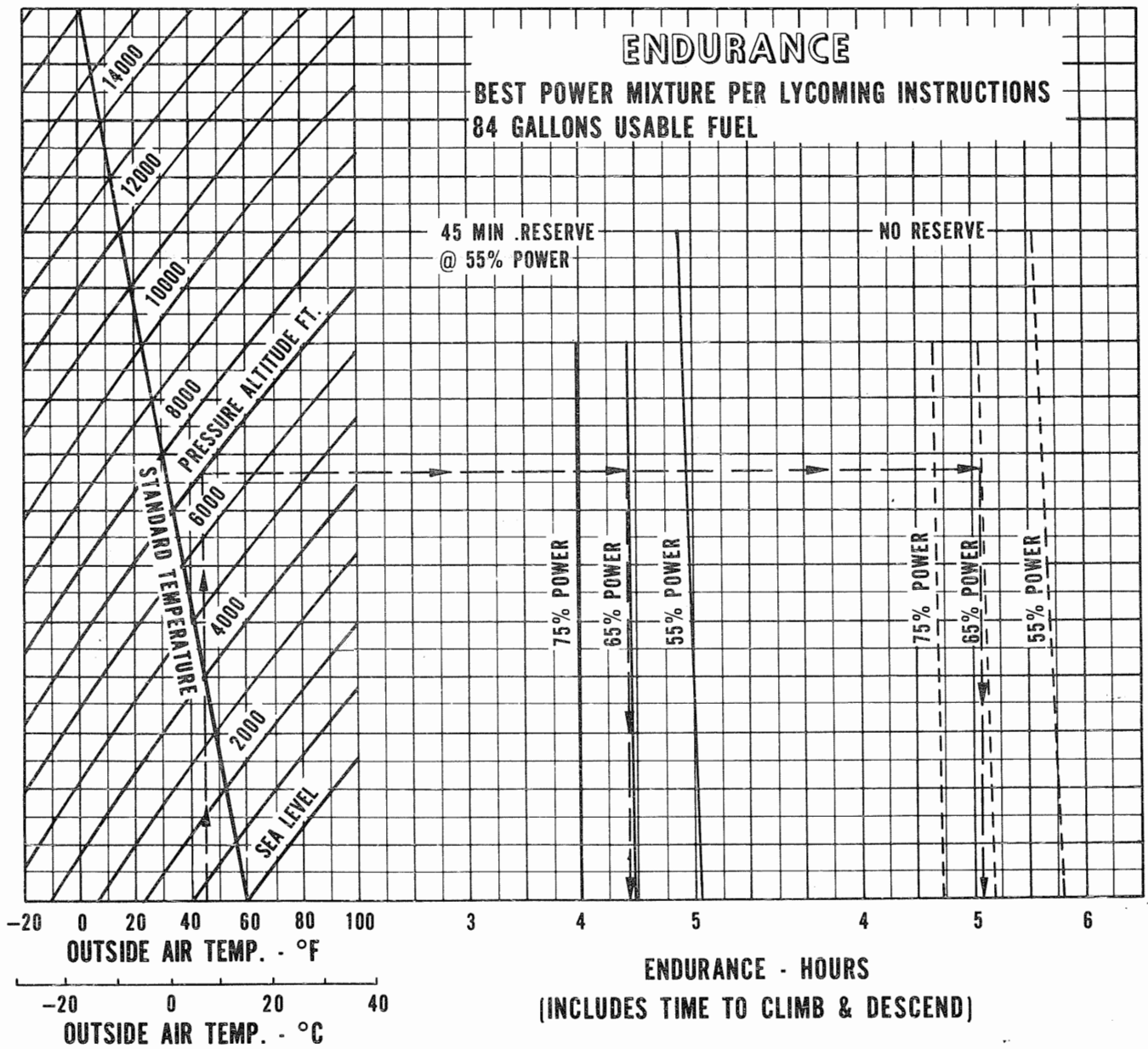


Note: Range may be reduced by up to 7% if wheel fairings are not installed.

BEST ECONOMY CRUISE RANGE (SERIAL NOS. 32-7940001 AND UP)

Figure 5-36

PA-32-300



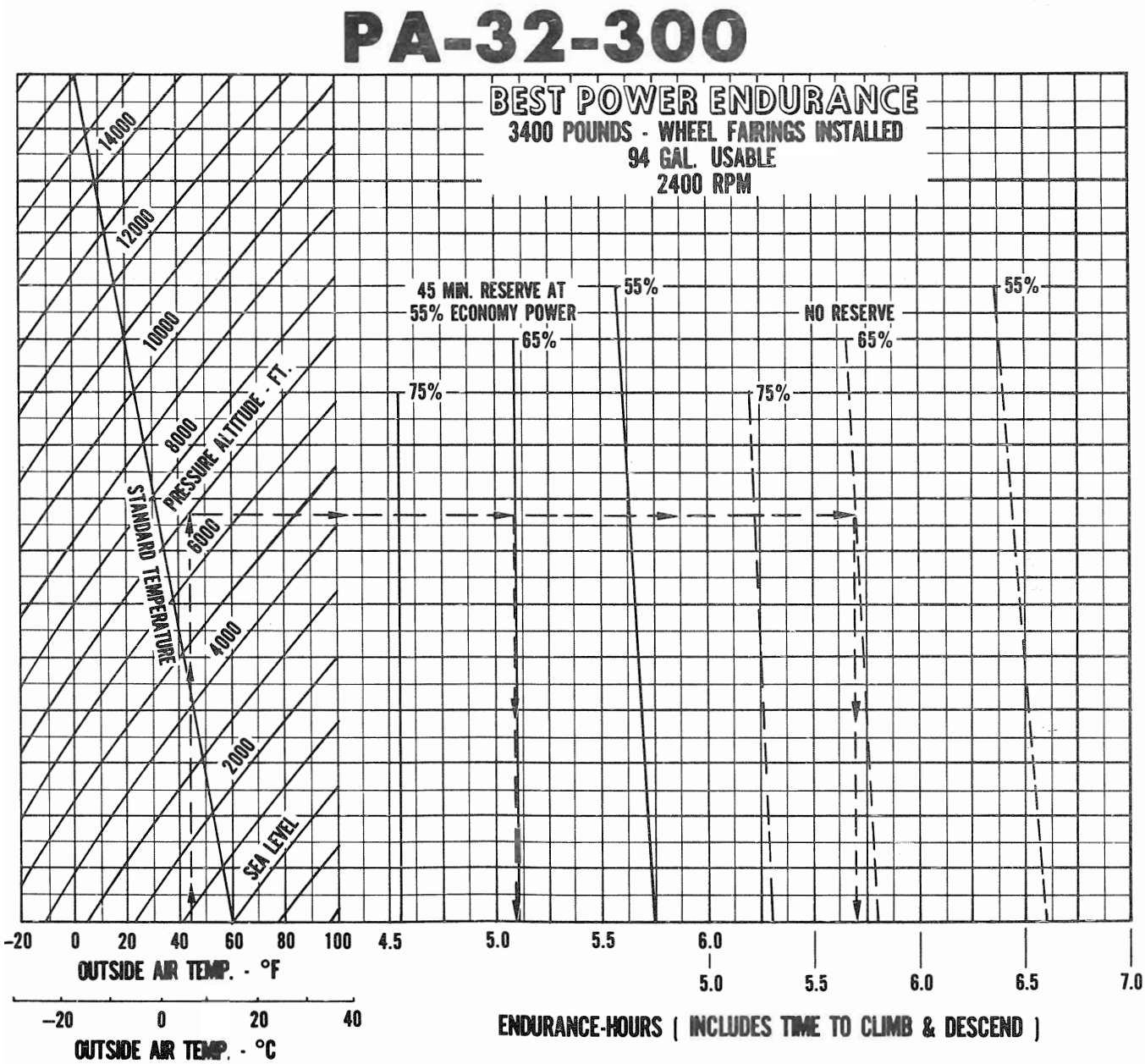
Example:

Cruise pressure altitude: 7000 ft.
Cruise OAT: 45°F
Power: 65%

Endurance (with reserve): 4.4 hours
Endurance (no reserve): 5.1 hours

ENDURANCE - BEST POWER (SERIAL NOS. 32-7740001 THROUGH 32-7840202)

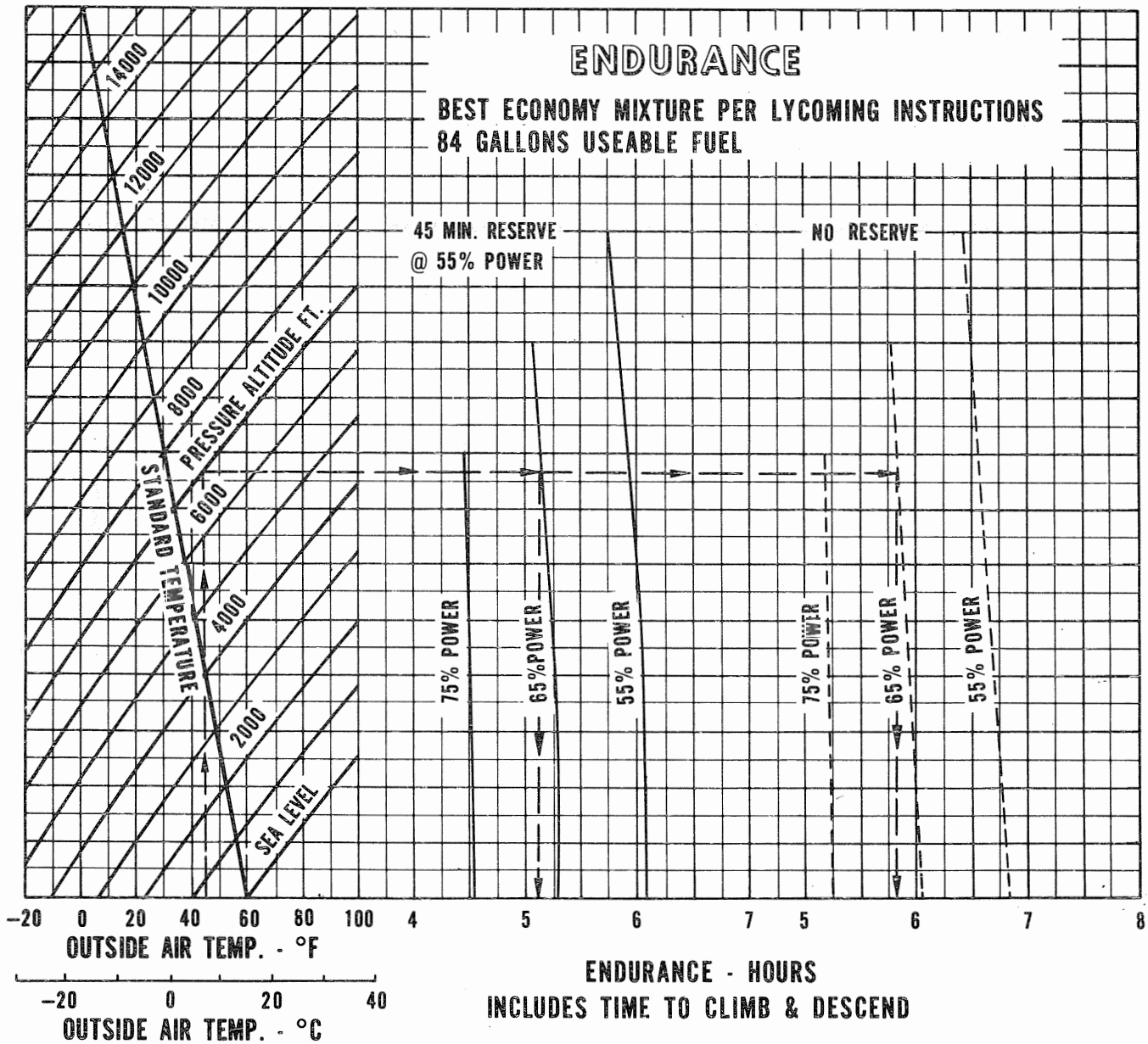
Figure 5-37



ENDURANCE - BEST POWER (SERIAL NOS. 32-7940001 AND UP)

Figure 5-38

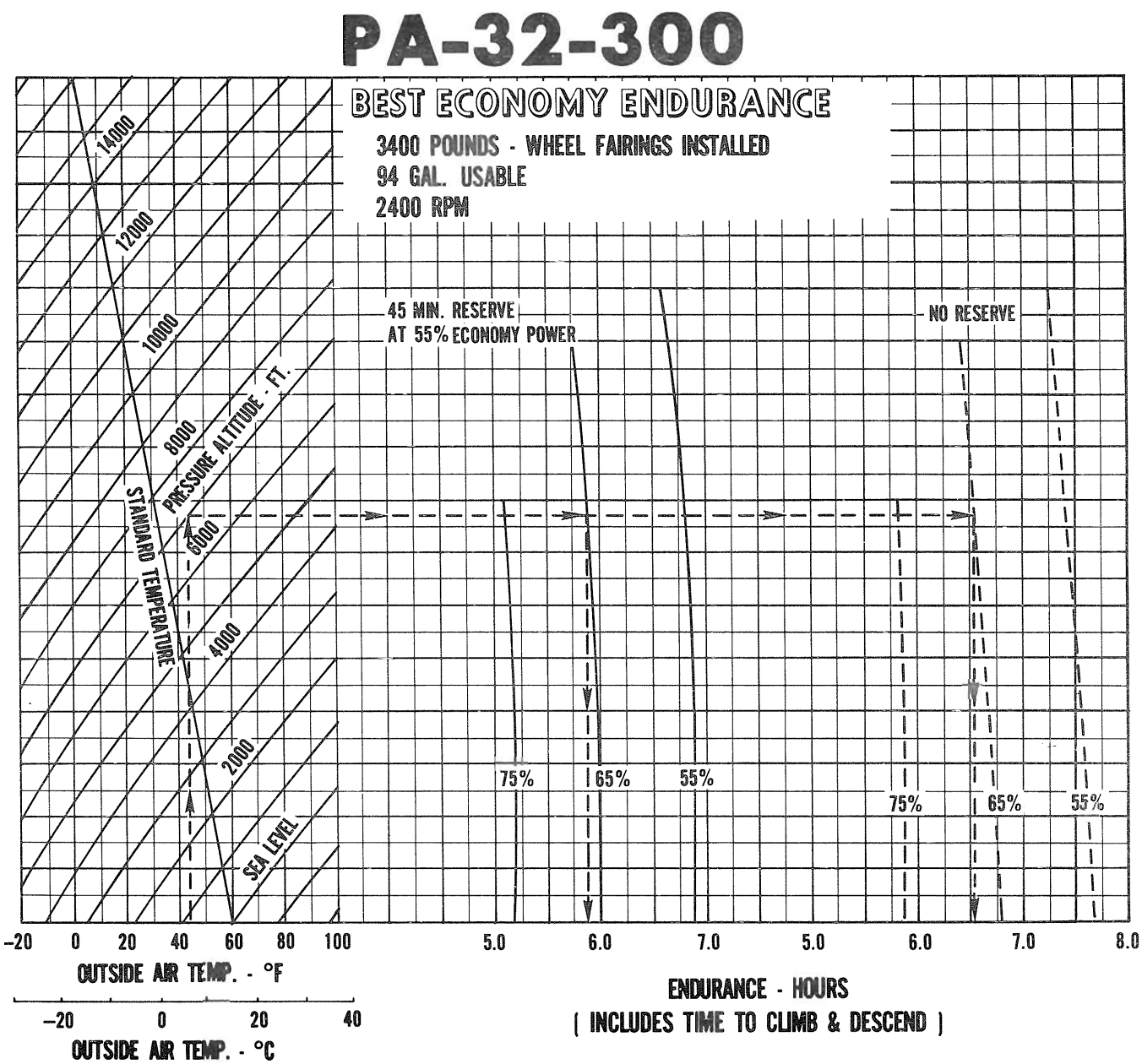
PA-32-300



Example:
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45°F
Power: 65%
Endurance (with reserve): 5.15 hours
Endurance (no reserve): 5.80 hours

ENDURANCE - BEST ECONOMY (SER. NOS. 32-7740001 THROUGH 32-7840202)

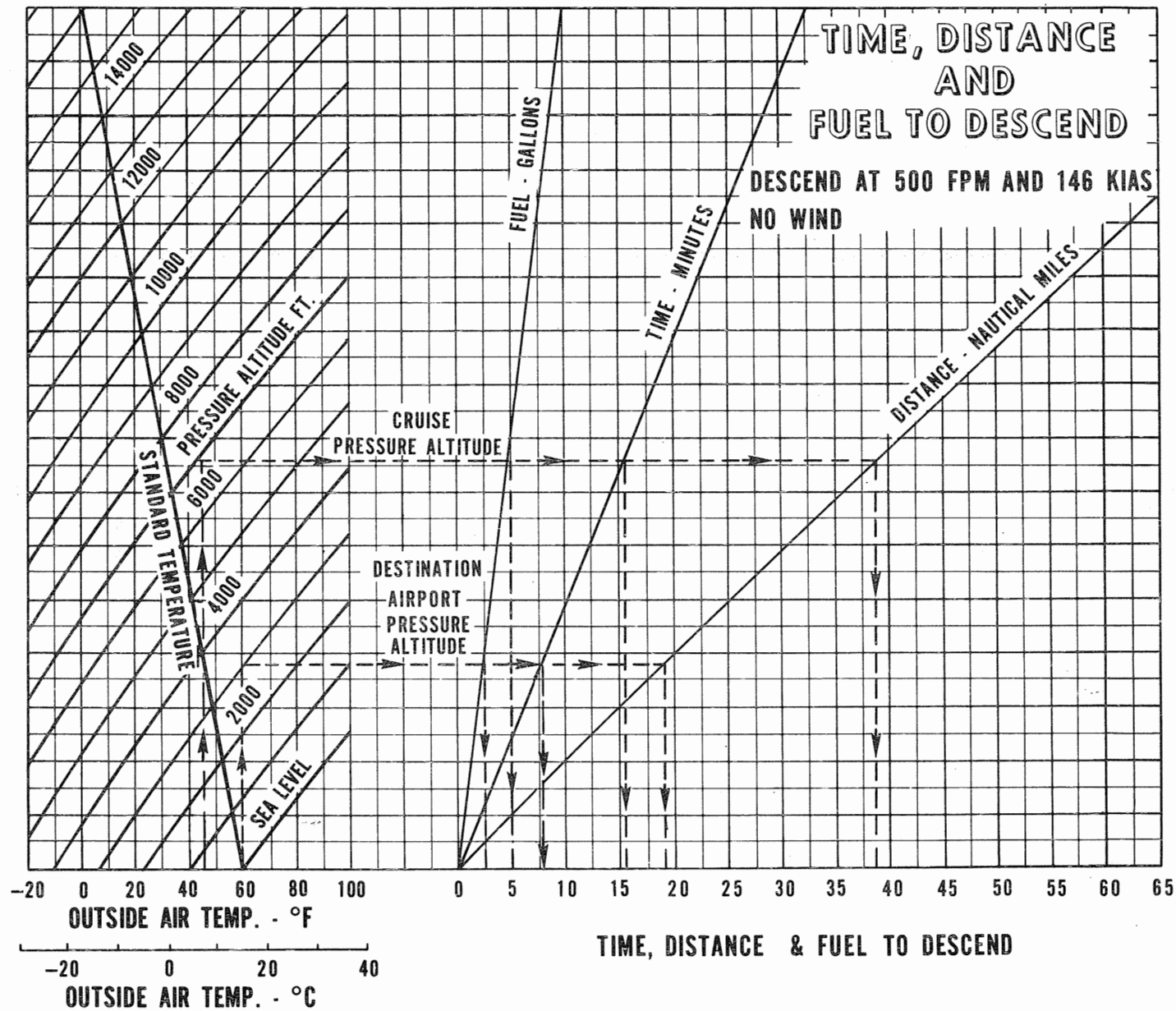
Figure 5-39



ENDURANCE - BEST ECONOMY (SERIAL NOS. 32-7940001 AND UP)

Figure 5-40

PA-32-300



Example:

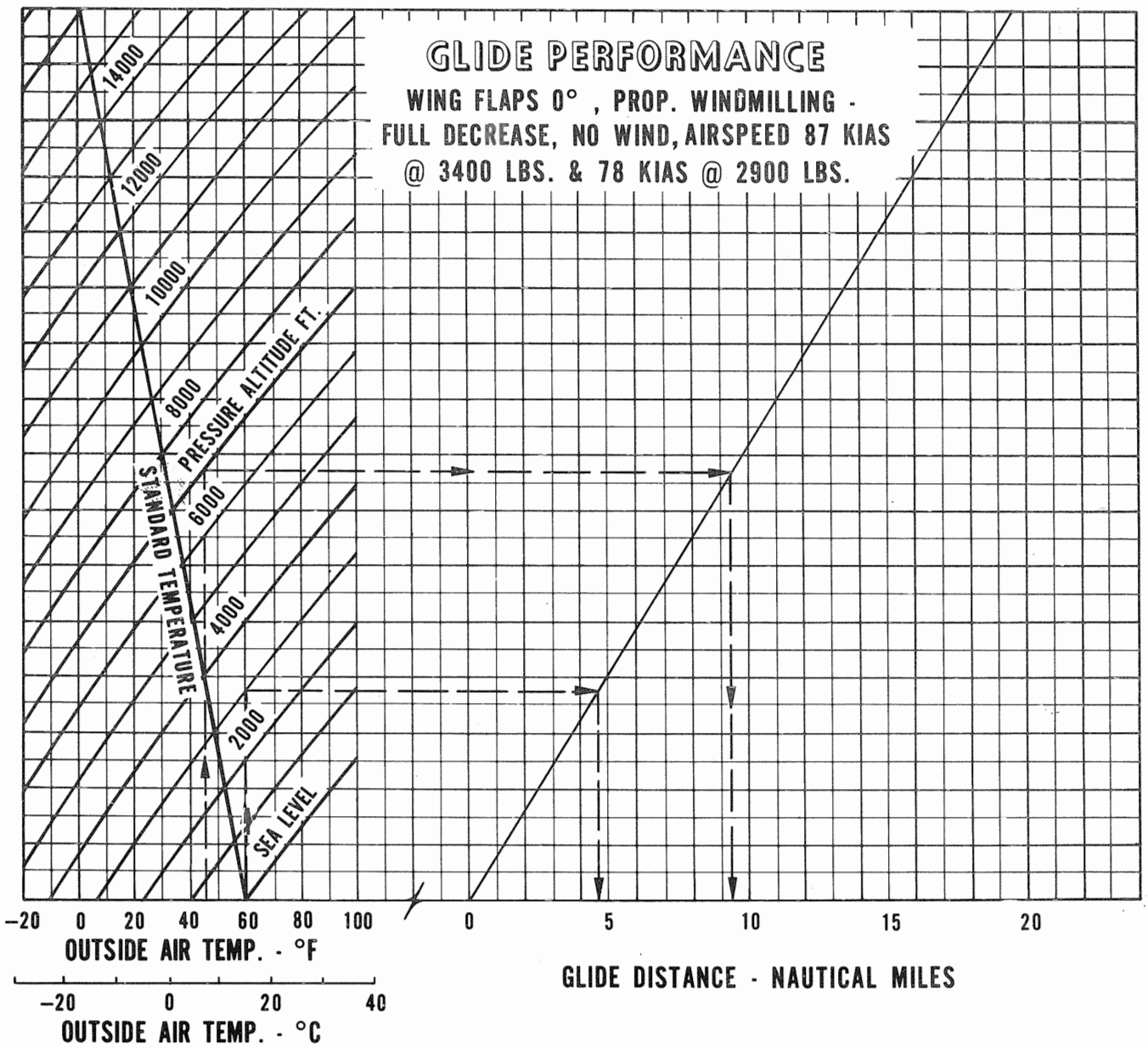
Cruise pressure altitude: 7000 ft.
Cruise OAT: 45°F
Destination airport pressure altitude: 3000 ft.
Destination airport temperature: 60° F
Fuel to descend: (4.5 gal. minus 2.5 gal.) = 2.0 gal.

Time to descend: (15.5 min. minus 8 min.) = 7.5 min.
Distance to descend: (39 nautical miles minus 19 nautical miles) = 20 nautical miles

TIME, DISTANCE AND FUEL TO DESCEND

Figure 5-41

PA-32-300



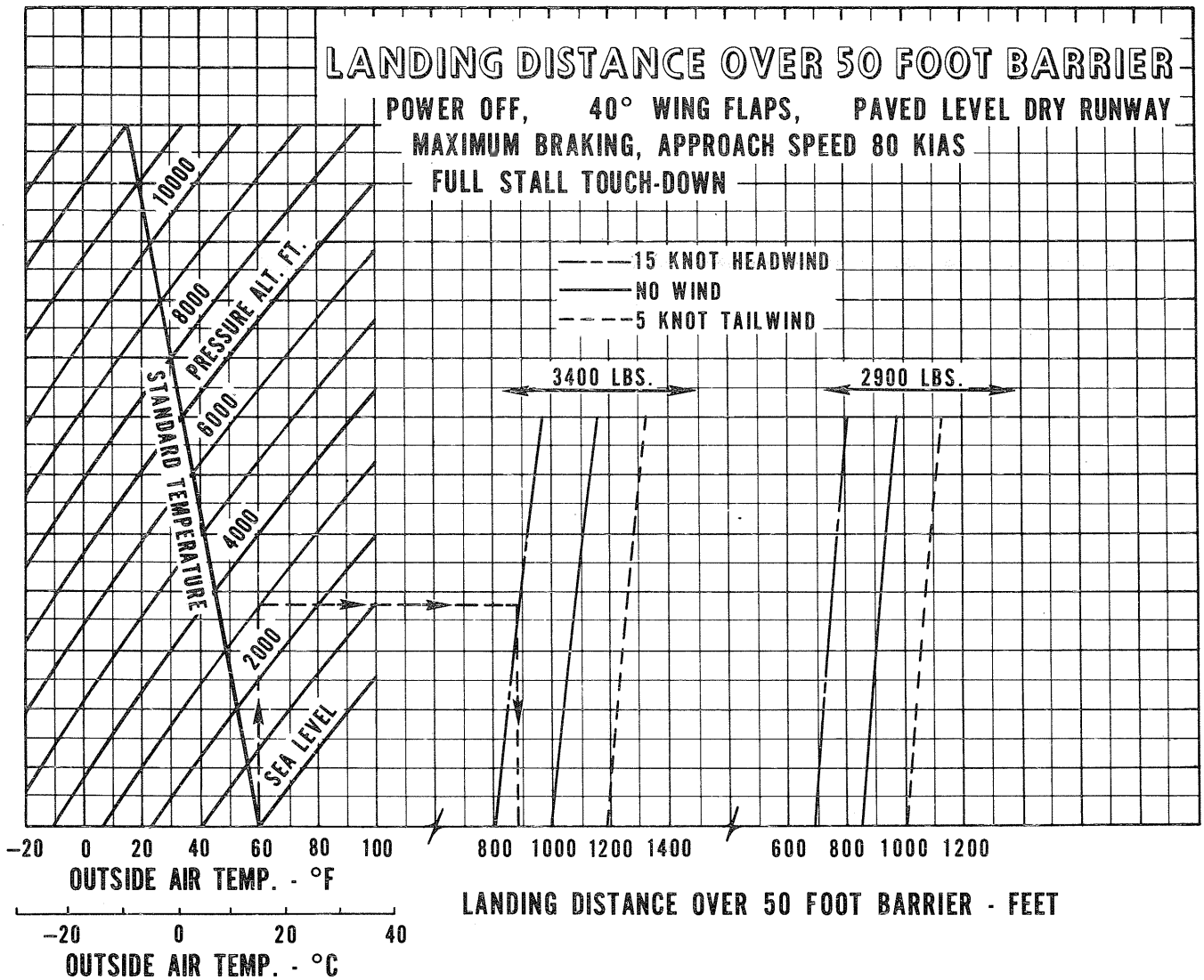
Example:

Cruise pressure altitude: 7000 ft.
Cruise OAT: 45°F
Terrain pressure altitude: 3000 ft.
Terrain temperature: 60°F
Glide Range: (9.3 nautical miles minus 4.8 nautical miles) = 4.5 nautical miles

GLIDE PERFORMANCE

Figure 5-43

PA-32-300

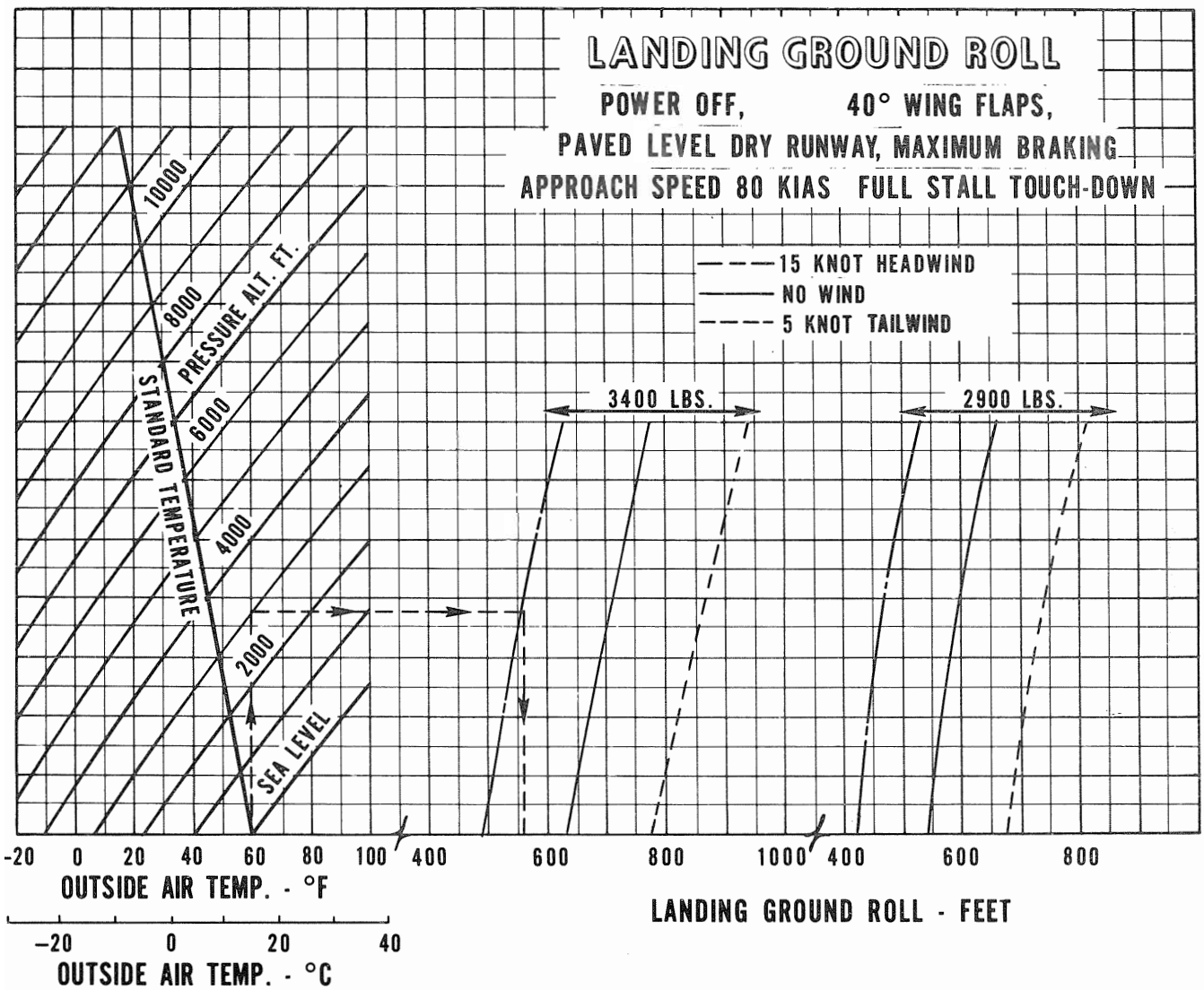


Example:
Airport pressure altitude: 3000 ft.
Temperature: 60° F
Gross weight: 3400 lbs.
Wind component: 15 knots headwind
Landing Distance over 50 ft. barrier: 840 ft.

LANDING DISTANCE OVER 50 FOOT BARRIER

Figure 5-45

PA-32-300



Example:
Airport pressure altitude: 3000 ft.
Temperature: 60° F
Gross weight: 3400 lbs.
Wind: 15 Knot Headwind
Ground roll: 560 ft.

LANDING GROUND ROLL

Figure 5-47

TABLE OF CONTENTS

SECTION 6

WEIGHT AND BALANCE

SECTION 6

WEIGHT AND BALANCE

6.1 GENERAL

In order to achieve the performance and flying characteristics which are designed into the airplane, it must be flown with the weight and center of gravity (C.G.) position within the approved operating range (envelope). Although the airplane offers a tremendous flexibility of loading, it cannot be flown with the maximum number of adult passengers, full fuel tanks and maximum baggage. With the flexibility comes responsibility. The pilot must ensure that the airplane is loaded within the loading envelope before he makes a takeoff.

Misloading carries consequences for any aircraft. An overloaded airplane will not take off, climb or cruise as well as a properly loaded one. The heavier the airplane is loaded, the less climb performance it will have.

Center of gravity is a determining factor in flight characteristics. If the C.G. is too far forward in any airplane, it may be difficult to rotate for takeoff or landing. If the C.G. is too far aft, the airplane may rotate prematurely on takeoff or tend to pitch up during climb. Longitudinal stability will be reduced. This can lead to inadvertent stalls and even spins; and spin recovery becomes more difficult as the center of gravity moves aft of the approved limit.

A properly loaded airplane, however, will perform as intended. Before the airplane is delivered, it is weighed, and a basic empty weight and C.G. location is computed (basic empty weight consists of the standard empty weight of the airplane plus the optional equipment). Using the basic empty weight and C.G. location, the pilot can easily determine the weight and C.G. position for the loaded airplane by computing the total weight and moment and then determining whether they are within the approved envelope.

The basic empty weight and C.G. location are recorded in the Weight and Balance Data Form (Figure 6-7) and the Weight and Balance Record (Figure 6-9). The current values should always be used. Whenever new equipment is added or any modification work is done, the mechanic responsible for the work is required to compute a new basic empty weight and C.G. position and to write these in the Aircraft Log Book and the Weight and Balance Record. The owner should make sure that it is done.

A weight and balance calculation is necessary in determining how much fuel or baggage can be boarded so as to keep within allowable limits. Check calculations prior to adding fuel to insure against improper loading.

The following pages are forms used in weighing an airplane in production and in computing basic empty weight, C.G. position, and useful load. Note that the useful load includes usable fuel, baggage, cargo and passengers. Following this is the method for computing takeoff weight and C.G.

THIS PAGE INTENTIONALLY LEFT BLANK

6.3 AIRPLANE WEIGHING PROCEDURES

At the time of delivery, Piper Aircraft Corporation provides each airplane with the basic empty weight and center of gravity location. This data is supplied by Figure 6-5.

The removal or addition of equipment or airplane modifications can affect the basic empty weight and center of gravity. The following is a weighing procedure to determine this basic empty weight and center of gravity location:

(a) Preparation

(1) Be certain that all items checked in the airplane equipment list are installed in the proper location in the airplane.

(2) Remove excessive dirt, grease, moisture, foreign items such as rags and tools from the airplane before weighing.

(3) Defuel airplane. Then open all fuel drains until all remaining fuel is drained. Operate engine on each tank until all undrainable fuel is used and engine stops. Then add the unusable fuel per the following:
Serial numbers 32-7740001 through 32-7840202 - 0.4 gallons total, 0.2 gallons each wing.
Serial numbers 32-7940001 and up - 4.0 gallons total, 2.0 gallons each wing.

(4) Fill with oil to full capacity.

(5) Place pilot and copilot seats in fourth (4th) notch, aft of forward position. Put flaps in the fully retracted position and all control surfaces in the neutral position. Tow bar should be in the proper location and all entrance and baggage doors closed.

(6) Weigh the airplane inside a closed building to prevent errors in scale readings due to wind.

(b) Leveling

(1) With airplane on scales, block main gear oleo pistons in the fully extended position.

(2) Level airplane (refer to Figure 6-3) deflating nose wheel tire, to center bubble on level.

(c) Weighing - Airplane Basic Empty Weight

(1) With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.

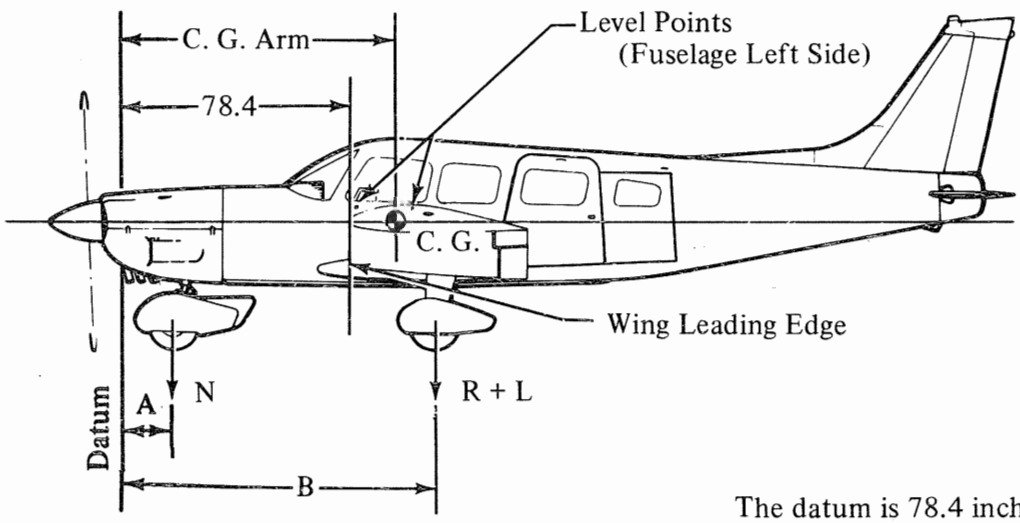
Scale Position and Symbol	Scale Reading	Tare	Net Weight
Nose Wheel (N)			
Right Main Wheel (R)			
Left Main Wheel (L)			
Airplane Empty Weight, as Weighed (T)	—— ——	—— ——	

WEIGHING FORM

Figure 6-1

(d) Basic Empty Weight Center of Gravity

(1) The following geometry applies to the PA-32-300 airplane when it is level. Refer to Leveling paragraph 6.3 (b).



The datum is 78.4 inches ahead of the wing leading edge at the intersection of the straight and tapered section.

A = 16.3

B = 109.7

LEVELING DIAGRAM

Figure 6-3

(2) The basic empty weight center of gravity (as weighed including optional equipment, full oil and unusable fuel) can be determined by the following formula:

$$\text{C.G. Arm} = \frac{N(A) + (R + L)(B)}{T} \quad \text{inches}$$

Where: $T = N + R + L$

6.5 WEIGHT AND BALANCE DATA AND RECORD

The Basic Empty Weight, Center of Gravity Location and Useful Load listed in Figure 6-5 are for the airplane as delivered from the factory. These figures apply only to the specific airplane serial number and registration number shown.

The basic empty weight of the airplane as delivered from the factory has been entered in the Weight and Balance Record (Figure 6-7). This form is provided to present the current status of the airplane basic empty weight and a complete history of previous modifications. Any change to the permanently installed equipment or modification which affects weight or moment must be entered in the Weight and Balance Record.

MODEL PA-32-300 CHEROKEE SIX

Airplane Serial Number _____

Registration Number _____

Date _____

AIRPLANE BASIC EMPTY WEIGHT

Item	Weight (Lbs)	x	C.G. Arm (Inches Aft of Datum)	=	Moment (In-Lbs)
Standard Empty Weight* Actual / Computed					
Optional Equipment					
Basic Empty Weight					

*The standard empty weight includes full oil capacity and unusable fuel per the following: (Serial numbers 32-7740001 through 32-7840202, 0.4 gallons and serial numbers 32-7940001 and up, 4.0 gallons).

AIRPLANE USEFUL LOAD - NORMAL CATEGORY OPERATION

(Gross Weight) - (Basic Empty Weight) = Useful Load

(3400 lbs) - (lbs) = lbs.

THIS BASIC EMPTY WEIGHT, C.G. AND USEFUL LOAD ARE FOR THE AIRPLANE AS DELIVERED FROM THE FACTORY. REFER TO APPROPRIATE AIRCRAFT RECORD WHEN ALTERATIONS HAVE BEEN MADE.

WEIGHT AND BALANCE DATA FORM

Figure 6-5

THIS PAGE INTENTIONALLY LEFT BLANK

PA-32-300	Serial Number	Registration Number	Page Number

Date	Item No. In	Item No. Out	Description of Article or Modification	Weight Change Added (+) Wt. (Lb.)	Added (+) Arm (In.)	Added (+) Moment /100	Removed (-) Wt. (Lb.)	Removed (-) Arm (In.)	Removed (-) Moment /100	Running Basic Empty Weight Wt. (Lb.)	Running Basic Empty Weight Moment /100
			As Delivered								

WEIGHT AND BALANCE RECORD

Figure 6-7

PA-32-300	Serial Number	Registration Number	Page Number

Date	Item No.		Description of Article or Modification	Weight Change						Running Basic Empty Weight	
				Added (+)			Removed (-)				
	In	Out		Wt. (Lb.)	Arm (In.)	Moment /100	Wt. (Lb.)	Arm (In.)	Moment /100	Wt. (Lb.)	Moment /100
			As Delivered								

WEIGHT AND BALANCE RECORD (cont)

Figure 6-7 (cont)

6.7 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT

(a) Add the weight of all items to be loaded to the basic empty weight.

(b) Use the Loading Graph (Figure 6-13) to determine the moment of all items to be carried in the airplane.

(c) Add the moment of all items to be loaded to the basic empty weight moment.

(d) Divide the total moment by the total weight to determine the C.G. location.

(e) By using the figures of item (a) and item (d) (above), locate a point on the C.G. range and weight graph (Figure 6-15). If the point falls within the C.G. envelope, the loading meets the weight and balance requirements.

	Weight (Lbs)	Arm Aft Datum (Inches)	Moment (In-Lbs)
Basic Empty Weight			
Pilot and Front Passenger	340.0	85.5	29070
Passengers (Center Seats) (Forward Facing)		118.1	
Passengers (Center Seats) (Aft Facing) (Optional)		119.1	
Passengers (Rear Seats)	340.0	157.6	53584
Passenger (Jump Seat) (Optional)		118.1	
Fuel (Ser. nos. 32-7740001 through 32-7840202 - 84 Gallons Maximum)		95.0	
Fuel (Ser. nos. 32-7940001 and up - 98 Gallons Maximum)		93.6	
Baggage (Forward)		42.0	
Baggage (Aft)		178.7	
Total Loaded Airplane			

The center of gravity (C.G.) of this sample loading problem is at inches aft of the datum line. Locate this point ( ) on the C.G. range and weight graph. Since this point falls within the weight - C.G. envelope, this loading meets the weight and balance requirements.

IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY.

SAMPLE LOADING PROBLEM (NORMAL CATEGORY)

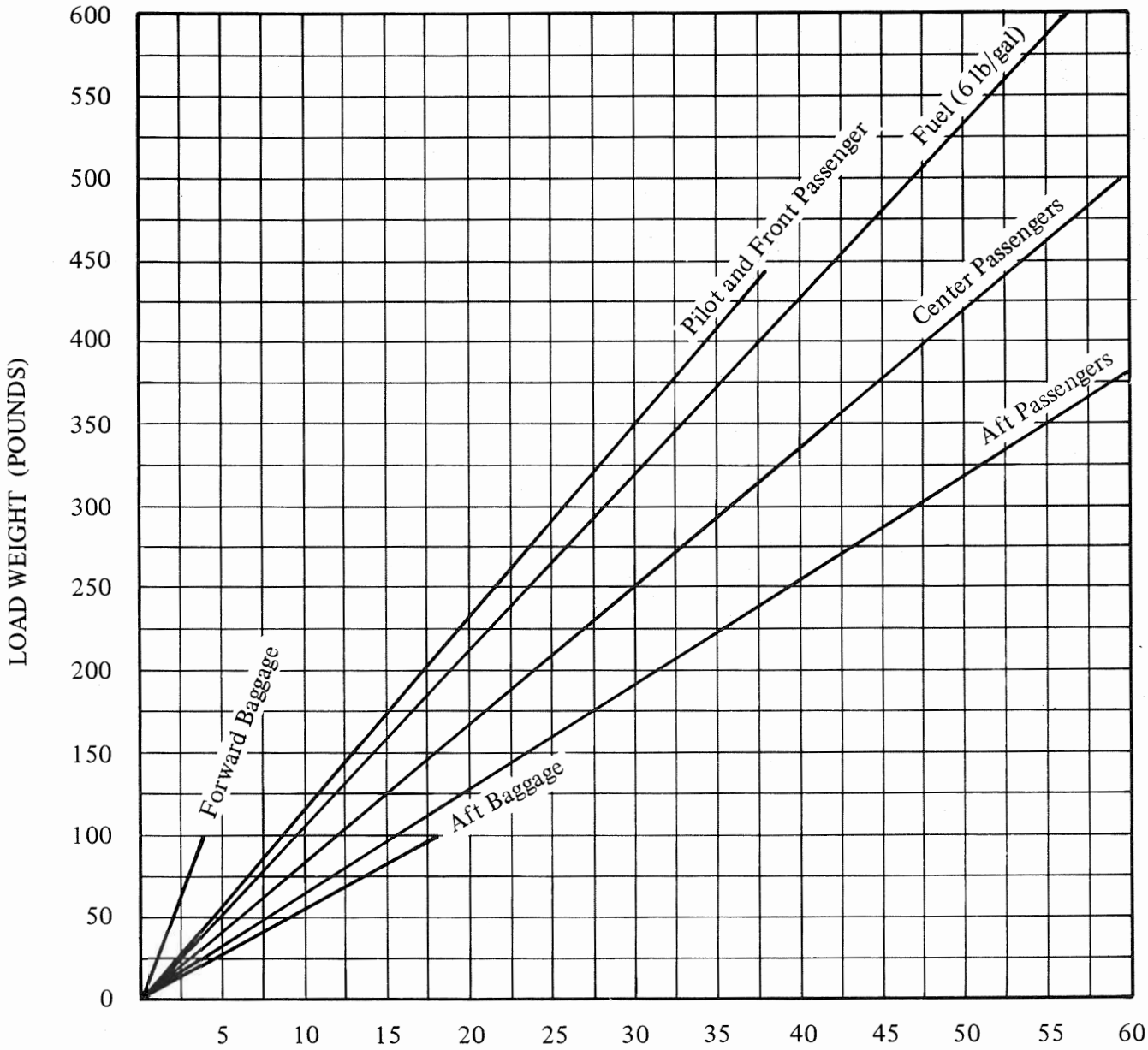
Figure 6-9

	Weight (Lbs)	Arm Aft Datum (Inches)	Moment (In-Lbs)
Basic Empty Weight			
Pilot and Front Passenger		85.5	
Passengers (Center Seats) (Forward Facing)		118.1	
Passengers (Center Seats) (Aft Facing) (Optional)		119.1	
Passengers (Rear Seats)		157.6	
Passenger (Jump Seat) (Optional)		118.1	
Fuel (Ser. nos. 32-7740001 through 32-7840202 - 84 Gallons Maximum)		95.0	
Fuel (Ser. nos. 32-7940001 and up - 98 Gallons Maximum)		93.6	
Baggage (Forward)		42.0	
Baggage (Aft)		178.7	
Total Loaded Airplane			

Totals must be within approved weight and C.G. limits. It is the responsibility of the airplane owner and the pilot to insure that the airplane is loaded properly. The Basic Empty Weight C.G. is noted on the Weight and Balance Data Form (Figure 6-5). If the airplane has been altered, refer to the Weight and Balance Record for this information.

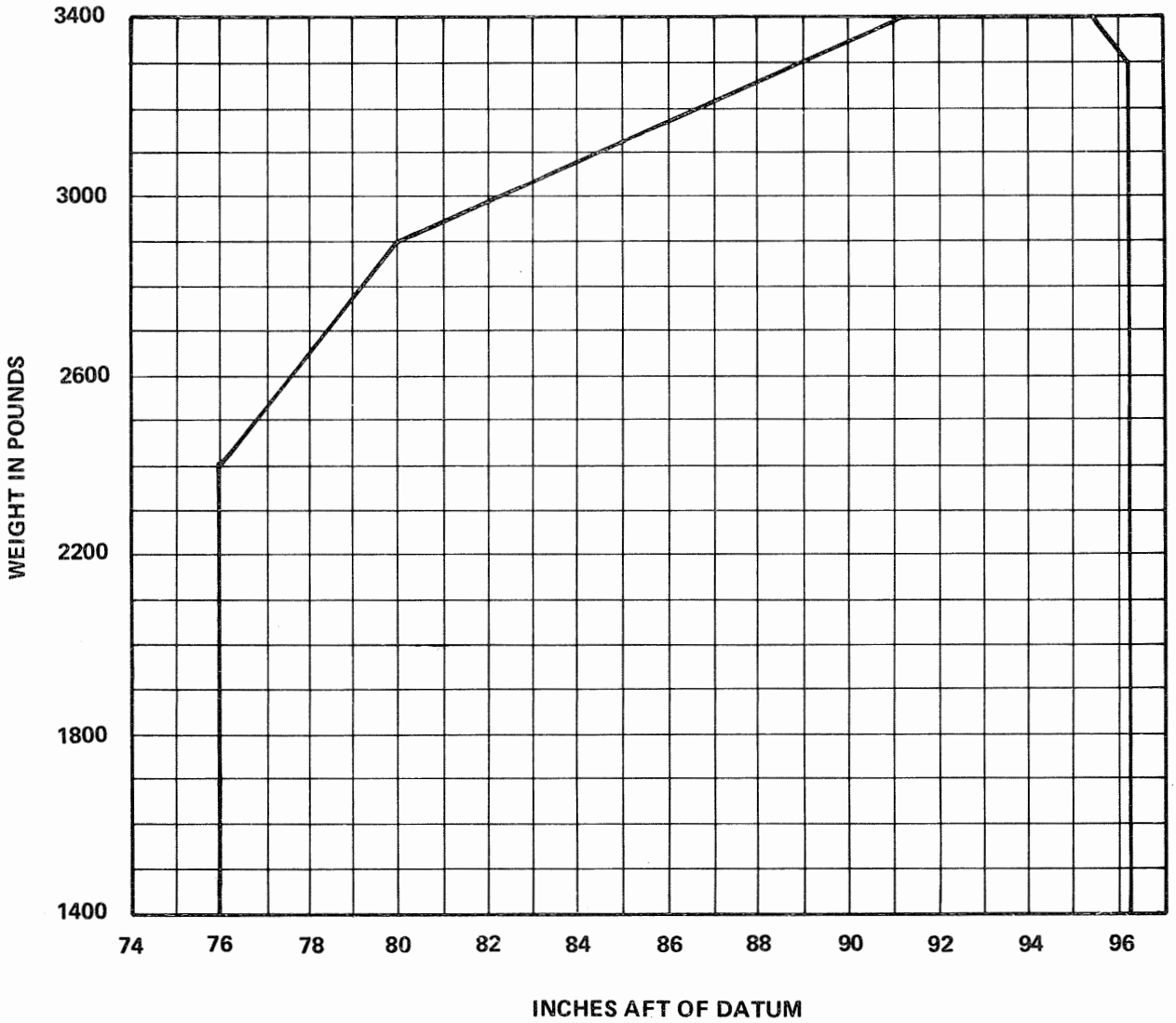
WEIGHT AND BALANCE LOADING FORM

Figure 6-11



LOADING GRAPH

Figure 6-13



C.G. RANGE AND WEIGHT

Figure 6-15

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

6.9 EQUIPMENT LIST

The following is a list of equipment which may be installed in the PA-32-300. It consists of those items used for defining the configuration of an airplane when the basic empty weight is established at the time of delivery. Only those standard items which are alternate standard items and those required to be listed by the certificating authority (FAA) are presented. Items marked with an "X" are those items which were installed on the airplane described below as delivered by the manufacturer.

Where the letter "A," "B," or "C" precedes an item; "A" denotes an item which is required equipment that must be installed in the aircraft; "B" denotes an item which is required equipment that must be installed in the aircraft unless replaced by an optional equivalent item; "C" denotes an optional item which replaces a required item of standard equipment. Where no letter precedes an item, that item is not required equipment.

Unless otherwise indicated, the installation certification basis for the equipment included in this list is the aircraft's approved type design.

PIPER AIRCRAFT CORPORATION PA-32-300 CHEROKEE SIX

SERIAL NO._____ REGISTRATION NO._____ DATE: _____

(a) Propeller and Propeller Accessories

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
1	A	Propeller, Hartzell (HC-C2YK-1( )F/F8475D-4) Cert. Basis - TC P920		51.0	-12.1	-618
3		Spinner Piper Dwg. 99374-0		4.8	-13.2	-63
5	A	Propeller Governor Piper Dwg. 66634-8 (Hartzell F-4-11 ( )) Cert. Basis - TC P920		4.5	-3.1	-14

THIS PAGE INTENTIONALLY LEFT BLANK

(b) Engine and Engine Accessories,

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
7	A	Engine (Lycoming Model IO-540-K1G5) Cert. Basis - TC 1E4	_	468.8	11.25	5274
9	A	Engine Driven Fuel Pump (Lycoming P/N 75247) Cert. Basis - TC 1E4		*1.7	27.6	47
11	A	Electric Fuel Pump (Airborne P/N 1B5-6)		3.0	112.6	338
13	A	Fuel Valve Piper Dwg. 69735-5 (Airborne P/N 1-H65-5)		2.4	110.8	266
15	A	Oil Coolers (2) Piper Dwg. 16599-0 (Harrison P/N C-8529245)		4.2	22.5	94
17	A	Air Filter (Fram P/N CA-161PL)		1.0	16.0	16
19	B	Alternator Piper Dwg. 99945-0 (Chrysler P/N 3656624)	_____	*12.7	-2.5	-32
21	A	Starter (Lycoming P/N 76211) (Prestolite P/N MZ 4206) Cert. Basis - TC 1E4		*18.0	0.7	13
23	A	Oil Filter (Lycoming P/N 63459) Cert. Basis - TC 1E4		*1.6	43.5	70

*Included in basic engine dry weight.

THIS PAGE INTENTIONALLY LEFT BLANK

(c) Landing Gear and Brakes

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
31	A	Two Main Wheel Assemblies a. Cleveland Aircraft Products Wheel Assy. No. 40-90 Brake Assy. No. 30-65 Cert. Basis - TSO C26a b. 6.00-6 Type III 6 Ply Rating Tires with Regular Tubes Cert. Basis - TSO C62		32.9	109.8	3612
33	B	Nose Wheel Assembly a. Cleveland Aircraft Products Wheel Assy. No. 38501 or 40-76F Cert. Basis - TSO C26a	_____	4.3	16.3	70
		b. McCauley Industrial Corp. Wheel Assy. No. D-30625 or D-30665 Cert. Basis - TSO C26b	_____	5.5	16.3	90
		c. 6.00-6 Type III 4 Ply Rating Tire with Regular Tube Cert. Basis - TSO C62	_____	9.0	16.3	147
35	A	Handbrake Master Cylinder Cleveland Aircraft Products No. 10-22		0.6	60.9	37
37	A	Toe Brake Cylinders a. Cleveland Aircraft Products No. 10-27	_____	0.7	55.1	39
		b. Gar-Kenyon Instruments 17000	_____	0.4	55.1	22

THIS PAGE INTENTIONALLY LEFT BLANK

(d) Electrical Equipment

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
41	A	Voltage Regulator Piper Dwg. 68804-3		0.5	19.4	10
43	B	Battery (Rebat S-25)	_____	21.9	41.4	907
45	A	Starter Relay Piper Dwg. 99130-2 (Rebat P/N 111-111)		1.0	32.4	33
47	A	Over Voltage Relay Piper PS50034-1 (Prestolite, Wico Div., P/N X16799)	—	0.5	23.0	12

THIS PAGE INTENTIONALLY LEFT BLANK

(e) Instruments

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
51	B	Altimeter Piper PS50008-2 (United Instrument UI5934-P or UI5934P-1) Cert. Basis - TSO C10b	_____	1.1	65.9	73
53	B	Airspeed Indicator Piper PS50049-35S (United Instruments 8025-B.280) Cert. Basis - TSO C2b	_____	0.6	66.8	40
55	A	Manifold & Fuel Flow Indicator Cert. Basis - TSO C45 and C47 a. Piper PS50031-7 (United Instruments 6082-H.56 or 6331-H.56) b. Piper PS50031-16 (United Instruments 6331-H.95)		1.2	66.2	80
57	A	Compass Piper Dwg. 67462-6 (Airpath P/N C-2200-L4-B) Cert. Basis - TSO C7c		0.9	64.9	59
59	A	Tachometer Piper Dwg. 62177-2 (AC 6411622) or Piper Dwg. 62177-3 (Stewart Warner 551-WE(N)		0.7	66.2	47
61	A	Left Engine Cluster Piper Dwg. 95241-20		0.8	67.4	54
63	A	Right Engine Cluster Piper Dwg. 95211-19 or -28		0.8	67.4	54

THIS PAGE INTENTIONALLY LEFT BLANK

(f) Miscellaneous

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
85	B	Left Front Seat Piper Dwg. 79337-19	_____	15.5	93.0	1442
87		Right Front Seat Piper Dwg. 79337-20		15.5	93.0	1442
89		Left Middle Seat Piper Dwg. 96827-24		13.5	124.1	1676
91		Right Middle Seat Piper Dwg. 96827-25		13.5	124.1	1676
93		Left Rear Seat Piper Dwg. 79479-2		14.5	155.7	2258
95		Right Rear Seat Piper Dwg. 79479-3		14.5	155.7	2258
97	A	Front Seat Belts (2) Piper PS50039-4-2A (American Safety Eqpt. Corp. 449965 Black) Cert. Basis - TSO C22f		1.8	86.9	156
99	A	Center Seat Belts (2) Piper PS50039-4-3A (American Safety Eqpt. Corp. 500577 Black) Cert. Basis - TSO C22f		1.6	123.0	197
101	A	Aft Seat Belts (2) Piper PS50039-4-4A (American Safety Eqpt. Corp. 500576 Black) Cert. Basis - TSO C22f		1.6	163.0	261

(f) Miscellaneous (cont)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
103	A	Shoulder Harness (2) (Front Seats Only) Piper PS50039-4-21 (Pacific Scientific 1107447-05 Black)		1.4	120.1	169
105	A	Baggage Straps Piper Dwg. 66804-0 and 66805-0		1.3	177.0	230
107		Tow Bar Piper Dwg. 69975-2		2.3	193.9	452

(g) Propeller and Propeller Accessories (Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)

THIS PAGE INTENTIONALLY LEFT BLANK

(h) Engine and Engine Accessories
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
111	Vacuum Pump				
	a. Piper Dwg. 26749-3 (Airborne P/N 200CC)	_____	3.6	27.4	99
	b. Piper Dwg. 79399-0 (Airborne P/N 211CC)	_____	1.8	27.4	50
	c. Piper Dwg. 36535-02 (Edo-Aire P/N 1U128A)	_____	2.2	27.4	60
113	Exhaust Gas Temperature Gauge Installation Piper Dwg. 69185-3, Alcor Indicator P/N 202A-7A or P/N 202B-7A Probe Model "A" Lead Assembly 90.00	_____	0.7	60.4	42

THIS PAGE INTENTIONALLY LEFT BLANK

(i) Landing Gear and Brakes
(Optional Equipment)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
121	C	Nose Wheel Assembly a. Cleveland Aircraft Products Wheel Assy. No. 38501 Cert. Basis - TSO C26a b. 6.00-6 Type III 6 Ply Rating Tire with Regular Tube Cert. Basis - TSO C62	_____	*0.3	16.3	5
123		Nose Wheel Fairing Piper Dwg. 76416	_____	3.6	23.1	83
125		Main Wheel Fairings (2) Piper Dwg. 65237	_____	7.6	113.6	863
127		Nose Wheel Fairing Piper Dwg. 37896-5	_____	10.3	23.1	238
128		Main Wheel Fairings (2) Piper Dwg. 37885-2, -3	_____	20.6	113.6	2340
129		Nose Wheel Fairing Piper Dwg. 35944-12	_____	7.0	23.1	162
130		Main Wheel Fairings (2) Piper Dwg. 79893-2, -3	_____	17.0	113.6	1931

*Weight and moment difference between standard and optional equipment.

THIS PAGE INTENTIONALLY LEFT BLANK

(j) Electrical Equipment
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
131	Instrument Panel Lights	_____	0.3	67.8	20
133	Instrument Lights (2) Grimes 15-0083-7	_____	0.2	99.0	20
135	Reading Lights				
	a. (2) Grimes #10-0154-1	_____	0.5	149.3	75
	b. (2) Grimes #10-0154-1	_____	0.5	115.0	58
	c. (4) Grimes #10-0644-1	_____	0.6	133.3	80
137	Forward Baggage Light Piper Dwg. 68697	_____	0.2	43.5	9
139	Landing Light Piper PS10008-4509 (G.E. Model 4509)	_____	0.5	-2.6	-1
141	Navigation Lights (Wing) (2) Grimes Model A1285 (Red and Green)	_____	0.4	106.6	43
143	Navigation Light (Rear) (1) Grimes Model A2064 (White)	_____	0.2	311.7	62
145	Rotating Beacon Piper Dwg. 79850-17	_____	1.5	290.3	435
147	Anti-Collision Lights (Fin Tip Only) Piper Dwg. 99033-2	_____	3.1	241.6	749
149	Anti-Collision Lights (Wing and Fin Tips) Piper Dwg. 99033-7	_____	6.3	197.8	1246

(j) Electrical Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
151	Heated Pitot Head Piper Dwg. 65797-5	_____	0.4	100.0	40
153	Piper Pitch Trim Piper Dwg. 69378	_____	4.4	191.5	843
155	Battery 12V 35 A.H. Rebat R35 (Wt. 28.4 lbs.)	_____	*6.5	41.4	269
157	Auxiliary Power Receptacle Piper Dwg. 68815	_____	2.6	48.4	126
159	External Power Cable Piper Dwg. 62355-2	_____	4.3	42.0	181
161	Lighter #200462, 12 Volt Universal	_____	.2	67.9	14

*Weight and moment difference between standard and optional equipment.

(k) Instruments
(Optional Equipment)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
167		Attitude Gyro a. Piper Dwg. 99002-3 (Edo-Aire P/N 5000B-9)	_____	1.9	64.4	122
		b. Piper Dwg. 99002-2 or -8 (Aeritalia S.P.A. P/N 36101P)	_____	2.2	64.4	142
		Cert. Basis - TSO C4c				
169		Directional Gyro a. Piper Dwg. 99003-2 or -3 (Edo-Aire P/N 4000B-9)	_____	2.4	64.7	156
		b. Piper Dwg. 99003-4 (Aviation Inst. Mfg. Corp. P/N 200-5)	_____	2.8	64.7	181
		c. Piper Dwg. 99003-7 (Aeritalia S.P.A. P/N 31101P)	_____	1.9	64.7	123
		Cert. Basis - TSO C5c				
171		Horizontal Situation Indicator (HSI) (Mitchell P/N NSD-360A) Cert. Basis - TSO C6c, C9c, C52c	_____	4.6	64.9	299
173	C	Tru-Speed Indicator Piper PS50049-35T (United Instruments P/N 81 25-B.275) Cert. Basis - TSO C2b	_____	(Same as standard equipment)		

(k) Instruments
(Optional Equipment) (cont)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
175	C	Altimeter Piper PS50008-3 (United Instruments P/N UI5934-PM or P/N UI5934PM-1) or Piper PS50008-4 (United Instruments P/N UI5934-PA or P/N UI5934PA-1) or Piper PS50008-5 (United Instruments P/N 5934-PAM-1) Cert. Basis - TSO C10b	_____	(Same as standard equipment)		
177	C	Encoding Altimeter Piper PS50008-6 (United Instruments P/N UI5035P-P23) or Piper PS50008-7 (United Instruments P/N UI5035PM-P24) Cert. Basis - TSO C10b and C88	_____	*0.7	65.3	46
179		Altitude Reporter (Narco AR-500) Piper Dwg. 69875-3 Cert. Basis - TSO C88	_____	1.0	56.2	57
181		Rate of Climb a. Piper Dwg. 99010-3 (Standard Precision Co. P/N SP-1403(1)-PIP)	_____	0.5	67.2	34
		b. Piper Dwg. 99010-4 or -5 (United Instruments P/N UI-7000) Cert. Basis - TSO C8b	_____	0.7	65.9	47

*Weight and moment difference between standard and optional equipment.

(k) Instruments
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
183	Alternate Static Source Installation Piper Dwg. 67479-2	_____	0.4	66.0	26
185	Turn and Slip Indicator a. Piper PS50030-2 (R. C. Allen P/N A2475-2)	_____	2.9	64.7	188
	b. Piper PS50030-2 (Electric Gyro Corp. P/N 1234T100-5(P)	_____	1.1	64.7	72
	c. Piper PS50030-2 (Electric Gyro Corp. P/N 1234T100-5(PTE) Cert. Basis - TSO C3b	_____	1.1	64.7	72
187	Turn Coordinator a. Piper PS50030-3 (R. C. Allen P/N RCA 80A-9)	_____	2.9	64.7	188
	b. Piper PS50030-3 (Electric Gyro Corp. P/N 1394T100-3(5P)	_____	1.1	64.7	72
	c. Piper PS50030-3 (Brittain (AIM) P/N 600-009-900)	_____	2.1	64.7	136
	d. Piper PS50030-3 (Electric Gyro Corp. P/N 1394T100-3(5PE) Cert. Basis - TSO C3b	_____	1.1	64.7	72
189	MK 10 Radar Altimeter Piper Dwg. 37693-2 or -8	_____	5.4	181.3	979
191	Engine Hour Meter Piper Dwg. 69889-0	_____	0.3	66.2	20

(k) Instruments
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
193	Clock Piper Dwg. 69920-3 or Piper Dwg. 99478-0 (Wakman P/N AN5743-L2) or (Aircraft Instruments and Dev. Inc. 1G10-1)	_____	0.4	67.4	27
195	Outside Air Temperature Gauge Piper Dwg. 79316-0 (Dresser Industries P/N NHM-70)	_____	0.2	77.6	16
197	Gyro Suction Gauge Piper Dwg. 99480-0 (Airborne P/N 1G10-1) or (AN Std. P/N AN577-11)	_____	0.5	67.2	34
199	Vacuum Regulator (Airborne P/N 2H3-19)	_____	0.6	53.2	32
201	Vacuum Filter Piper Dwg. 66673-0 (Airborne P/N 1J7-1)	_____	0.3	53.5	16

(l) Autopilots
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
207	AutoFlite II				
	Cert. Basis - STC SA1157SW	_____	6.6	93.9	620
209	AutoControl IIIB	_____	7.4	88.5	655
	a. Directional Gyro #52D54	_____	3.1	64.0	198
	b. Omni Coupler 1C-388	_____	0.9	64.3	58
	Cert. Basis - STC SA1406SW				
211	AltiMatic IIIC	_____	22.8	103.3	2355
	a. Directional Gyro #52D54	_____	3.1	64.9	201
	b. Omni Coupler 1C-388	_____	0.9	64.3	58
	c. GS Coupler 1C-493	_____	1.5	56.7	85
	Cert. Basis - STC SA3011SW				
213	Altimatic IIIC	_____	21.3	103.3	2200
	a. Directional Gyro #52D54	_____	3.1	64.9	201
	b. Omni Coupler IC-388	_____	0.9	64.3	58
	c. GS Coupler IC-493	_____	1.5	56.7	85
	Cert. Basis - STC SA 3305SW/D				

THIS PAGE INTENTIONALLY LEFT BLANK

(m) Radio Equipment
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
219	Collins VHF-250 or VHF-251 Comm Transceiver				
	a. Single	_____	4.0	61.9	248
	b. Dual	_____	8.1	61.9	502
	Cert. Basis - TSO C37b, C38b				
221	Collins VIR-350 or VIR-351 Nav Receiver				
	a. Single	_____	3.9	62.4	243
	b. Dual	_____	7.9	62.4	493
	Cert. Basis - TSO C40a, C36c				
223	Collins IND-350 VOR/LOC Indicator				
	a. Single	_____	1.0	65.2	65
	b. Dual	_____	2.0	65.2	130
	Cert. Basis - TSO C40a, C36c				
225	Collins IND-351 VOR/LOC/ GS Indicator				
	Cert. Basis - TSO C40a, C36c	_____	1.3	65.2	85
227	Collins GLS-350 Glide Slope Receiver				
	Cert. Basis - TSO C34c	_____	2.0	41.6	83
228	Collins DCE 400 Distance Computing Equipment				
	Cert. Basis - TSO C40a	_____	2.1	63.9	134
229	Collins RCR-650 ADF Receiver and Antenna and IND-650 Indicator				
	Cert. Basis - TSO C41c	_____	7.7	122.1	941
231	Collins AMR-350 Audio/Marker Panel				
	Cert. Basis - TSO C35d, C50b	_____	*3.3	123.9	409

*Weight includes antenna and cable.

(m) Radio Equipment
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
233	Collins TDR-950 Transponder Cert. Basis - TSO C74c	_____	*2.8	62.4	175

*Weight includes antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
239	King KX 170( ) VHF Comm/Nav				
	Transceiver, Single	_____	7.3	61.6	450
	Transceiver, Dual	_____	15.0	61.6	924
241	King KX 175( ) VHF				
	Transceiver,	_____	11.4	61.6	703
	King KN 72 VOR/LOC Converter,	_____	2.8	38.7	108
	King KN 73 Glide Slope Receiver,	_____	2.8	39.9	111
	King KN 75 Glide Slope Receiver,	_____	2.0	39.5	79
	King KN 77 VOR/LOC Converter,	_____	3.1	38.7	120
	King KI 204 VOR/ILS Indicator,	_____	1.7	65.5	111
	King KNI 520 VOR/ILS Indicator	_____	1.7	65.5	111
	Cert. Basis - TSO C3bc, C37b, C38b, C40a				
243	King KX 175( ) VHF				
	Transceiver (2nd),	_____	10.0	61.6	616
	King KN 72 VOR/LOC Converter,	_____	2.8	38.7	108
	King KN 77 VOR/LOC Converter,	_____	3.5	38.7	135
	King KI 203 VOR/LOC Indicator	_____	1.7	65.5	111
	King KNI 520 VOR/ILS Indicator	_____	1.7	65.5	111
	Cert. Basis - TSO C36c, C37b, C38b, C40a				
245	King KI 201( ) VOR/LOC Indicator				
	a. Single	_____	2.4	64.9	156
	b. Dual	_____	5.0	64.9	325
247	King KI 208 VOR/LOC Indicator				
	a. Single	_____	1.0	64.9	65
	b. Dual	_____	2.0	64.9	130

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
249	King KI 209 VOR/LOC/GS Indicator Cert. Basis - TSO C34c, C36c, C40a	_____	1.2	64.9	78
251	King KI 213 VOR/LOC/GS Indicator	_____	2.5	64.9	162
253	King KI 214( ) VOR/LOC/GS Indicator	_____	2.9	64.9	189
255	King KN 74 R-Nav	_____	4.7	61.3	288
257	King KI 206 R-Nav Indicator	_____	1.3	61.6	80
259	King KN 61 DME Cert. Basis - TSO C66a	_____	13.3	189.5	2520
261	King KN 65A DME Cert. Basis - TSO C66a	_____	13.8	185.4	2559
263	King KR 85 Digital ADF	_____	8.6	96.6	831
	a. Audio Amplifier Cert. Basis - TSO C41b	_____	0.8	54.1	43
265	King KR 86 ADF				
	a. First	_____	6.7	104.8	702
	b. Second	_____	9.7	108.9	1057
	c. Audio Amplifier	_____	0.8	54.1	43
267	King KMA 20( ) Audio Panel Cert. Basis - TSO C35c, C50b	_____	*3.7	74.9	277
269	King KT 76( )/78( ) Transponder Cert. Basis - TSO C74b	_____	*3.1	63.1	196

*Weight includes antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
275	Narco Comm 10A VHF Transceiver	_____	3.9	62.4	243
277	Narco Comm 11A VHF Transceiver				
	a. Single	_____	3.6	62.4	225
	b. Dual	_____	7.1	62.4	443
279	Narco Comm 11B VHF Transceiver				
	a. Single	_____	3.9	62.4	243
	b. Dual	_____	7.8	62.4	487
281	Narco Comm 111 VHF Transceiver				
	a. Single	_____	4.0	62.4	250
	b. Dual	_____	8.0	62.4	500
	Cert. Basis - TSO C37b, C38b				
283	Narco Comm 111B VHF Transceiver				
	a. Single	_____	3.9	62.4	243
	b. Dual	_____	7.8	62.4	487
	Cert. Basis - TSO C37b, C38b				
285	Narco Comm 120 VHF Transceiver				
	a. Single	_____	4.8	61.9	297
	b. Dual	_____	8.6	62.4	537
	Cert. Basis - TSO C37b, C38b				
287	Narco Nav 10 VHF Receiver	_____	1.9	63.6	121
289	Narco Nav 11 VHF Receiver				
	a. Single	_____	2.8	63.6	178
	b. Dual	_____	5.6	63.6	356

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
291	Narco Nav 12 VHF Receiver	_____	3.4	63.6	216
293	Narco Nav 14 VHF Receiver	_____	2.5	62.4	156
295	Narco Nav 111 Cert. Basis - TSO C36c, C40a, C66a	_____	2.5	63.6	159
297	Narco Nav 112 Receiver Cert. Basis - TSO C36c, C40a, C66c, C34c	_____	3.3	63.6	210
299	Narco Nav 114 VHF Receiver Cert. Basis - TSO C38b, C40a, C36c, C34c, C66a	_____	2.5	62.4	156
301	Narco Nav 121 VHF Receiver a. Single b. Dual Cert. Basis - TSO C36c, C40c, C66a	_____ _____	3.1 6.2	63.5 63.4	197 393
303	Narco Nav 122 VHF Receiver a. Single b. Dual Cert. Basis - TSO C35d, C36c, C40c, C66a	_____ _____	*5.3 *8.8	105.7 87.5	560 770
305	Narco Nav 122A VHF Receiver a. Single b. Dual Cert. Basis - TSO C34c, C35d, C36c, C40c, C66a	_____ _____	*5.4 *9.0	104.6 86.8	565 781
307	Narco Nav 124A VHF Receiver a. Single b. Dual Cert. Basis - TSO C35d, C36c, C40a, C66a	_____ _____	*6.4 *11.1	100.3 84.2	642 935

*Weight includes marker antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
309	Narco Nav 124R VHF Receiver Cert. Basis - TSO C36c, C40a, C66a	_____	4.4	62.4	275
311	Narco ID 124 VOR/LOC/GS Indicator				
	a. Single	_____	1.2	65.5	79
	b. Dual	_____	2.4	65.5	157
	Cert. Basis - TSO C34c, C35d, C36c, C40c				
313	Narco OC-110 Converter and Mount Cert. Basis - TSO C36c, C40a	_____	2.1	231.5	486
315	Narco UGR-2A Glide Slope				
	a. Single	_____	3.0	40.0	120
	b. Dual	_____	7.0	131.6	921
	Cert. Basis - TSO C34b				
317	Narco UGR-3 Glide Slope	_____	2.9	40.0	116
319	Narco MBT-12-R, Marker Beacon	_____	4.0	77.7	311
321	Narco CP-125 Audio Selector Panel	_____	2.2	76.2	168
323	Narco CP-135 Audio Selector Panel Cert. Basis - TSO C50b	_____	2.2	76.2	168
325	Narco CP-135M Audio Selector Panel Cert. Basis - TSO C50b, C35d	_____	*3.9	132.6	517
327	Narco CLC-60A R-Nav	_____	11.5	133.9	1540
	a. Narco SA-11 Adapter	_____	0.8	45.5	36

*Weight includes marker antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
329	Narco DME-190	_____	*5.9	65.9	389
331	Narco DME-190 TSO Cert. Basis - TSO C66a	_____	*5.9	65.9	389
333	Narco DME-195 Receiver and Indicator Cert. Basis - TSO C66a	_____	*10.8	193.5	2090
335	Narco ADF-140 a. Single b. Dual Cert. Basis - TSO C41c	_____ _____	6.0 **17.9	94.3 109.9	566 1967
337	Narco ADF-141 a. Single b. Dual Cert. Basis - TSO C41c	_____ _____	6.4 **17.9	94.3 109.9	604 1967
339	Narco AT50A Transponder Cert. Basis - TSO C74b	_____	*3.0	62.3	187
341	Narco AT150 Transponder Cert. Basis - TSO C74c	_____	*3.2	62.3	200

*Weight includes antenna and cable.
**Weight includes dual antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
343	Antenna and Cable				
	a. Nav Receiving	_____	1.3	209.4	273
	b. #1 VHF Comm	_____	0.6	146.3	88
	c. #2 VHF Comm	_____	0.9	181.1	163
	d. Glide Slope (Single)	_____	0.9	96.7	87
	e. Glide Slope (Dual)	_____	2.8	180.0	504
	f. Single ADF Sense	_____	0.4	160.0	64
345	Anti-Static Antenna and Cable				
	a. #1 VHF Comm	_____	1.5	162.7	252
	b. #2 VHF Comm	_____	1.6	192.5	308
	c. Single ADF Sense	_____	0.6	160.0	96
347	Emergency Locator Transmitter (C.C.C. Model CIR-11-2)	_____	1.7	267.2	454
	a. Antenna and Coax	_____	0.2	255.4	51
	b. Shelf and Access Hole	_____	0.5	266.4	133
	Cert. Basis - TSO C91				
348	Emergency Locator Transmitter (Narco Model ELT-10)	_____	3.5	267.2	935
	a. Antenna and Coax	_____	0.3	255.4	77
	b. Shelf and Access Hole	_____	0.5	266.4	133
349	RCA Radar Piper Dwg. 36885-2	_____	23.0	81.0	1863
350	Microphone				
	a. Piper Dwg. 68856-10	_____	0.3	69.9	21
	b. Piper Dwg. 68856-11	_____	0.6	74.9	45
	c. Piper Dwg. 68856-12	_____	0.3	69.9	21
351	Boom Microphone - Headset Piper Dwg. 37921-3	_____	0.3	85.5	26
353	Cabin Speaker Piper Dwg. 63239-2	_____	0.8	97.5	78
355	Headset Piper Dwg. 68856-10	_____	0.5	65.0	33

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)

(n) Miscellaneous
(Optional Equipment)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
363		Zinc Chromate Finish Piper Dwg. 79700-2	_____	7.5	113.2	849
365		Stainless Steel Control Cables Piper Dwg. 79700-10	_____	—	—	—
367		Air Conditioner Piper Dwg. 99750	_____	70.4	114.5	8061
369		Ground Ventilating Blower Piper Dwg. 79273-5, -11 or -18	_____	8.6	204.0	1754
371		Assist Step Piper Dwg. 65384 or 37846-3	_____	1.5	147.5	221
373		Super Cabin Sound Proofing a. Piper Dwg. 78480 b. Piper Dwg. 79601-7	_____ _____	24.4 19.0	107.2 107.2	2616 2037
375	C	Adjustable Front Seat (Left) Piper Dwg. 79592-0 or 79592-2	_____	*4.6	84.7	390
377		Adjustable Front Seat (Right) Piper Dwg. 79592-1 or 79592-3	_____	*4.6	84.1	387
379		Jump Seat (With Seat Belts) Piper Dwg. 69595-4	_____	9.2	122.3	1125
381		Club Seating (Includes oversize headrest center seats) Piper Dwg. 37825-2	_____	*14.2	90.4	1284

*Weight and moment difference between standard and optional equipment.

(n) Miscellaneous
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
383	Inboard Armrest - Aft Piper Dwg. 79479-7	_____	2.6	152.0	395
385	Headrests (2) Front Piper Dwg. 79337-18	_____	2.0	99.5	199
387	Headrests (2) Center Piper Dwg. 79337-18	_____	2.0	132.1	264
389	Headrests (2) Rear Piper Dwg. 79337-18	_____	2.0	171.5	343
391	Oversize Headrests - Front (2) Piper Dwg. 79764-2	_____	3.2	99.5	318
393	Oversize Headrests - Center (2) (Fwd. Facing Seats Only) Piper Dwg. 79764-2	_____	3.2	132.1	423
395	Oversize Headrests - Aft (2) Piper Dwg. 79764-2	_____	3.2	171.5	549
397	Inertia Safety Belts - Center (2) Piper PS50039-4-15 (Pacific Scientific P/N 1107319-03 Black) or (American Safety Eqpt. Corp. P/N 500853-403)	_____	1.5	133.9	201
399	Inertia Safety Belts - Rear (2) Piper PS50039-4-14 (Pacific Scientific P/N 1107319-01 Black) or (American Safety Eqpt. Corp. P/N 500853-401)	_____	1.6	181.5	290
401	Assist Straps (2) Piper Dwg. 79455-0	_____	0.3	120.0	36

(n) Miscellaneous
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
403	Curtain and Rod Installation Piper Dwg. 79721-2	_____	1.9	143.6	273
405	Curtain and Rod Installation Piper Dwg. 67955-3	_____	5.2	143.6	747
407	Refreshment Console Piper Dwg. 37825-5	_____	7.0	118.5	830
409	Cabin Work Table Installation Piper Dwg. 37825-6	_____	3.9	**185.6	724
411	Deluxe Carpeting	_____	*-3.6	113.9	-410
413	Luxurious Interior Piper Dwg. 67953-3	_____	*25.0	113.9	2848
415	Fire Extinguisher Installation a. Piper Dwg. 35680-14 (Graviner P/N HA1014-01)	_____	5.6	62.8	352
	b. Piper Dwg. 76167-2 (W. Kiddie P/N 2¾DCK-6)	_____	4.6	71.0	327
417	Clip Installation - Map Piper Dwg. 37907-2	_____	0.1	75.0	8
	TOTAL OPTIONAL EQUIPMENT	_____	_____	_____	_____

*Weight and moment difference between standard and optional equipment.
**Stowed position.

EXTERIOR FINISH

Base Color _____ Registration No. Color _____

Trim Color _____ Type Finish _____

Accent Color _____

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

SECTION 7

DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

SECTION 7

DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

7.1 THE AIRPLANE

The PA-32-300 is a six-place (seventh seat optional), single-engine, low-wing, all metal monoplane.

7.3 AIRFRAME

Except for the tubular steel engine mount, steel landing gear struts, other miscellaneous steel parts, and the fiberglass or ABS plastic extremities - cowling and tips of wing and tail surfaces - the basic airframe is of aluminum alloy.

The fuselage is a conventional semi-monocoque structure with a cabin door on the right front and a cargo and passenger door on the left rear.

The wings are attached to each side of the fuselage by the insertion of the butt ends of the main spars into a spar box carry-through which is an integral part of the fuselage structure. This provides, in effect, a continuous main spar with splices at each side of the fuselage. There are also fore and aft attachments at the rear spar and at an auxiliary front spar.

The wing airfoil section is a laminar flow type, $NACA65_2$-415 with a maximum thickness at about 40% aft of the leading edge.

The empennage consists of the fin, the stabilator, and the stabilator trim tab.

7.5 ENGINE AND PROPELLER

The Lycoming IO-540-K1G5 engine installed in the PA-32-300 is rated at 300 horsepower at 2700 rpm. This engine has a compression ratio of 8.7 to 1 and requires 100/130 minimum octane fuel. The engine is equipped with a geared starter, a 60 ampere alternator, dual magnetos, vacuum pump drive, and fuel injection.

The exhaust pipes are routed in pairs to three heavy gauge stainless steel mufflers. Exhaust gases are routed overboard at the underside of the engine cowling. The mufflers are surrounded by a shroud which provides heat for the cabin and for windshield defrosting.

Cowling on the Cherokee Six is designed to cool the engine in all normal flight conditions, including protracted climb, without the use of cowl flaps or cooling flanges.

The constant speed propeller is a Hartzell HC-C2YK-1( )F/F8475D-4 with a diameter of 80 inches. The propeller is controlled by a governor mounted at the left forward side of the crankcase. The governor is operated by a cable from the power control quadrant.

7.7 INDUCTION SYSTEM

An induction scoop is located on the left side of the lower cowl. An intake air box is attached to the inside of the cowl adjacent to the air filter box. The filter box is located at the aft end of the induction scoop. Access to the filter is gained through a detachable plate located on the outside of the lower cowl. The intake air box incorporates a manually operated two-way valve designed to allow induction air either to pass through the filter or to bypass the filter and supply heated air directly to the engine.

Alternate air selection insures induction air flow should the filter become blocked. Since the air is heated, the alternate air system offers protection against induction system blockage caused by snow or freezing rain, or by the freezing of moisture accumulated in the induction air filter. Alternate air is unfiltered; therefore, it should not be used during ground operation when dust or other contaminants might enter the system. The primary (through the filter) induction source should always be used for takeoffs. The control is operated by pressing the knob to the left to clear the retaining gate and then moved in the desired direction.

The Bendix RSA-10ED1 type fuel injection system consists of a servo regulator which meters fuel flow in proportion to air flow to the engine, giving the proper fuel-air mixture at all engine speeds, and a fuel flow divider which receives the metered fuel and accurately divides the fuel flow among the individual cylinder fuel nozzles.

A combination fuel flow indicator and manifold pressure gauge is installed in the left side of the instrument panel. The fuel flow indicator is connected to the fuel flow divider and monitors fuel pressure. The instrument converts fuel pressure to an accurate indication of fuel flow in gallons per hour and percentage of cruise power.

'.9 ENGINE CONTROLS

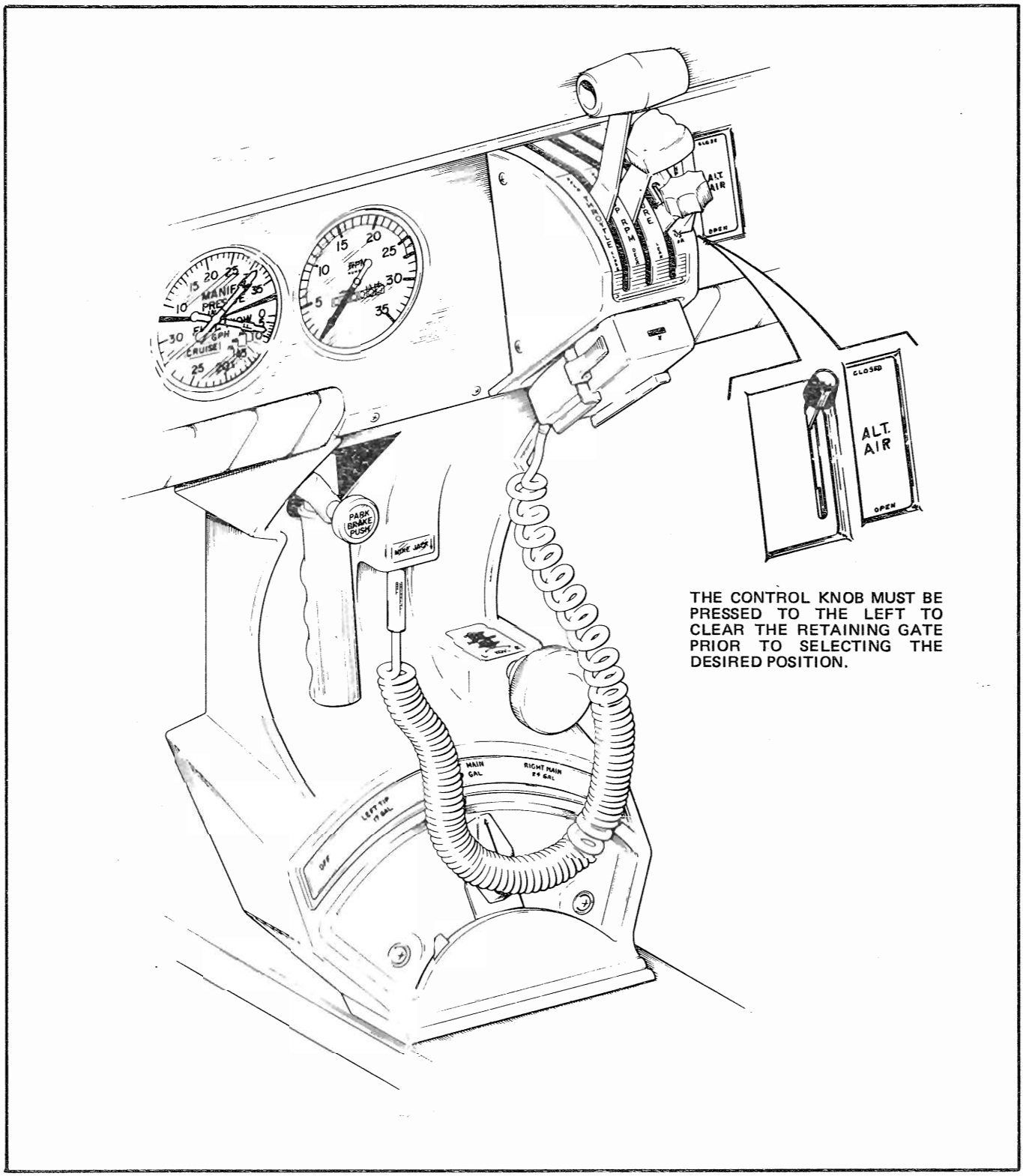
Engine controls consist of a throttle control, a propeller control and a mixture control lever. These :ontrols are located on the control quadrant on the lower center of the instrument panel (Figure 7-1) where :hey are accessible to both the pilot and the copilot. The controls utilize teflon-lined control cables to 'educe friction and binding.

The throttle lever is used to adjust the manifold pressure. The propeller control lever is used to adjust :he propeller speed from high RPM to low RPM.

The mixture control lever is used to adjust the air to fuel ratio. The engine is shut down by the placing)f the mixture control lever in the full lean position. In addition, the mixture control has a lock to prevent ıctivation of the mixture control instead of the pitch control. For information on the leaning procedure, ;ee the Avco-Lycoming Operator's Manual.

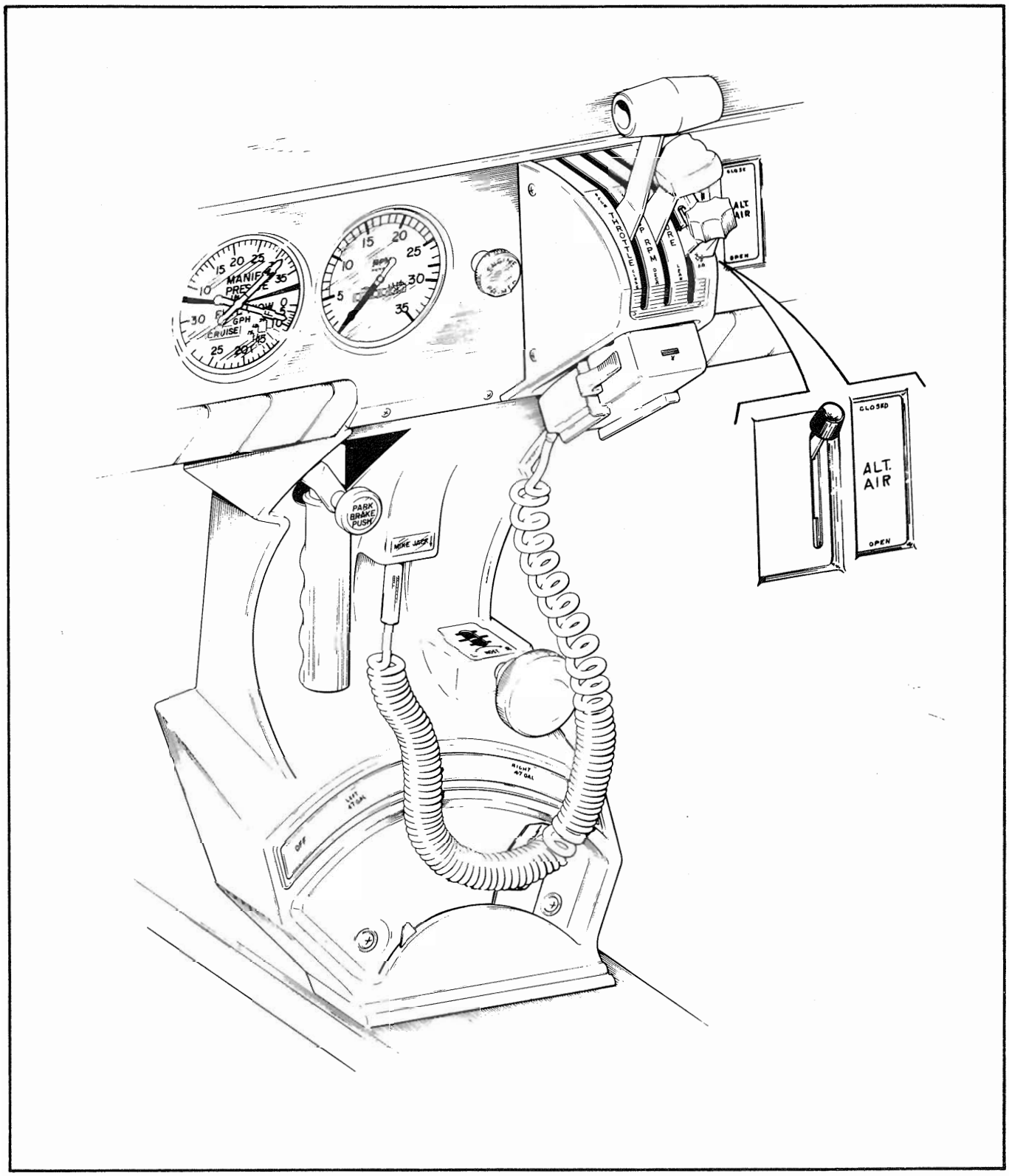
The friction adjustment lever on the right side of the control quadrant may be adjusted to increase or lecrease the friction holding the throttle, propeller, and mixture controls or to lock the controls in a ;elected position.

The alternate air control is located to the right of the control quadrant. When the alternate air lever is ın the up, or closed, position the engine is operating on filtered air; when the lever is in the down, or open,)osition the engine is operating on unfiltered, heated air. The control is operated by pressing the knob to :he left to clear the retaining gate and then moved in the desired direction. (Refer to Figure 7-1.)



CONTROL QUADRANT AND CONSOLE (SERIAL NOS. 32-7740001 THROUGH 32-7840202)

Figure 7-1



CONTROL QUADRANT AND CONSOLE (SERIAL NOS. 32-7940001 AND UP)

Figure 7-1a

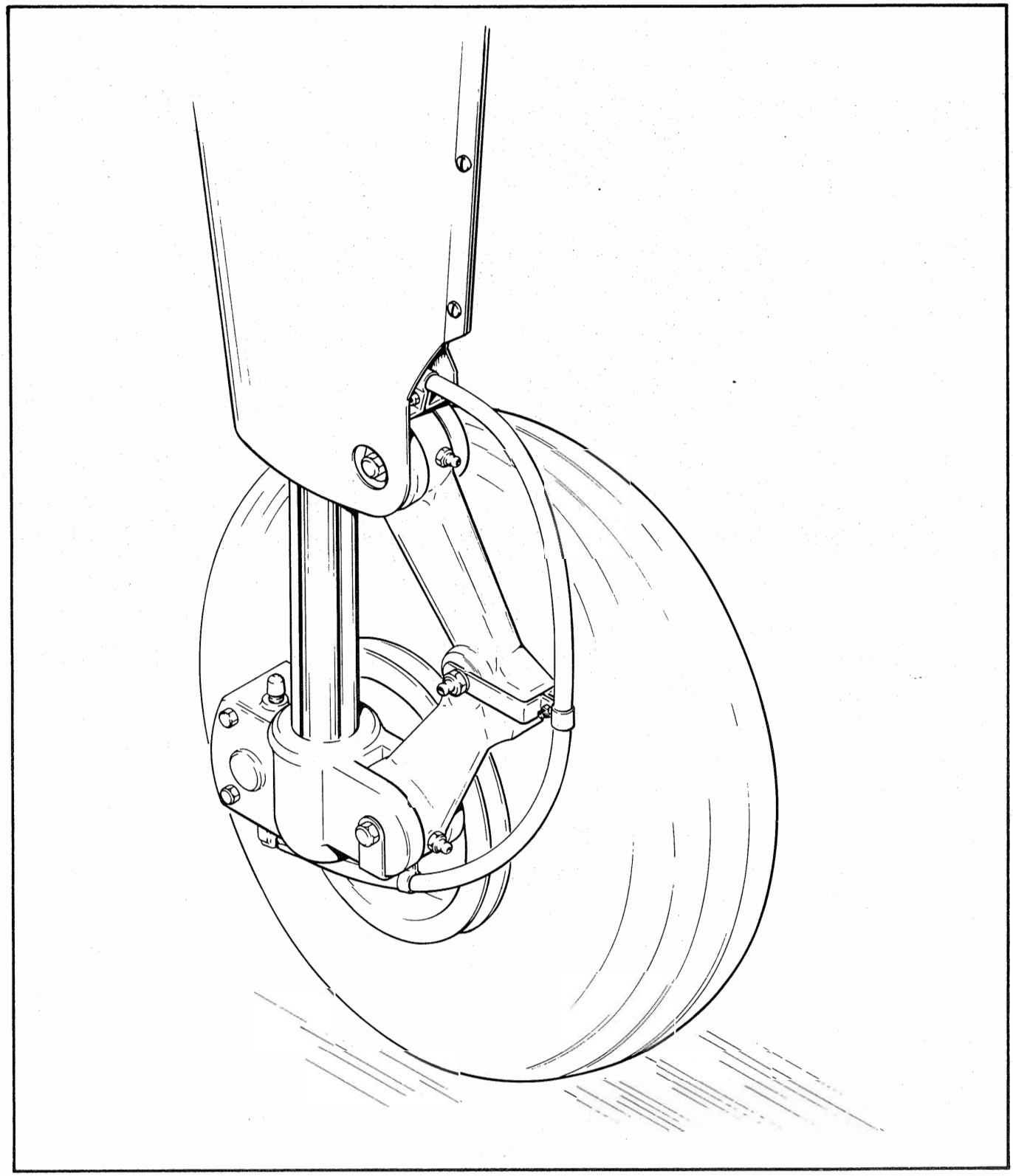
7.11 LANDING GEAR

All three landing gear use Cleveland 6.00 x 6 wheels. The main gear have brake drums and Cleveland double disc hydraulic brake assemblies (Figure 7-3). The nose wheel carries a 6.00 x 6 four or six ply tire and the main gear use 6.00 x 6 six ply tires. All three tires are tube type.

The nose gear is steerable using a combination of full rudder pedal travel and brakes. The nose gear can be turned 24° each side of center. A spring device is incorporated in the rudder pedal torque tube assembly to aid in rudder centering and to provide rudder trim. The nose gear also includes a shimmy dampener.

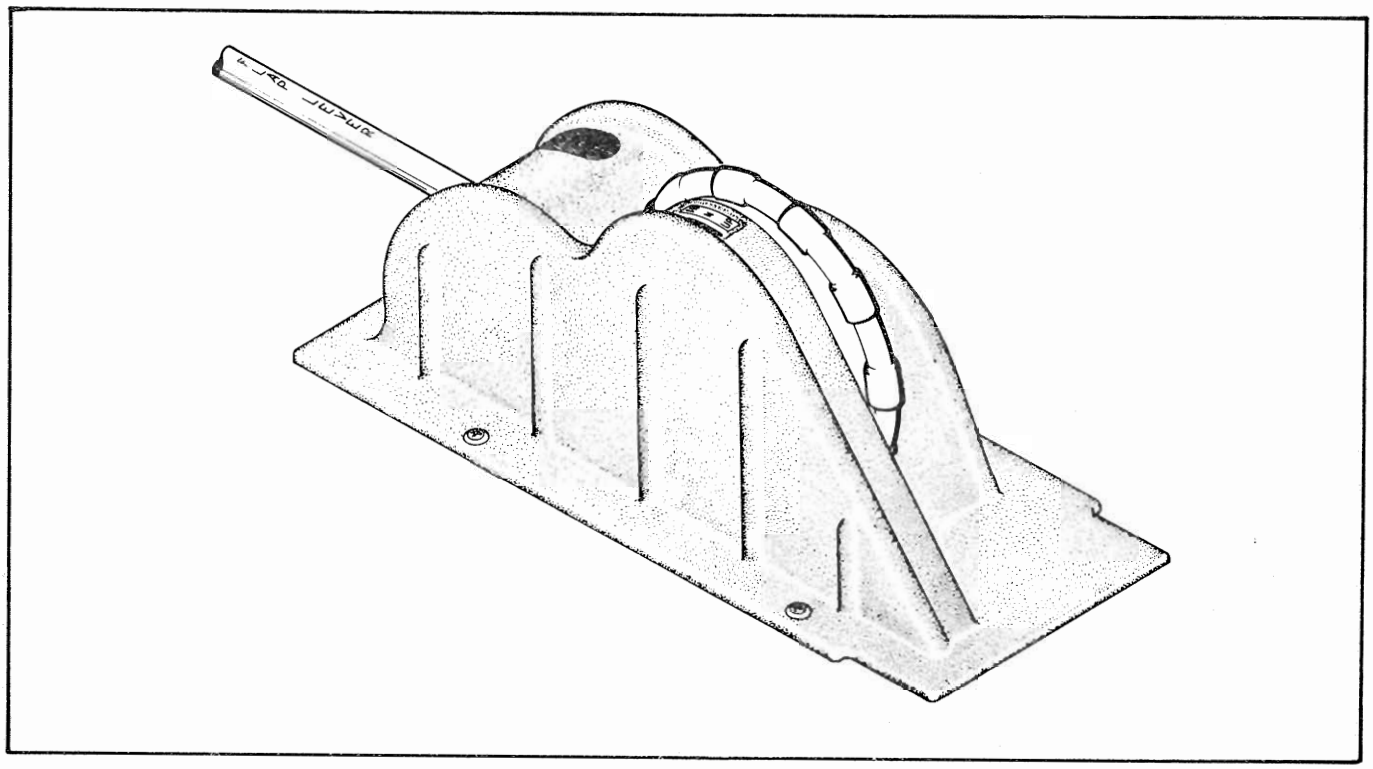
The oleo struts are of the air-oil type. The normal extensions are 3-1/4 inches for the nose gear and 4-1/2 inches for the main gear under normal static load (empty weight of airplane plus full fuel and oil).

The brakes are operated by toe pedals attached to the rudder pedals or by a hand lever and master cylinder located below and behind the left center of the instrument sub-panel. Hydraulic cylinders are located above each pedal and adjacent to the hand lever. The brake fluid reservoir is on the top left front of the fire wall. The parking brake is incorporated in the lever brake and is engaged by pulling back on the lever and depressing the knob attached to the top of the handle. To release the parking brake, pull back on the brake lever to disengage the catch; then allow the handle to swing forward.



MAIN WHEEL ASSEMBLY

Figure 7-3



FLIGHT CONTROL CONSOLE
Figure 7-5

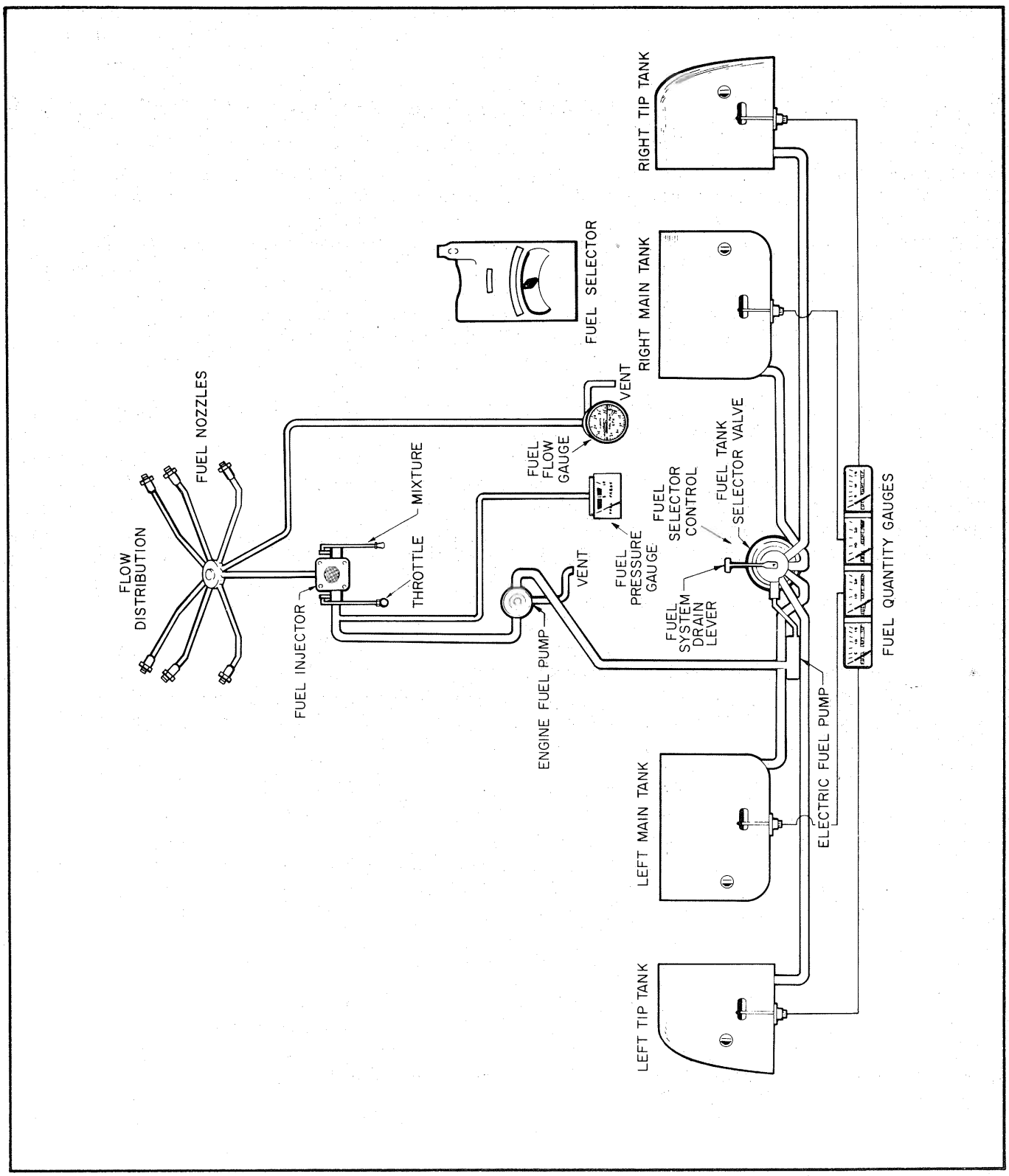
7.13 FLIGHT CONTROLS

Dual controls, with a cable system between the controls and the surfaces, are installed as standard equipment.

The horizontal tail is of the all-movable slab type (stabilator).

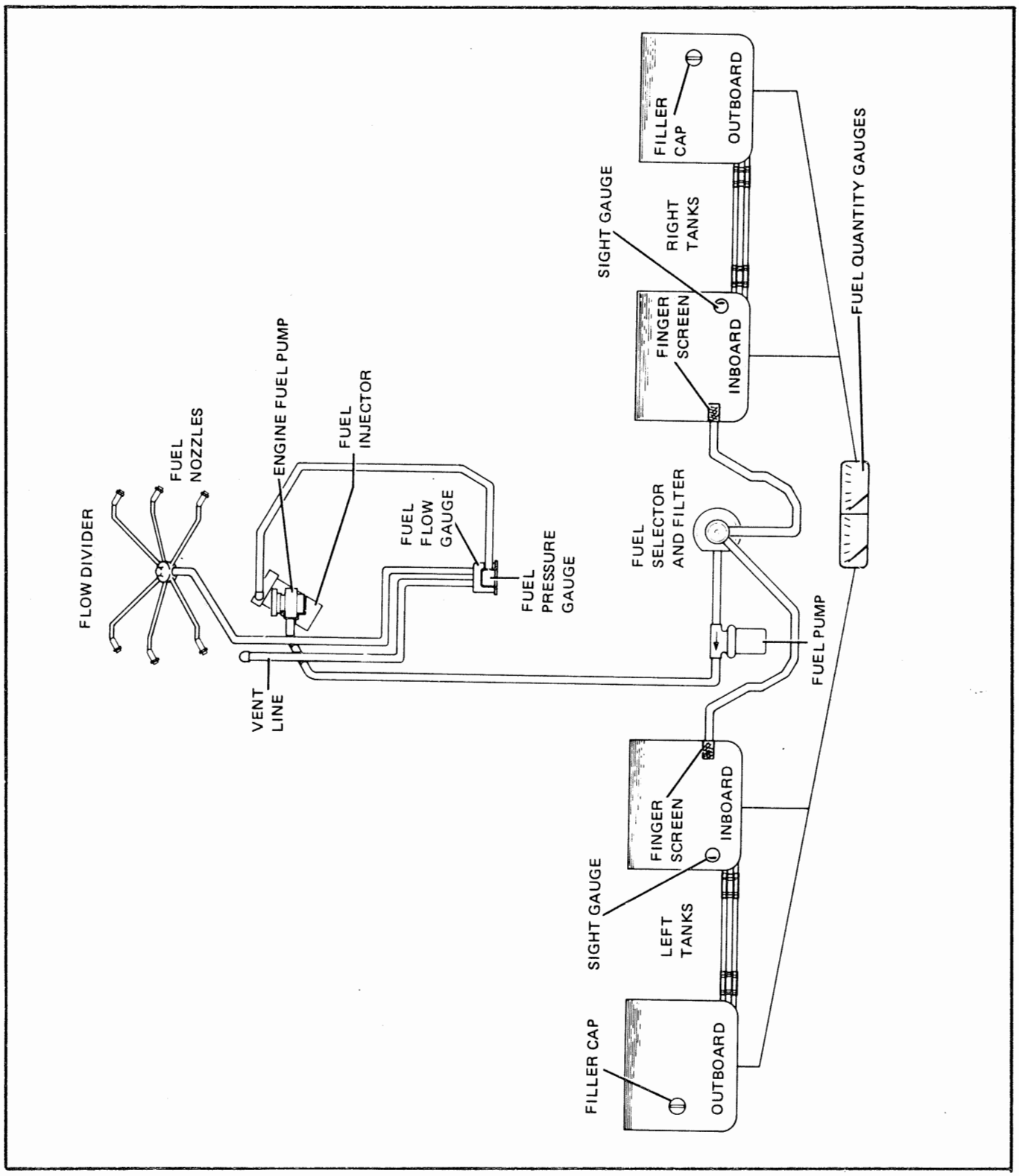
An anti-servo tab which also acts as a longitudinal trim tab, is located on the horizontal tail. This tab is actuated by a control mounted on the control tunnel between the front seats (Figure 7-5).

The flaps are manually operated, and spring-loaded to return to the up position. A past-center lock incorporated in the actuating linkage holds the flap when it is in the up position so that it may be used as a step on the right side. Since the flap will not support a step load except in the full up position, it should be completely retracted when the airplane is on the ground. The flaps have three extended positions, 10, 25, and 40 degrees.



FUEL SYSTEM SCHEMATIC (SERIAL NOS. 32-7740001 THROUGH 32-7840202)

Figure 7-7



FUEL SYSTEM SCHEMATIC (SERIAL NOS. 32-7940001 AND UP)

Figure 7-7a

7.15 FUEL SYSTEM

AIRPLANES SERIAL NOS. 32-7740001 THROUGH 32-7840202

The standard fuel capacity of airplanes with the above serial numbers is 84 gallons, all of which is usable except for approximately one pint in each of the four tanks. The two main inboard tanks, which hold 25 gallons each, are attached to the wing structure with screws and nut plates and can be removed for service or inspection. The tip tanks are constructed of resin impregnated fiberglass, and each one holds 17 gallons. (Refer to Figure 7-7.)

When using less than the standard 84 gallon capacity of the tanks, fuel should be distributed equally between each side. The tip tanks should always be filled first, and fuel from the main tanks should be used first. All weight in excess of 3112 pounds must be in fuel weight only.

The fuel selector control is located below the center of the instrument panel on the sloping face of the control tunnel (Figure 7-1). It has five positions, one position corresponding to each of the four tanks plus an OFF position.

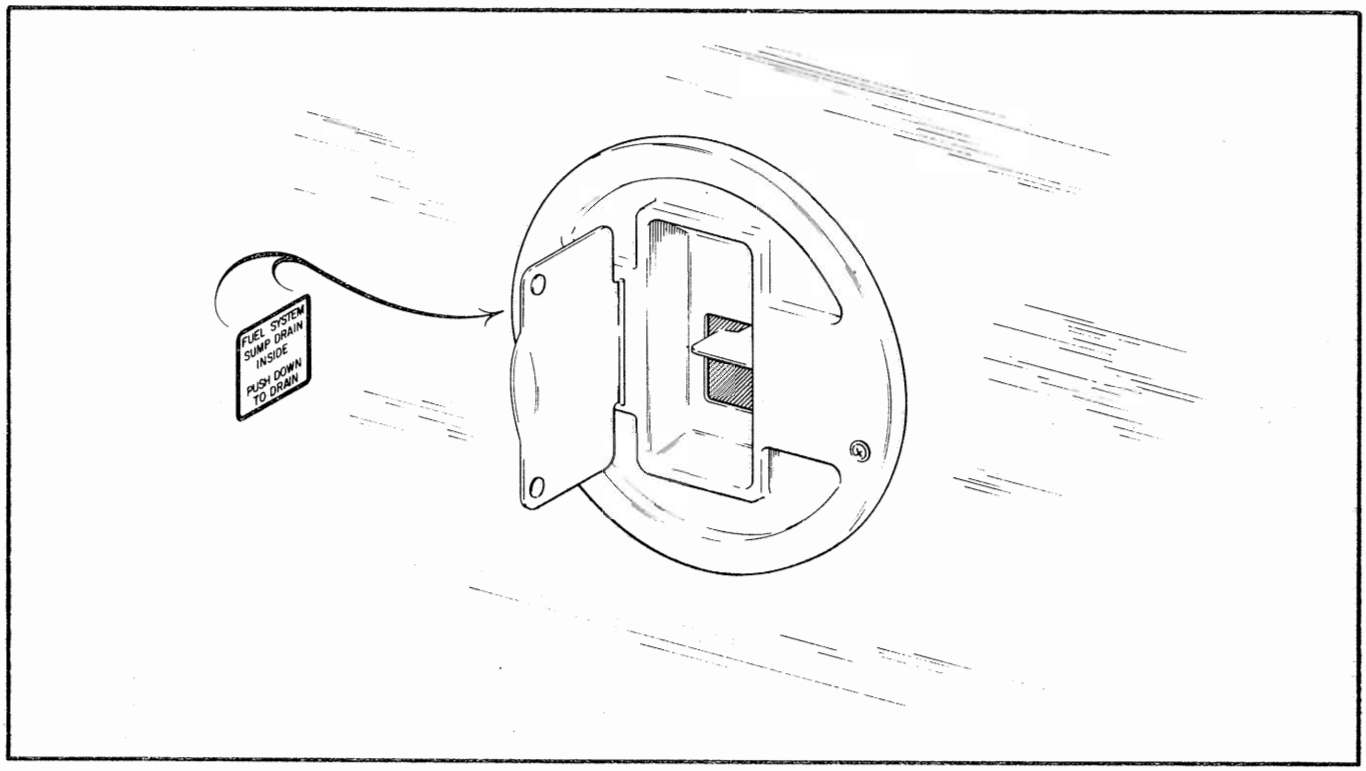
To avoid the accumulation of water and sediment, the fuel system sumps should be drained daily prior to first flight and after refueling. Each tank is equipped with an individual quick drain located at the lower inboard rear corner of the tank. The fuel strainer and a system quick drain valve are located in the fuselage at the lowest point of the fuel system. It is important that the fuel system sumps be drained in the following manner:

1. Drain each tank sump through its individual quick drain located at the lower inboard rear corner of the tank, making sure that enough fuel has flowed to ensure the removal of all water and sediment.
2. Place a container beneath the fuel sump drain outlet located under the fuselage.
3. Drain the fuel strainer by pressing down on the lever located on the right side of the cabin on the forward edge of the wing spar housing (Figure 7-9). Move the selector through the following sequence: OFF position, left tip, left main, right main, and right tip while draining the strainer. Make sure that enough fuel has flowed to drain the fuel line between each tank outlet and the fuel strainer, as well as the strainer itself. With full fuel tanks, it will take approximately 11 seconds to drain all the fuel in one of the fuel lines from the tip tank to the strainer, and approximately 6 seconds to drain all of the fuel from the line from either main tank to the fuel strainer. When the tanks are less than full, it will take a few seconds longer.
4. Examine the contents of the container placed under the fuel sump drain outlet. When the fuel flow is free of water and sediment, close the drain and dispose of the contents of the bottle.

CAUTION

When draining fuel, care should be taken to ensure that no fire hazard exists before starting the engine.

After using the underseat quick drain, check from the outside to make sure that it has closed completely and is not leaking.



FUEL DRAIN LEVER

Figure 7-9

Fuel quantity gauges for each of the four tanks are located in the engine gauge cluster on the left side of the instrument panel. A fuel pressure indicator is also incorporated in the engine gauge cluster on earlier models.

An electric fuel pump is provided for use in case of failure of the engine driven pump. The electric pump operates from a single switch and independent circuit protector. It should be ON for all takeoffs and landings.

AIRPLANE SERIAL NOS. 32-7940001 AND UP

The standard fuel capacity of airplanes with the above serial numbers is 98 gallons, of which 94 gallons are usable. The tanks are attached to the wing structure with screws and nut plates and can be removed for service or inspection.

When using less than the standard 98 gallon capacity of the tanks, fuel should be distributed equally between each side.

The fuel selector control is located below the center of the instrument panel on the sloping face of the control tunnel (refer to Figure 7-1a). It has three positions, one position corresponding to each wing tank plus an OFF position.

To avoid the accumulation of water and sediment, the fuel tank sumps and strainer should be drained daily prior to first flight and after refueling. Each tank is equipped with an individual quick drain located at the lower inboard rear corner of the tank. The fuel strainer and a system quick drain valve are located in the fuselage at the lowest point of the fuel system. It is important that the fuel system be drained in the following manner:

1. Drain each tank sump through its individual quick drain located at the lower inboard rear corner of the tank, making sure that enough fuel has flowed to ensure the removal of all water and sediment.
2. Place a container beneath the fuel strainer sump drain outlet located under the fuselage.
3. Drain the fuel strainer sump by pressing down on the lever located on the right side of the cabin on the forward edge of the wing spar housing (Figure 7-9). Move the selector through the following sequence: OFF position, left, right, while draining the strainer sump. Make sure that enough fuel has flowed to drain the fuel line between each tank outlet and the fuel strainer, as well as the strainer itself. With full fuel tanks, it will take approximately 6 seconds to drain all of the fuel from the line from either tank to the fuel strainer. When the tanks are less than full, it will take a few seconds longer.
4. Examine the contents of the container placed under the fuel sump drain outlet. When the fuel flow is free of water and sediment, close the drain and dispose of the contents of the bottle.

CAUTION

When draining fuel, care should be taken to ensure that no fire hazard exists before starting the engine.

After using the underseat quick drain, check from the outside to make sure that it has closed completely and is not leaking.

Fuel quantity gauges for each of the tanks are located in the engine gauge cluster on the left side of the instrument panel. A fuel pressure indicator is also incorporated in the engine gauge cluster.

A fuel quantity indicator to measure the fuel not visible through the filler neck in each wing is installed in the inboard fuel tank. This gauge indicates usable fuel quantities from 5 gallons to 25 gallons in the ground attitude. The sole purpose of this gauge is to assist the pilot in determining fuel quantities of less than 25 gallons during the preflight inspection.

An electric fuel pump is provided for use in case of failure of the engine driven pump. The electric pump operates from a single switch and independent circuit protector. It should be ON for all takeoffs and landings.

7.17 ELECTRICAL SYSTEM

The 14-volt electrical system includes a 12-volt battery for starting and to back up alternator output (Figure 7-11). Electrical power is supplied by a 60 ampere alternator. The battery, a master switch relay, a voltage regulator and an overvoltage relay are located beneath the floor of the forward baggage compartment, and access is obtained by removing the floor.

Electrical switches are located on a panel to the pilot's left (Figure 7-13) and all circuit breakers are on the lower right instrument panel (Figure 7-15). A switch panel light is available as optional equipment. The light is installed above the switch panel and is controlled by a rheostat switch mounted on the left side of the panel. Two thumb-wheel rheostat switches to the left of the circuit breakers control the navigation lights and the intensity of the instrument panel lights.

Standard electrical accessories include the starter, the electric fuel pump, the stall warning indicator, the ammeter, and the annunciator panel.

The annunciator panel includes alternator and low oil pressure indicator lights. When the optional gyro system is installed, the annunciator panel also includes a low vacuum indicator light. The annunciator panel lights are provided only as a warning to the pilot that a system may not be operating properly, and that he should check and monitor the applicable system gauge to determine when or if any necessary action is required.

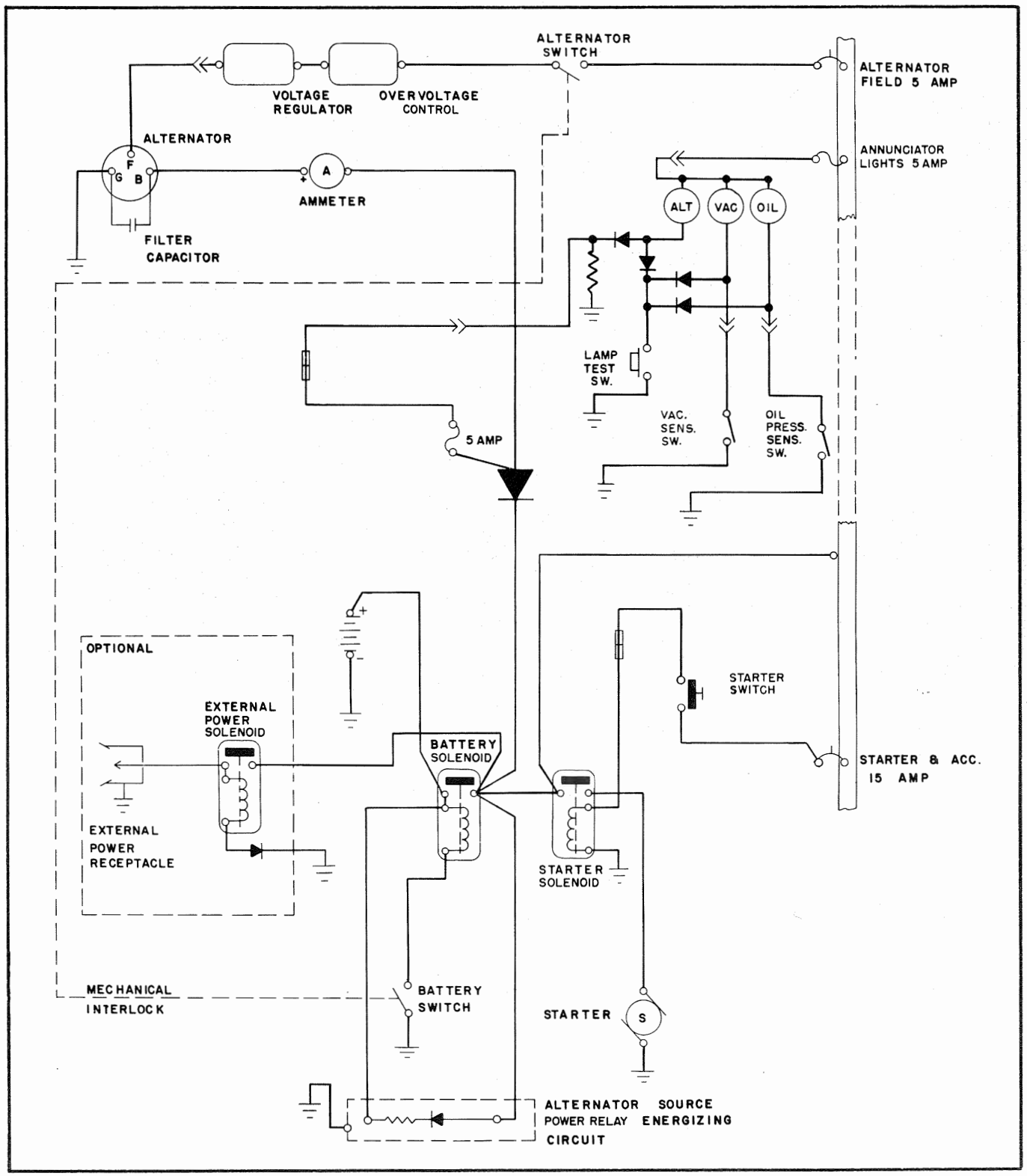
Optional electrical accessories include the navigation lights, an anti-collision light, instrument panel lighting, and cabin courtesy lights.

WARNING

Strobe lights should not be operating when flying through overcast and clouds since reflected light can produce spacial disorientation. Do not operate strobe lights in close proximity to ground, during takeoff and landing.

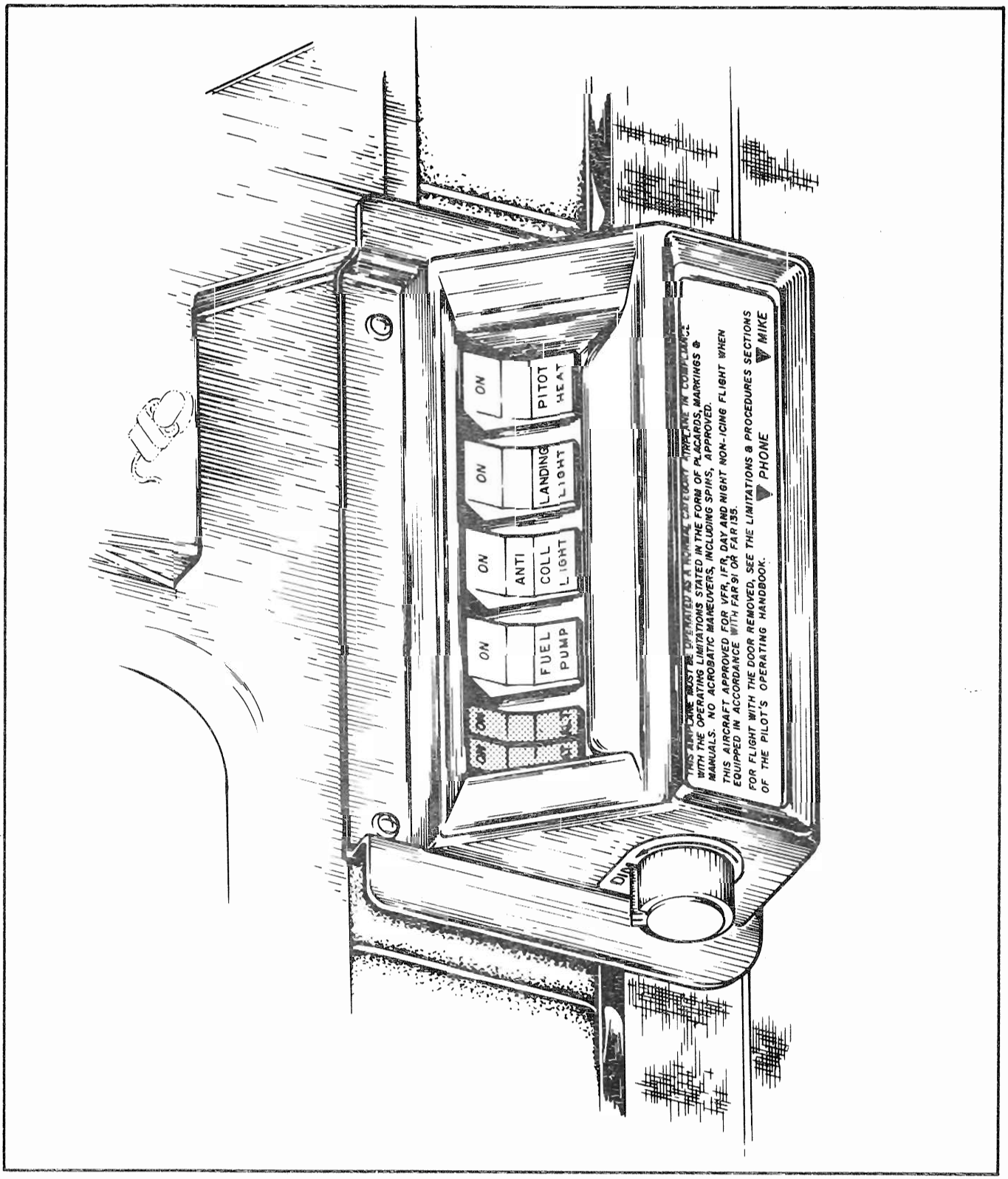
The cabin courtesy light system consists of a forward entrance light located above the cockpit door and a rear entrance light which replaces the aft left reading light over the cabin door. These lights are operated individually with switches which are incorporated as part of each light assembly. The courtesy light circuit is independent of the aircraft master switch; therefore, the lights can be operated regardless of the position of the master switch. Unless the engine is running, the courtesy lights should not be left on for extended time periods, as battery depletion could result.

Circuit provisions are made to handle the addition of communications and navigational equipment.



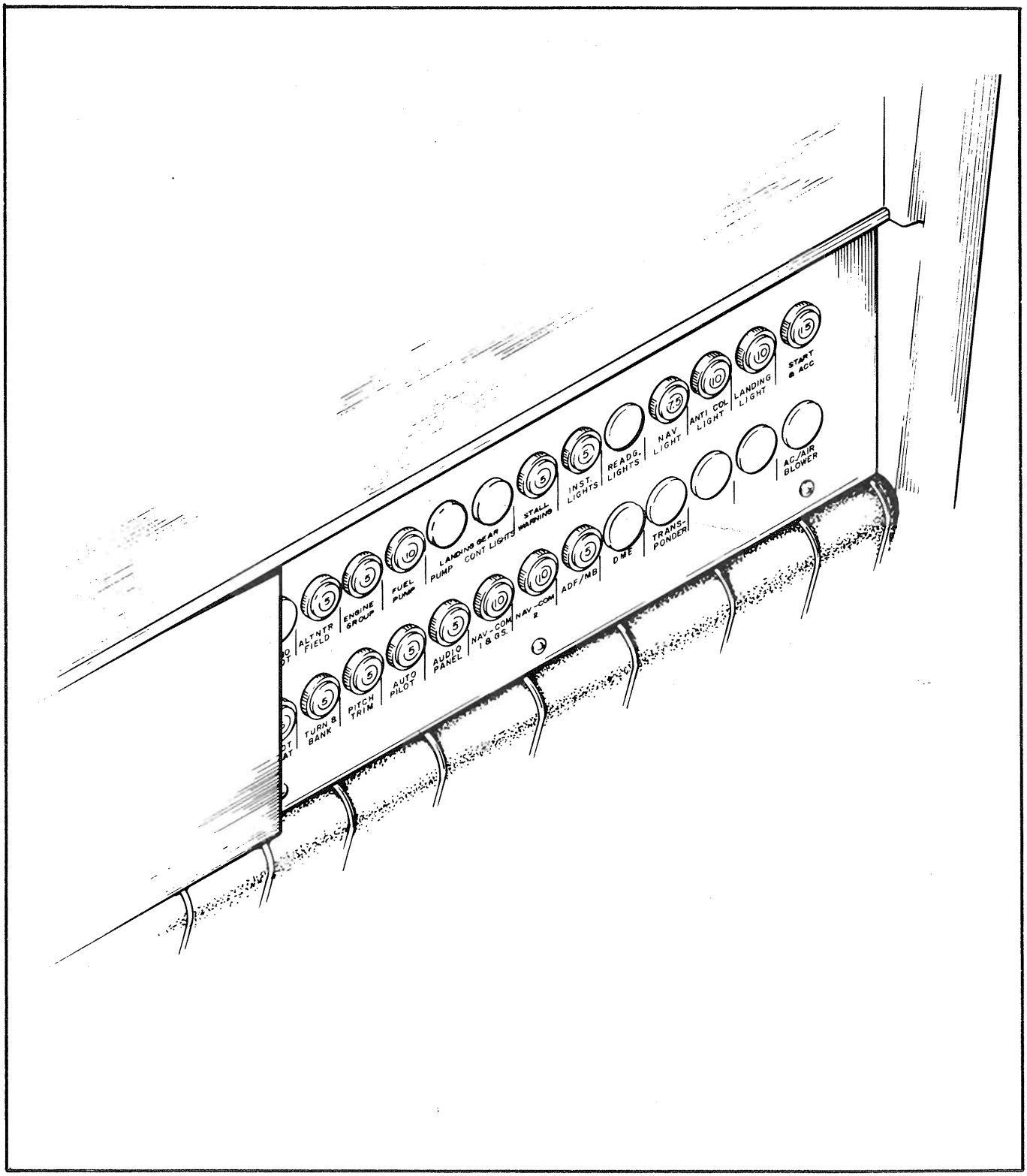
ALTERNATOR AND STARTER SCHEMATIC

Figure 7-11



SWITCH PANEL

Figure 7-13



CIRCUIT BREAKER PANEL

Figure 7-15

The ammeter in the alternator system displays in amperes the load placed on the alternator. It does not indicate battery discharge. With all electrical equipment off (except the master switch) the ammeter will be indicating the amount of charging current demanded by the battery. As each item of electrical equipment is turned on, the current will increase to a total appearing on the ammeter. This total includes the battery. The average continuous load for night flight, with radios on, is about 30 amperes. This 30 ampere value, plus approximately 2 amperes for a fully charged battery, will appear continuously under these flight conditions.

The master switch is a split switch with the left half operating the master relay and the right half energizing the alternator. This switch is interlocked so that the alternator cannot be operated without the battery. For normal operation, be sure that both halves are turned on.

If no output is indicated by the ammeter during flight, reduce the electrical load by turning off all unnecessary electrical equipment. Check both the 5 ampere field breaker and the 60 ampere output breaker and reset if open. If neither circuit breaker is open, turn off the alternator switch for 1 second to reset the overvoltage relay. If the ammeter continues to indicate no output, turn off the alternator switch; maintain a minimum electrical load; and terminate the flight as soon as practical.

7.19 VACUUM SYSTEM

The vacuum system employed to operate the gyro instruments includes an engine-driven dry vacuum pump, a vacuum regulator valve, and the tubing necessary to complete the system.

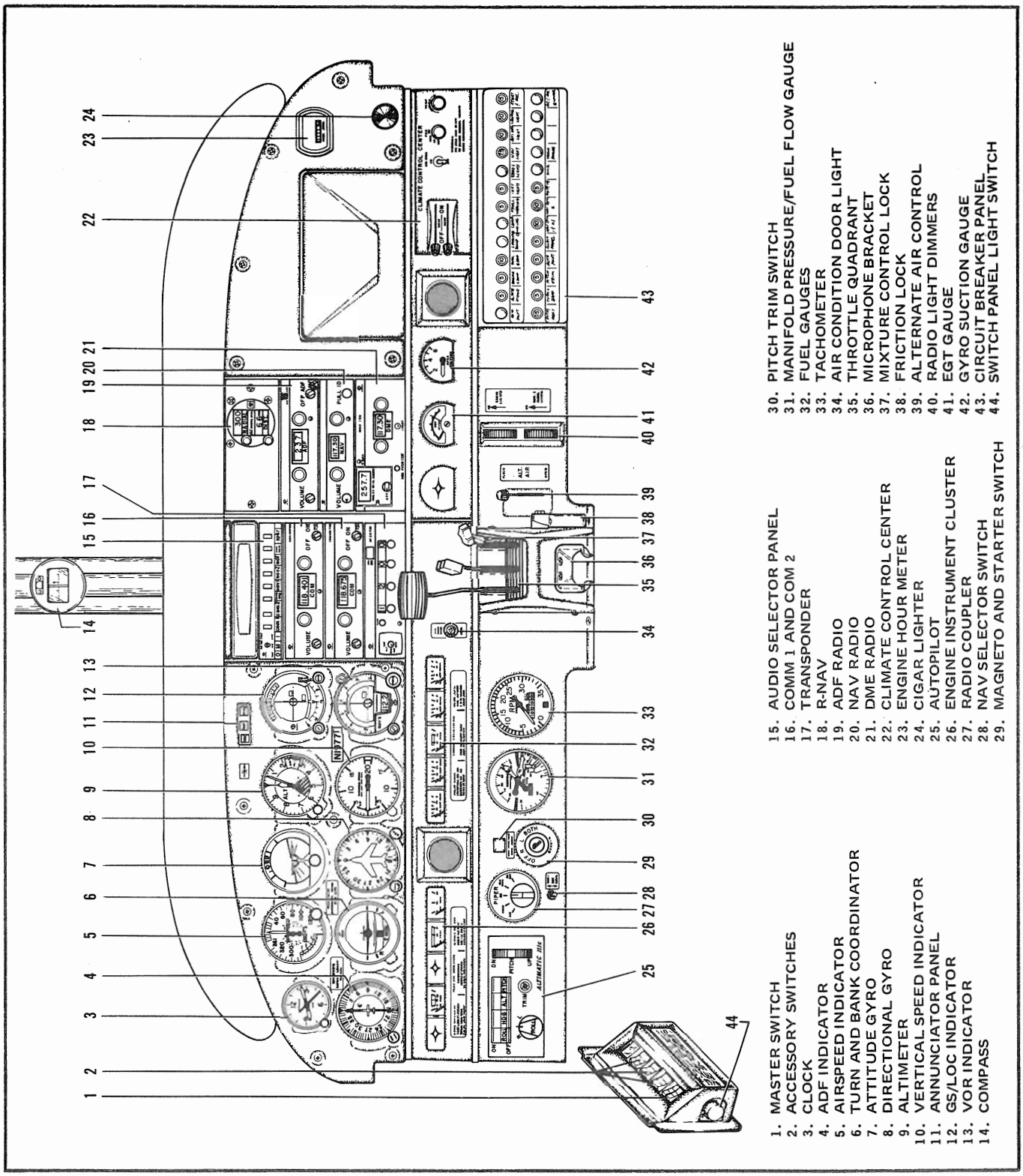
The vacuum gauge is mounted on the right side of the instrument panel. The gauge is calibrated in inches of mercury and indicates the amount of suction created by the engine-driven vacuum pump. As the system filter becomes clogged or the lines obstructed, the gauge will show a decrease in pressure (a low vacuum indicator light is provided in the annunciator panel). Do not reset the regulator until the filter and lines have been checked.

A vacuum regulator valve is incorporated in the system to control vacuum pressure to the gyro instruments. The regulator valve is located under the instrument panel. Access to the valve for maintenance and adjustment is gained from below the instrument panel. The regulator should be set so that the vacuum gauge reads $5.0 \pm .1$ inches of mercury with the engine running at medium RPM after warm-up.

7.21 INSTRUMENT PANEL

The instrument panel of the Cherokee Six is designed to accommodate the customary advanced flight instruments and the normally required power plant instruments (Figure 7-17). The artificial horizon and directional gyro are vacuum operated and are located in the center of the left hand instrument panel. The vacuum gauge is located on the right hand instrument panel. The turn indicator, on the left side, is electrically operated.

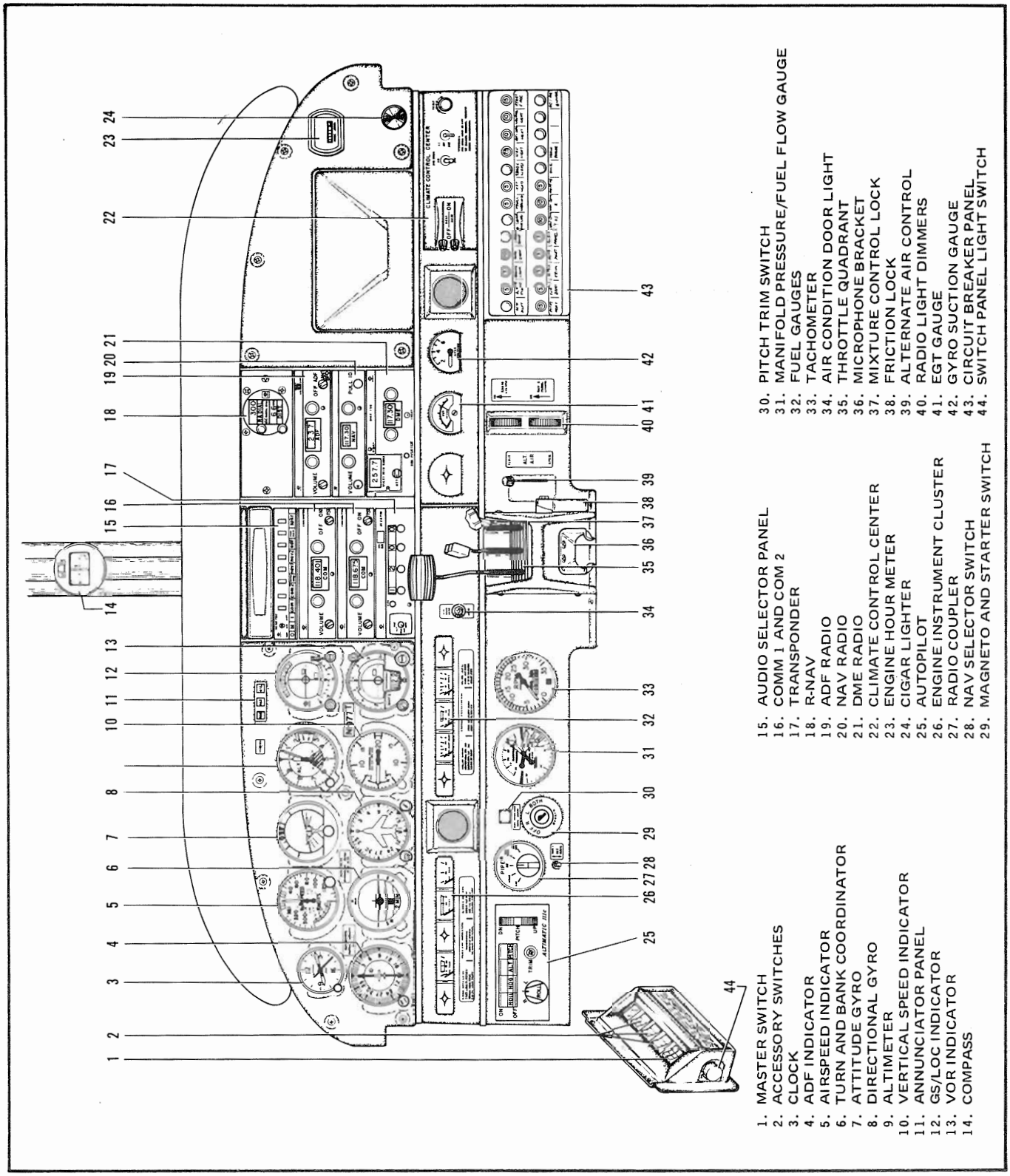
An annunciator panel is mounted in the upper instrument panel to warn the pilot of a possible malfunction in the alternator, oil pressure, or vacuum systems.



INSTRUMENT PANEL (SERIAL NOS. 32-7740001 THROUGH 32-7840202)

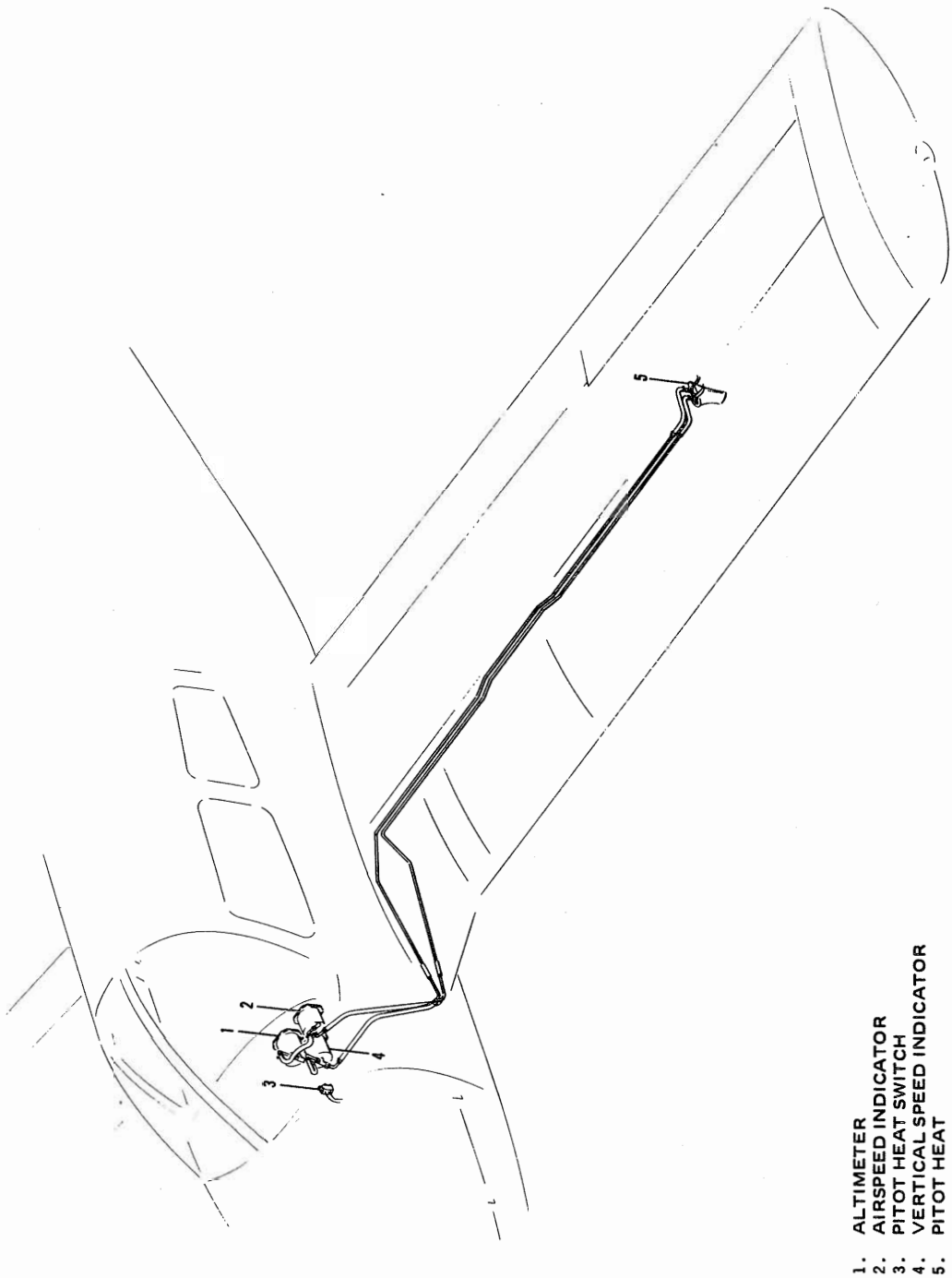
Figure 7-17

THIS PAGE INTENTIONALLY LEFT BLANK



INSTRUMENT PANEL (SERIAL NOS. 32-7940001 AND UP)

Figure 7-17a



PITOT-STATIC SYSTEM

Figure 7-19

7.23 PITOT-STATIC SYSTEM

The system supplies both pitot and static pressure for the airspeed indicator, altimeter and vertical speed indicator when installed. (See Figure 7-19.)

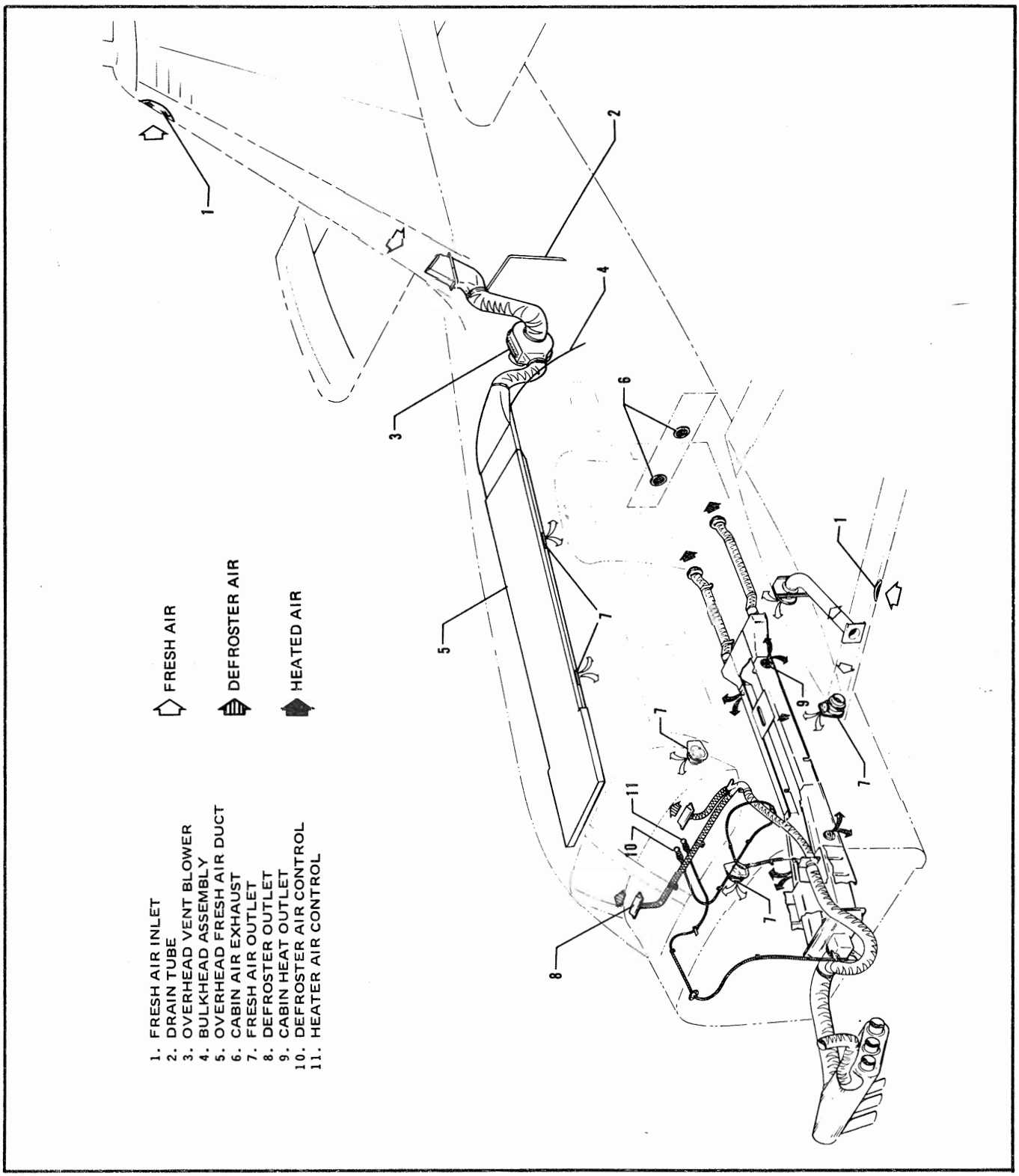
Pitot and static pressure are picked up by the pitot head on the bottom of the left wing. An optional heated pitot head, which alleviates problems with icing or heavy rain, is available. The switch for pitot heat is located on the electrical switch panel to the pilot's left.

An alternate static source is available as optional equipment. The control valve is located below the left side of the instrument panel. When the valve is set in the alternate position, the altimeter, vertical speed indicator and airspeed indicator will be using cabin air for static pressure. The storm window and cabin vents must be closed and the cabin heater and defroster must be on during alternate static source operation. The altimeter error is less than 50 feet unless otherwise placarded.

To prevent bugs and water from entering the pitot and static pressure holes when the airplane is parked, a cover should be placed over the pitot head. A partially or completely blocked pitot head will give erratic or zero readings on the instruments.

NOTE

During preflight, check to make sure the pitot cover is removed.



HEATING AND VENTILATING SYSTEM

Figure 7-21

7.25 HEATING AND VENTILATING SYSTEM

Heat for the cabin interior and the defroster system (Figure 7-21) is drawn from a heater muff attached to the exhaust system. Controls for these systems are located on the lower right side of the instrument panel.

NOTE

If unusual odors are detected, turn off the heat and inspect the system for leaks.

Fresh air inlets are located in the leading edge of each wing at the intersection of the tapered and straight sections, and in the leading edge of the fin. Two adjustable outlets are located on each side of the cabin, one forward and one aft of the front seat near the floor. There are also adjustable outlets above each seat. In airplanes without air conditioning, an optional blower may be added to the overhead vent system to aid in the circulation of cabin air.

7.27 CABIN FEATURES

For ease of entry and exit and for pilot and passenger comfort, the front seats are adjustable fore and aft. All standard seats recline and have armrests and are available with optional headrests. The front seats can be equipped with optional vertical adjustment. The center and rear seats are easily removed for additional cargo space.

NOTE

To remove the center seats, retainers securing the back legs of the seats must be unlocked. This is accomplished on earlier models by turning the slotted head aft of each back leg ninety degrees with a coin or a screwdriver. In the locked position, the slot on the head runs fore to aft. Releasing the retainers on later models is accomplished by depressing the plunger behind each rear leg. Any time the seats are installed in the airplane, the retainers should be in the locked position. To remove the rear seats, depress the plunger behind each front leg and slide seat to rear.

An optional jump seat can be installed between the two middle seats to give the airplane a seven-place capacity.

Single strap shoulder harnesses controlled by inertia reels are standard equipment for the front seats and are offered as optional equipment for the third, fourth, fifth and sixth seats, but not for the seventh seat. The shoulder strap is routed over the shoulder adjacent to the windows and attached to the lap belt in the general area of the person's inboard hip.

The inertia reel should be checked by tugging sharply on the strap. The reel will lock in place under this test and prevent the strap from extending. Under normal movement, the strap will extend and retract as required.

An optional club seating interior is also available. In the club seating interior the center seats face aft. These seats are equipped with lap belts only. Removal of the seats is accomplished by removing the two bolts holding the aft attach points and sliding the seat aft.

An optional refreshment console is located between the center seats. It is removed in an identical manner to the center seats.

An optional cabin work table, serving the two seats on the right side of the passenger cabin, is offered to the club seating arrangement. The table must be stowed during takeoff and landing. If the table is to be used, it should be set up after a level cruise is established.

To remove the cabin work table from the aft baggage compartment, unlock the stud located on the bottom of the close-out bulkhead. Loosen the white tie-down strap and remove the table from the mounting brackets by lifting the table two inches straight up until it clears the mounting brackets.Do not twist the table while it is in the brackets.

To install the cabin work table during flight, hold the table in place and tilt the free end of the table upward 30° until the lobed upper knobs on the table supports align with the top holes of the escutcheons located below the right cabin window trim. Hold the upper lobes in place and lower the free end of the table to the level work position. The retaining springs will click when secure.

To stow the cabin work table, remove the table by lifting the free end of the table upward to disengage the bottom lobes of the table supports. Lift until the top support lobes disengage at approximately 30° of tilt and remove the table. Position the table in the stowage area and, with the table work surface facing forward, place the slots in the table support into the receptacle clips mounted on the hat shelf. Make sure the white tie-down strap is not behind the table. With the table fully placed in the clips, bring the white tie-down strap across the face of the table and lock over the stud located on the bottom of the close-out bulkhead.

7.29 BAGGAGE AREA

The airplane has two separate baggage areas, each with a 100 pound capacity. An 8 cubic foot forward luggage compartment, located just aft of the firewall, is accessible through a 16 x 22 inch door on the right side of the fuselage. A 17.3 cubic foot aft compartment is located behind the fifth and sixth seats and is accessible during flight from inside the cabin.

An automatic forward baggage light feature is available which utilizes a magnetic reed switch and a magnet for activation. The switch and magnet are mounted just above the hinge line of the forward baggage door.

Opening the baggage door fully causes activation of the switch which illuminates the baggage light. The baggage light is independent of the aircraft master switch; therefore, the light will illuminate regardless of the position of the master switch. The baggage door should not be left open for extended time periods, as battery depletion could result.

NOTE

It is the pilot's responsibility to be sure when the baggage is loaded that the airplane's C.G. falls within the allowable C.G. range. (See Weight and Balance Section.)

7.31 STALL WARNING

An approaching stall is indicated by a stall warning indicator which is activated between five and ten knots above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall. Stall speeds are shown on graphs in the Performance Charts Section. The stall warning indicator is a continuous sounding horn located behind the instrument panel. The stall warning indicator is activated by a lift detector installed on the leading edge of the left wing. During preflight, the stall warning system should be checked by turning the master switch "ON," lifting the detector and checking to determine if the indicator is actuated.

7.33 FINISH

All exterior surfaces are primed with etching primer and finished with acrylic lacquer. To keep the finish attractive looking, economy size spray cans of touch-up paint are available from Piper Dealers.

7.35 AIR CONDITIONING*

The air conditioning system is a recirculating air system. The major components include an evaporator, a condenser, a compressor, a blower, switches and temperature controls.

The evaporator is located behind the rear baggage compartment. This cools the air used for the air conditioning system.

The condenser is mounted on a retractable scoop located on the bottom of the fuselage and to the rear of the baggage compartment area. The scoop extends when the air conditioner is ON and retracts to a flush position when the system is OFF.

The compressor is mounted on the forward right underside of the engine. It has an electric clutch which automatically engages or disengages the compressor to the belt drive system of the compressor.

An optional electric blower is mounted on the aft side of the rear cabin panel. Air from the baggage area is drawn through the evaporator by the blower and distributed through an overhead duct to individual outlets located adjacent to each occupant.

The switches and temperature control are located on the lower right side of the instrument panel in the climate control center panel. The temperature control regulates the temperature of the cabin. Turning the control clockwise increases cooling; counterclockwise decreases cooling.

The fan speed switch and the air conditioning ON-OFF switch are inboard of the temperature control. The fan can be operated independently of the air conditioning; however, the fan must be on for air conditioner operation. Turning either switch off will disengage the compressor clutch and retract the condenser door. Cooling air should be felt within one minute after the air conditioner is turned on.

NOTE

If the system is not operating in 5 minutes, turn the system OFF until the fault is corrected.

The fan switch allows operation of the fan with the air conditioner turned OFF to aid in cabin air circulation. On early models "LOW", "MED" or "HIGH" can be selected to direct a flow of air through the air conditioner outlets in the overhead duct. On later models a toggle switch marked "HI", "OFF" or "LO" is used for this function. The outlets can be adjusted or turned of individually.

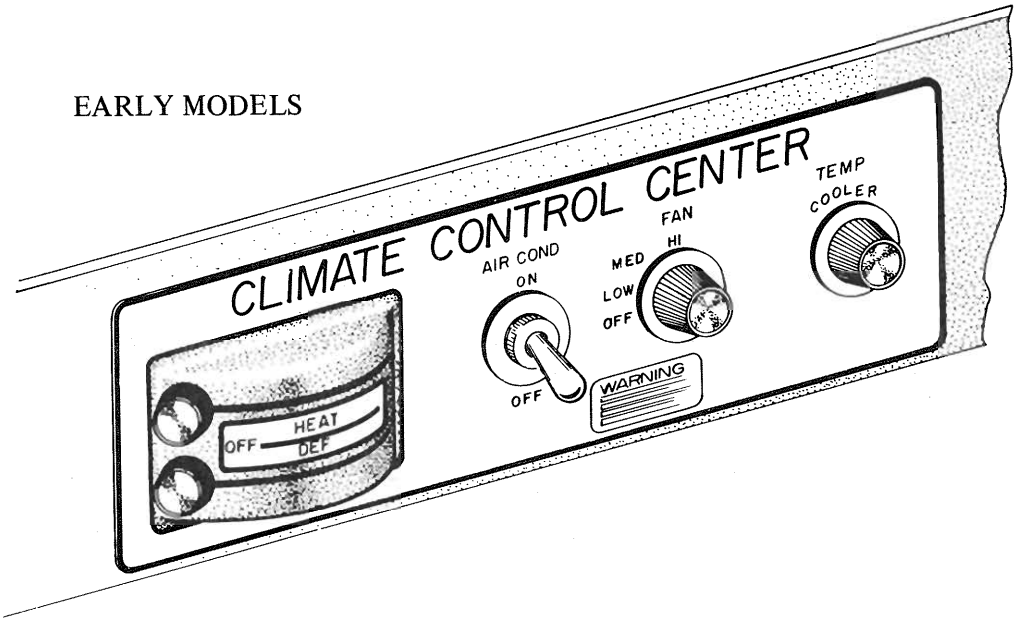
The condenser door light is located to the right of the engine instrument cluster in front of the pilot. The door light illuminates when the door is open and is off when the door is closed.

A circuit breaker on the circuit breaker panel protects the air conditioning electrical system.

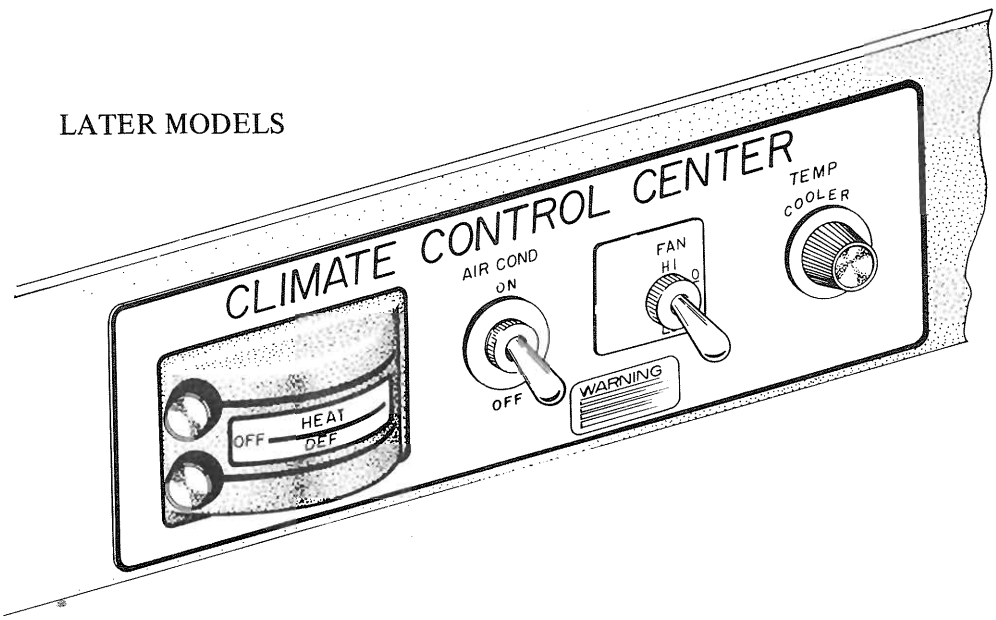
Whenever the throttle is in the full forward position, it actuates a micro switch which disengages the compressor and retracts the scoop. This allows maximum power and maximum rate of climb. The fan continues to operate and the air will remain cool for about one minute. When the throttle is retarded approximately 1/4 inch, the clutch will engage, the scoop will extend, and the system will again supply cool, dry air.

*Optional equipment

EARLY MODELS



LATER MODELS



CLIMATE CONTROL CENTER

Figure 7-23

7.37 PIPER EXTERNAL POWER*

An optional starting installation known as Piper External Power (PEP) is accessible through a receptacle located on the left side of the nose section aft of the cowling. An external battery can be connected to the socket, thus allowing the operator to crank the engine without having to gain access to the airplane's battery.

7.39 EMERGENCY LOCATOR TRANSMITTER*

The Emergency Locator Transmitter (ELT) when installed, is located in the aft portion of the fuselage just below the stabilator leading edge and is accessible through a plate on the right side of the fuselage. This plate is attached with slotted-head nylon screws for ease of removal; these screws may be readily removed with a variety of common items such as a dime, a key, a knife blade, etc. If there are no tools available in an emergency the screw heads may be broken off by any means. The ELT is an emergency locator transmitter which meets the requirements of FAR 91.52.

A battery replacement date is marked on the transmitter to comply with FAA regulations, the battery must be replaced on or before this date. The battery must also be replaced if the transmitter has been used in an emergency situation or if the accumulated test time exceeds one hour, or if the unit has been inadvertently activated for an undetermined time period.

NOTE

If for any reason a test transmission is necessary, the test transmission should be conducted only in the first five minutes of any hour and limited to three audio sweeps. If the tests must be made at any other time, the tests should be coordinated with the nearest FAA tower or flight service station.

NARCO ELT 10 OPERATION

On the ELT unit itself is a three position switch placarded "ON," "OFF" and "ARM." The ARM position sets the ELT so that it will transmit after impact and will continue to transmit until its battery is drained. The ARM position is selected when the ELT is installed in the airplane and it should remain in that position.

To use the ELT as a portable unit in an emergency, remove the cover and unlatch the unit from its mounting base. The antenna cable is disconnected by a left quarter-turn of the knurled nut and a pull. A sharp tug on the two small wires will break them loose. Deploy the self-contained antenna by pulling the plastic tab marked "PULL FULLY TO EXTEND ANTENNA." Move the switch to ON to activate the transmitter.

In the event the transmitter is activated by an impact, it can only be turned off by moving the switch on the ELT unit to OFF. Normal operation can then be restored by pressing the small clear plastic reset button located on the top of the front face of the ELT and then moving the switch to ARM.

A pilot's remote switch located on the left side panel is provided to allow the transmitter to be turned on from inside the cabin. The pilot's remote switch is placarded "ON" and "ARMED." The switch is normally in the ARMED position. Moving the switch to ON will activate the transmitter. Moving the switch back to the ARMED position will turn off the transmitter only if the impact switch has not been activated.

*Optional Equipment

The ELT should be checked to make certain the unit has not been activated during the ground check. Check by selecting 121.50 MHz on an operating receiver. If there is an oscillating chirping sound, the ELT may have been activated and should be turned off immediately. This requires removal of the access cover and moving the switch to OFF, then press the reset button and return the switch to ARM. Recheck with the receiver to ascertain the transmitter is silent.

CCC CIR 11-2 OPERATION

On the unit itself is a three position selector switch placarded "OFF," "ARM" and "ON." The ARM position is provided to set the unit to the automatic position so that it will transmit only after impact and will continue to transmit until the battery is drained to depletion or until the switch is manually moved to the OFF position. The ARM position is selected when the transmitter is installed at the factory and the switch should remain in that position whenever the unit is installed in the airplane. The ON position is provided so the unit can be used as a portable transmitter or in the event the automatic feature was not triggered by impact or to periodically test the function of the transmitter.

Select the OFF position when changing the battery, when rearming the unit if it has been activated for any reason, or to discontinue transmission.

NOTE

If the switch has been placed in the ON position for any reason, the OFF position has to be selected before selecting ARM. If ARM is selected directly from the ON position, the unit will continue to transmit in the ARM position.

A pilot's remote switch, located on the left side panel, is provided to allow the transmitter to be controlled from inside the cabin. The pilot's remote switch is placarded "ON," "AUTO/ARM" and "OFF/RESET." The switch is normally left in the AUTO/ARM position. To turn the transmitter off, move the switch momentarily to the OFF/RESET position. The aircraft master switch must be ON to turn the transmitter OFF. To actuate the transmitter for tests or other reasons, move the switch upward to the ON position and leave it in that position as long as transmission is desired.

The unit is equipped with a portable antenna to allow the locator to be removed from the aircraft in case of an emergency and used as a portable signal transmitter.

The locator should be checked during the ground check to make certain the unit has not been accidentally activated. Check by tuning a radio receiver to 121.50 MHz. If there is an oscillating sound, the locator may have been activated and should be turned off immediately. Reset to the ARM position and check again to insure against outside interference.

7.41 RADAR*

A weather radar system can be installed in this airplane. The basic components of this installation are a R-T/antenna and a cockpit indicator. The function of the weather radar system is to detect weather conditions along the flight path and to visually display a continuous weather outline on the cockpit indicator. Through interpretation of the advance warning given on the display, the pilot can make an early decision on the most desirable weather avoidance course.

NOTE

When operating weather avoidance radar systems inside of moderate to heavy precipitation, it is advisible to set the range scale of the radar to its lowest scale.

For detailed information on the weather radar system and for procedures to follow in operating and adjusting the system to its optimum efficiency, refer to the appropriate operating and service manuals provided by the radar system manufacturer.

WARNING

Heating and radiation effects of radar can cause serious damage to the eyes and tender organs of the body. Personnel should not be allowed within fifteen feet of the area being scanned by the antenna while the system is transmitting. Do not operate the radar during refueling or in the vicinity of trucks or containers accomodating explosives or flammables. Flashbulbs can be exploded by radar energy. Before operating the radar, direct the nose of the airplane so that the forward 120 degree sector is free of any metal objects such as other aircraft or hangers for a distance of at least 100 yards, and tilt the antenna upward 15 degrees. Do not operate the radar while the airplane is in a hangar or other enclosure.

*Optional equipment

TABLE OF CONTENTS

SECTION 8

AIRPLANE HANDLING, SERVICING AND MAINTENANCE

SECTION 8

AIRPLANE HANDLING, SERVICING AND MAINTENANCE

8.1 GENERAL

This section provides general guidelines relating to the handling, servicing and maintenance of the Cherokee Six.

Every owner should stay in close contact with his Piper dealer or distributor and Authorized Piper Service Center to obtain the latest information pertaining to his aircraft and to avail himself of the Piper Aircraft Service Back-up.

Piper Aircraft Corporation takes a continuing interest in having the owner get the most efficient use from his aircraft and keeping it in the best mechanical condition. Consequently, Piper Aircraft from time to time issues Service Bulletins, Service Letters and Service Spares Letters relating to the aircraft.

Service Bulletins are of special importance and should be complied with promptly. These are sent to the latest registered owners, distributors and dealers. Depending on the nature of the bulletin, material and labor allowances may apply, and will be addressed in the body of the Bulletin.

Service Letters deal with product improvements and service hints pertaining to the aircraft. They are sent to dealers, distributors and occasionally (at the factory's discretion) to latest registered owners, so they can properly service the aircraft and keep it up to date with the latest changes. Owners should give careful attention to the Service Letter information.

Service Spares Letters offer improved parts, kits and optional equipment which were not available originally and which may be of interest to the owner.

If an owner is not having his aircraft serviced by an Authorized Piper Service Center, he should periodically check with a Piper dealer or distributor to find out the latest information to keep his aircraft up to date.

Piper Aircraft Corporation has a Subscription Service for the Service Bulletins, Service Letters and Service Spares Letters. This service is offered to interested persons such as owners, pilots and mechanics at a nominal fee, and may be obtained through Piper dealers and distributors.

A service manual, parts catalog, and revisions to both, are available from Piper dealers or distributors. Any correspondence regarding the airplane should include the airplane model and serial number to insure proper response.

THIS PAGE INTENTIONALLY LEFT BLANK

8.3 AIRPLANE INSPECTION PERIODS

The Federal Aviation Administration (FAA) occasionally publishes Airworthiness Directives (ADs) that apply to specific groups of aircraft. They are mandatory changes and are to be complied with within a time limit set by the FAA. When an AD is issued, it is sent to the latest registered owner of the affected aircraft and also to subscribers of the service. The owner should periodically check with his Piper dealer or A & P mechanic to see whether he has the latest issued AD against his aircraft.

Piper Aircraft Corporation provides for the initial and first 50-hour inspection, at no charge to the owner. The Owner Service Agreement which the owner receives upon delivery of the aircraft should be kept in the aircraft at all times. This identifies him to authorized Piper dealers and entitles the owner to receive service in accordance with the regular service agreement terms. This agreement also entitles the transient owner full warranty by any Piper dealer in the world.

One hundred hour inspections are required by law if the aircraft is used commercially. Otherwise this inspection is left to the discretion of the owner. This inspection is a complete check of the aircraft and its systems, and should be accomplished by a Piper Authorized Service Center or by a qualified aircraft and power plant mechanic who owns or works for a reputable repair shop. The inspection is listed, in detail, in the inspection report of the appropriate Service Manual.

An annual inspection is required once a year to keep the Airworthiness Certificate in effect. It is the same as a 100-hour inspection except that it must be signed by an Inspection Authorized (IA) mechanic or a General Aviation District Office (GADO) representative. This inspection is required whether the aircraft is operated commercially or for pleasure.

A Progressive Maintenance program is approved by the FAA and is available to the owner. It involves routine and detailed inspections at 50-hour intervals. The purpose of the program is to allow maximum utilization of the aircraft, to reduce maintenance inspection cost and to maintain a maximum standard of continuous airworthiness. Complete details are available from Piper dealers.

A spectographic analysis of the oil is available from several sources. This system, if used intelligently, provides a good check of the internal condition of the engine. For this system to be accurate, oil samples must be sent in at regular intervals, and induction air filters must be cleaned or changed regularly.

8.5 PREVENTIVE MAINTENANCE

The holder of a Pilot Certificate issued under FAR Part 61 may perform certain preventive maintenance described in FAR Part 43. This maintenance may be performed only on an aircraft which the pilot owns or operates and which is not used in air carrier service. The following is a list of the maintenance which the pilot may perform:

(a) Repair or change tires and tubes.
(b) Service landing gear wheel bearings, such as cleaning, greasing or replacing.
(c) Service landing gear shock struts by adding air, oil or both.
(d) Replace defective safety wire and cotter keys.
(e) Lubrication not requiring disassembly other than removal of non-structural items such as cover plates, cowling or fairings.
(f) Replenish hydraulic fluid in the hydraulic reservoirs.
(g) Refinish the exterior or interior of the aircraft (excluding balanced control surfaces) when removal or disassembly of any primary structure or operating system is not required.
(h) Replace side windows and safety belts.
(i) Replace seats or seat parts with replacement parts approved for the aircraft.
(j) Replace bulbs, reflectors and lenses of position and landing lights.
(k) Replace cowling not requiring removal of the propeller.
(l) Replace, clean or set spark plug clearance.
(m) Replace any hose connection, except hydraulic connections, with approved replacement hoses.
(n) Remove the battery and check fluid level and specific gravity.

Although the above work is allowed by law, each individual should make a self analysis as to whether he has the ability to perform the work.

If the above work is accomplished, an entry must be made in the appropriate logbook. The entry should contain:

(a) The date the work was accomplished.
(b) Description of the work.
(c) Number of hours on the aircraft.
(d) The certificate number of pilot performing the work.
(e) Signature of the individual doing the work.

8.7 AIRPLANE ALTERATIONS

If the owner desires to have his aircraft modified, he must obtain FAA approval for the alteration. Major alterations accomplished in accordance with Advisory Circular 43.13-2, when performed by an A & P mechanic, may be approved by the local FAA office. Major alterations to the basic airframe or systems not covered by AC 43.13-2 require a Supplemental Type Certificate.

The owner or pilot is required to ascertain that the following Aircraft Papers are in order and in the aircraft.

(a) To be displayed in the aircraft at all times:
  (1) Aircraft Airworthiness Certificate Form FAA-8100-2.
  (2) Aircraft Registration Certificate Form FAA-8050-3.
  (3) Aircraft Radio Station License if transmitters are installed.

(b) To be carried in the aircraft at all times:
  (1) Pilot's Operating Handbook.
  (2) Weight and Balance data plus a copy of the latest Repair and Alteration Form FAA-337, if applicable.
  (3) Aircraft equipment list.

Although the aircraft and engine logbooks are not required to be in the aircraft, they should be made available upon request. Logbooks should be complete and up to date. Good records will reduce maintenance cost by giving the mechanic information about what has or has not been accomplished.

8.9 GROUND HANDLING

(a) Towing

The airplane may be moved on the ground by the use of the nose wheel steering bar that is stowed in the rear baggage compartment or by power equipment that will not damage or excessively strain the nose gear steering assembly. Towing lugs are incorporated as part of the nose gear fork.

CAUTION

When towing with power equipment, do not turn the nose gear beyond its steering radius in either direction, as this will result in damage to the nose gear and steering mechanism.

CAUTION

Do not tow the airplane when the controls are secured.

In the event towing lines are necessary, ropes should be attached to both main gear struts as high up on the tubes as possible. Lines should be long enough to clear the nose and/or tail by not less than fifteen feet, and a qualified person should ride in the pilot's seat to maintain control by use of the brakes.

(b) Taxiing

Before attempting to taxi the airplane, ground personnel should be instructed and approved by a qualified person authorized by the owner. Engine starting and shut-down procedures as well as taxi techniques should be covered. When it is ascertained that the propeller back blast and taxi areas are clear, power should be applied to start the taxi roll, and the following checks should be performed:

(1) Taxi a few feet forward and apply the brakes to determine their effectiveness.
(2) Taxi with the propeller set in low pitch, high RPM setting.
(3) While taxiing, make slight turns to ascertain the effectiveness of the steering.
(4) Observe wing clearance when taxiing near buildings or other stationary objects. If possible, station an observer outside the airplane.
(5) When taxiing over uneven ground, avoid holes and ruts.
(6) Do not operate the engine at high RPM when running up or taxiing over ground containing loose stones, gravel, or any loose material that may cause damage to the propeller blades.

(c) Parking

When parking the airplane, be sure that it is sufficiently protected from adverse weather conditions and that it presents no danger to other aircraft. When parking the airplane for any length of time or overnight, it is suggested that it be moored securely.

(1) To park the airplane, head it into the wind if possible.
(2) Set the parking brake by pulling back on the brake lever and depressing the knob on the handle. To release the parking brake, pull back on the handle until the catch disengages; then allow the handle to swing forward.

CAUTION

Care should be taken when setting brakes that are overheated or during cold weather when accumulated moisture may freeze a brake.

(3) Aileron and stabilator controls should be secured with the front seat belt and chocks used to properly block the wheels.

(d) Mooring

The airplane should be moored for immovability, security and protection. The following procedures should be used for the proper mooring of the airplane:

(1) Head the airplane into the wind if possible.
(2) Retract the flaps.
(3) Immobilize the ailerons and stabilator by looping the seat belt through the control wheel and pulling it snug.
(4) Block the wheels.
(5) Secure tie-down ropes to the wing tie-down rings and to the tail skid at approximately 45 degree angles to the ground. When using rope of non-synthetic material, leave sufficient slack to avoid damage to the airplane should the ropes contract.

CAUTION

Use bowline knots, square knots or locked slip knots. Do not use plain slip knots.

NOTE

Additional preparations for high winds include using tie-down ropes from the landing gear forks and securing the rudder.

(6) Install a pitot head cover if available. Be sure to remove the pitot head cover before flight.
(7) Cabin and baggage doors should be locked when the airplane is unattended.

8.11 ENGINE AIR FILTER

(a) Removing Engine Air Filter

(1) Remove the access door on left side of lower cowl.
(2) Remove the wing nuts securing the filter. Remove the filter.

(b) Cleaning Engine Air Filter

The injector air filter must be cleaned at least once every 50 hours, and more often, even daily, when operating in dusty conditions. Extra filters are inexpensive, and a spare should be kept on hand for use as a rapid replacement.

To clean the filter:

(1) Tap the filter gently to remove dirt particles, being careful not to damage the filter. DO NOT wash the filter in any liquid. DO NOT attempt to blow out dirt with compressed air.
(2) If the filter is excessively dirty or shows any damage, replace it immediately.
(3) Wipe the filter housing with a clean cloth soaked in unleaded gasoline. When the housing is clean and dry, install the filter.

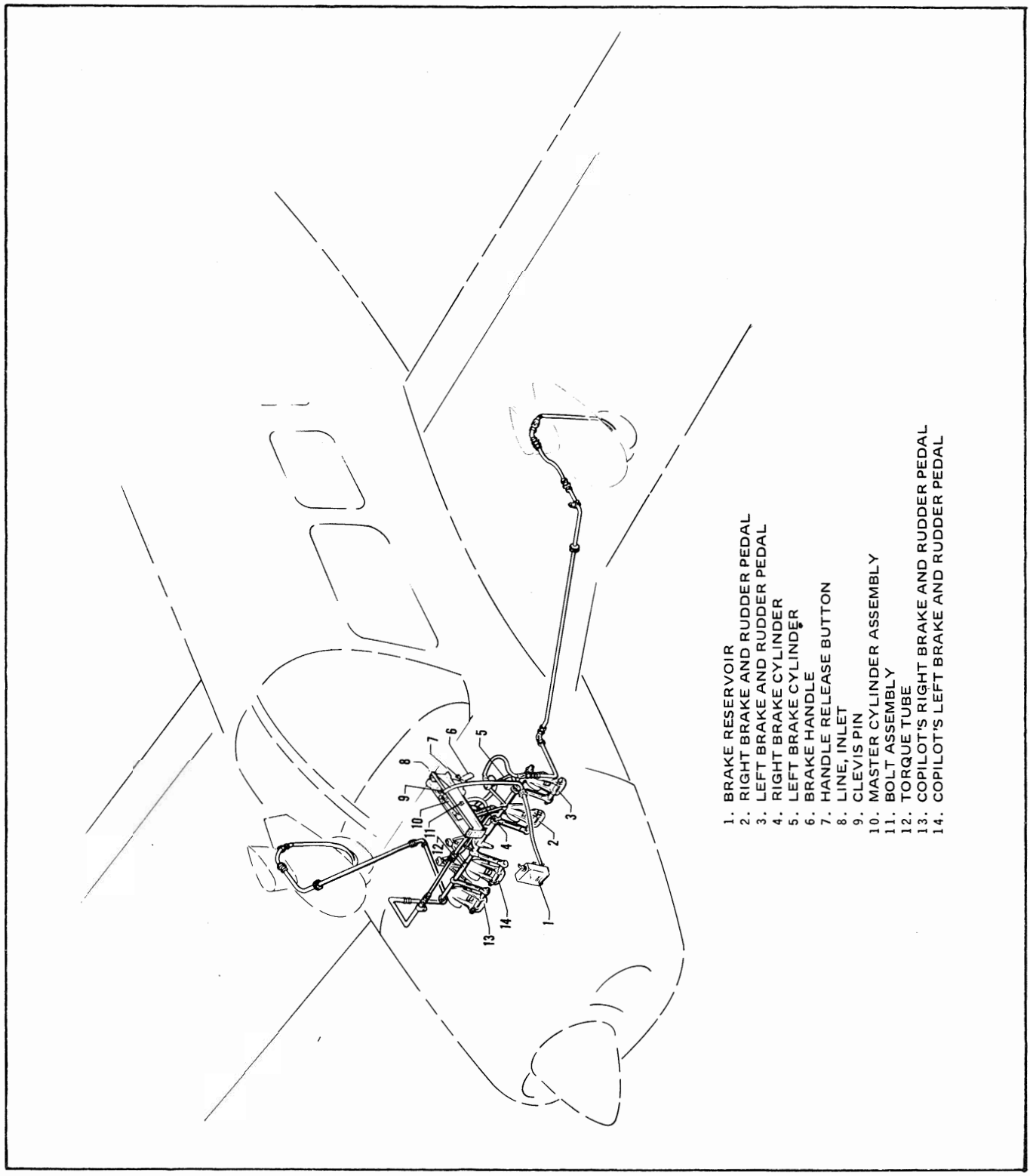
(c) Installation Of Engine Air Filter

After cleaning or when replacing the filter, install the filter in the reverse order of removal.

8.13 BRAKE SERVICE

The brake system is filled with MIL-H-5606 (petroleum base) hydraulic brake fluid. The fluid level should be checked periodically or at every 100 hour inspection and replenished when necessary. The brake reservoir is located on the left side of the fire wall in the engine compartment. If the entire system must be refilled, fill with fluid under pressure from the brake end of the system. This will eliminate air from the system.

No adjustment of the brake clearances is necessary. If after extended service brake blocks become excessively worn, they should be replaced with new segments.



BRAKE SYSTEM

Figure 8-1

8.15 LANDING GEAR SERVICE

The landing gears use Cleveland Aircraft Products 6.00 x 6 wheels. All three tires are 6.00 x 6 tube type. The main gear tires are 6 ply rating and the nose gear tire is 4 or 6 ply rating. (See Section 8.23.)

Main wheels are removed by taking off the hub cap, axle nut, and the two bolts holding the brake segment in place, after which the wheel slips easily from the axle.

The nose wheel is removed by taking off the axle nut and washer from one side, sliding out the axle rod and plugs, lightly tapping out the axle tube, and then removing the wheel and spacer tubes from between the fork. Wheels are replaced by reversing the procedure.

Tires are removed from the wheels by deflating the tire, removing the through bolts, and separating the wheel halves.

Landing gear oleo struts should be checked for proper strut exposure and visible leaks. The required extensions for the struts under normal static load (empty weight of airplane plus full fuel and oil) are 3-1/4 inches for the nose gear and 4-1/2 inches for the main gear. If the strut exposure is below that required, it should be determined whether air or oil is needed by first raising the airplane on jacks. Depress the valve core to allow air to escape from the strut housing chamber. Remove the filler plug and slowly raise the strut to full compression. If the fluid is then visible up to the bottom of the filler plug hole, only proper inflation with air is required.

If fluid is below the bottom of the filler plug hole, oil should be added. Replace the plug with the valve core removed. Then attach a clear plastic hose to the valve stem of the filler plug and submerge the free end in a container of hydraulic fluid (MIL-H-5606). Fully compress and extend the strut several times, thus drawing fluid into the strut chamber and expelling air. To allow fluid to enter the bottom chamber of the nose gear strut housing, it is necessary to disconnect the torque link assembly and allow the strut to extend a full 10 inches. (The nose gear torque links need not be disconnected.) DO NOT allow the strut to extend beyond 12 inches. When air bubbles cease to flow through the hose, fully compress the strut, remove the filler plug, and again check the fluid level. When the fluid level is correct, disconnect the hose, reinstall the valve core, the filler plug, and the main gear torque links.

With the fluid in the strut housing at the proper level, attach a strut pump to the air valve. With the airplane on the ground under normal static load, inflate the oleo strut to the proper strut exposure.

In jacking the airplane for landing gear or other service, two hydraulic jacks and a tail stand should be used. At least 350 pounds of ballast should be placed on the base of the tail stand before jacking up the airplane. The hydraulic jacks are placed under the jack points on the underside of the wings, and the airplane is jacked up until the tail stand can be attached to the tail skid. After attaching the tail stand and adding ballast, the jacking can be continued until the airplane is at the desired height.

8.17 PROPELLER SERVICE

The spinner and backing plate should be cleaned and inspected for cracks frequently. Before each flight the propeller should be inspected for nicks, scratches, and corrosion. If found, they should be repaired as soon as possible by a rated mechanic, since a nick or scratch causes an area of increased stress which can lead to serious cracks or the loss of a propeller tip. The back face of the blades should be painted when necessary with flat black paint to retard glare. To prevent corrosion, the surface should be cleaned and waxed periodically.

8.19 OIL REQUIREMENTS

The oil capacity of the Lycoming IO-540 series engine is 12 quarts, and the minimum safe quantity is 2-3/4 quarts. It is recommended that the oil be changed every 50 hours and sooner under unfavorable operating conditions. The following grades are recommended for the specified temperatures:

Average Ambient Air Temperature For Starting	Single Viscosity Grade	Multi-Viscosity Grades
Above 60°F	SAE 50	SAE 40 or SAE 50
30° to 90°F	SAE 40	SAE 40
0° to 70°F	SAE 30	SAE 40 or 20W-30
Below 10°F	SAE 20	SAE 20W-30

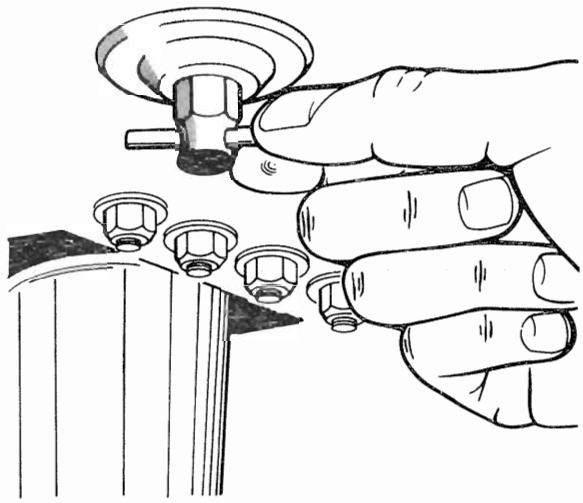
8.21 FUEL SYSTEM

(a) Servicing Fuel System

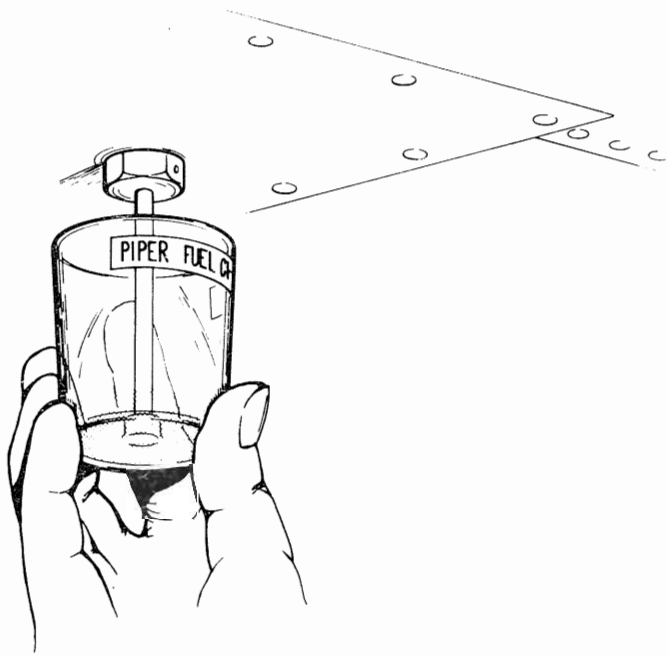
At every 50 hour inspection, the fuel screens in the strainer and in the injector must be cleaned. The screen in the injector is located in the housing where the fuel line connects to the injector. The fuel strainer is located under the floor panel and is accessible for cleaning through an access plate on the underside of the fuselage. After cleaning, a small amount of grease applied to the gasket will facilitate reassembly.

(b) Fuel Requirements

Aviation grade fuel with a minimum octane of 100/130 is specified for this airplane. Since the use of lower grades can cause serious engine damage in a short period of time, the engine warranty is invalidated by the use of lower octanes. Refer to the latest issue of Lycoming Service Instructions No. 1070 for approved alternate grade fuels.



SERIAL NUMBERS 32-7740001 THROUGH 32-7840202



SERIAL NUMBERS 32-7940001 AND UP

FUEL DRAIN

Figure 8-3

(c) Filling Fuel Tanks

Serial Numbers 32-7740001 through 32-7840202:

Observe all safety precautions required when handling gasoline. Fill the fuel tanks through the filler located on the forward slope of the wings and on the wing tips. Each wing tank holds a maximum of 25 U.S. gallons, and each wing tip tank holds a maximum of 17 U.S. gallons. When using less than the standard 84 gallon capacity, fuel should be distributed equally between each side, with the wing tip tanks filled first.

Serial Numbers 32-7940001 and up:

Observe all safety precautions required when handling gasoline. Fill the fuel tanks through the filler located on the forward slope of the wings. Each wing holds a maximum of 49 U. S. gallons. When using less than standard 98 gallon capacity, fuel should be distributed equally between each side.

(d) Draining Fuel Strainer, Sumps and Lines

The fuel tank sumps and strainer should be drained before the first flight of the day and after refueling to avoid the accumulation of water and sediment. Each fuel tank has an individual quick drain at the lower inboard corner. A fuel strainer with a fuel system quick drain is located at the lowest point in the system. Each tank sump should be drained through its individual quick drain until sufficient fuel has flowed to ensure the removal of any contaminants. The fuel strainer sump quick drain, operated by a lever inside the cabin on the right forward edge of the wing spar housing, should be opened while the fuel selector valve is moved through the tank positions. (Four tank positions on serial numbers 32-7740001 through 32-7840202 and two tank positions on serial numbers 32-7940001 and up). Enough fuel should flow at each position to allow the fuel lines and the strainer to ensure removal of contaminants. A container is provided for the checking of fuel clarity. (See Description - Airplane and Systems Section for more detailed instructions.)

CAUTION

When draining fuel, be sure that no fire hazard exists before starting the engine.

After using the fuel system quick drain, check from outside the airplane to be sure that it has closed completely and is not leaking.

(e) Draining Fuel System

Serial Numbers 32-7740001 through 32-7840202:

The bulk of the fuel may be drained by opening the individual drain on each tank. The remaining fuel may be drained through the fuel strainer. Any individual tank may be drained by closing the fuel selector valve and then draining the desired tank.

Serial Numbers 32-7940001 and up:

The bulk of the fuel may be drained by opening the individual drain on each tank. The remaining fuel may be drained through the fuel strainer.

8.23 TIRE INFLATION

For maximum service from the tires, keep them inflated to the proper pressures – 28-30 psi for the nose gear and 35-40 psi for the main gear. All wheels and tires are balanced before original installation, and the relationship of tire, tube, and wheel should be maintained upon reinstallation. Unbalanced wheels can cause extreme vibration in the landing gear; therefore, in the installation of new components, it may be necessary to rebalance the wheels with the tires mounted. When checking tire pressure, examine the tires for wear, cuts, bruises, and slippage.

8.25 BATTERY SERVICE

Access to the 12-volt battery is through a removable panel in the floor of the forward baggage compartment. The battery box has a plastic tube which is normally closed off with a cap and which should be opened occasionally to drain off any accumulation of liquid. The battery should be checked for proper fluid level. DO NOT fill the battery above the baffle plates. DO NOT fill the battery with acid - use water only. A hydrometer check will determine the percent of charge in the battery.

If the battery is not up to charge, recharge starting at a 4 amp rate and finishing with a 2 amp rate. Quick charges are not recommended.

8.27 CLEANING

(a) Cleaning Engine Compartment

Before cleaning the engine compartment, place a strip of tape on the magneto vents to prevent any solvent from entering these units.

(1) Place a large pan under the engine to catch waste.

(2) With the engine cowling removed, spray or brush the engine with solvent or a mixture of solvent and degreaser. In order to remove especially heavy dirt and grease deposits, it may be necessary to brush areas that were sprayed.

CAUTION

Do not spray solvent into the alternator, vacuum pump, starter, or air intakes.

(3) Allow the solvent to remain on the engine from five to ten minutes. Then rinse the engine clean with additional solvent and allow it to dry.

CAUTION

Do not operate the engine until excess solvent has evaporated or otherwise been removed.

(4) Remove the protective tape from the magnetos.

(5) Lubricate the controls, bearing surfaces, etc., in accordance with the Lubrication Chart in the PA-32 Service Manual.

(b) Cleaning Landing Gear

Before cleaning the landing gear, place a plastic cover or similar material over the wheel and brake assembly.

(1) Place a pan under the gear to catch waste.
(2) Spray or brush the gear area with solvent or a mixture of solvent and degreaser, as desired. Where heavy grease and dirt deposits have collected, it may be necessary to brush areas that were sprayed, in order to clean them.
(3) Allow the solvent to remain on the gear from five to ten minutes. Then rinse the gear with additional solvent and allow to dry.
(4) Remove the cover from the wheel and remove the catch pan.
(5) Lubricate the gear in accordance with the Lubrication Chart in the PA-32 Service Manual.

(c) Cleaning Exterior Surfaces

The airplane should be washed with a mild soap and water. Harsh abrasives or alkaline soaps or detergents could make scratches on painted or plastic surfaces or could cause corrosion of metal. Cover areas where cleaning solution could cause damage. To wash the airplane, use the following procedure:

(1) Flush away loose dirt with water.
(2) Apply cleaning solution with a soft cloth, a sponge or a soft bristle brush.
(3) To remove exhaust stains, allow the solution to remain on the surface longer.
(4) To remove stubborn oil and grease, use a cloth dampened with naphtha.
(5) Rinse all surfaces thoroughly.
(6) Any good automotive wax may be used to preserve painted surfaces. Soft cleaning cloths or a chamois should be used to prevent scratches when cleaning or polishing. A heavier coating of wax on the leading surfaces will reduce the abrasion problems in these areas.

(d) Cleaning Windshield and Windows

(1) Remove dirt, mud and other loose particles from exterior surfaces with clean water.
(2) Wash with mild soap and warm water or with aircraft plastic cleaner. Use a soft cloth or sponge in a straight back and forth motion. Do not rub harshly.
(3) Remove oil and grease with a cloth moistened with kerosene.

CAUTION

Do not use gasoline, alcohol, benzene, carbon tetrachoride, thinner, acetone, or window cleaning sprays.

(4) After cleaning plastic surfaces, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth. Do not use a circular motion.
(5) A severe scratch or mar in plastic can be removed by rubbing out the scratch with jeweler's rouge. Smooth both sides and apply wax.

(e) Cleaning Headliner, Side Panels and Seats

(1) Clean headliner, side panels, and seats with a stiff bristle brush, and vacuum where necessary.
(2) Soiled upholstery, except leather, may be cleaned with a good upholstery cleaner suitable for the material. Carefully follow the manufacturer's instructions. Avoid soaking or harsh rubbing.

CAUTION

Solvent cleaners require adequate ventilation.

(3) Leather should be cleaned with saddle soap or a mild hand soap and water.

(f) Cleaning Carpets

To clean carpets, first remove loose dirt with a whisk broom or vacuum. For soiled spots and stubborn stains use a noninflammable dry cleaning fluid. Floor carpets may be cleaned like any household carpet.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

SECTION 9

SUPPLEMENTS

SECTION 9

SUPPLEMENTS

9.1 GENERAL

This section provides information in the form of Supplements which are necessary for efficient operation of the airplane when equipped with one or more of the various optional systems and equipment not provided with the standard airplane.

All of the Supplements provided by this section are "FAA Approved" and consecutively numbered as a permanent part of this Handbook. The information contained in each Supplement applies only when the related equipment is installed in the airplane.

THIS PAGE INTENTIONALLY LEFT BLANK

SUPPLEMENT 1

AIR CONDITIONING INSTALLATION

SECTION 1 - GENERAL

This supplement supplies information necessary for the efficient operation of the airplane when the optional Air Conditioning system is installed. The information contained within this supplement is to be used in conjunction with the complete handbook.

This supplement has been "FAA Approved" as a permanent part of this handbook and must remain in this handbook at all times when the optional air conditioning system is installed.

SECTION 2 - LIMITATIONS

(a) To insure maximum climb performance the air conditioner must be turned "OFF" manually prior to takeoff to disengage the compressor and retract the condenser door. Also the air conditioner must be turned "OFF" manually before the landing approach in preparation for a possible go-around.

(b) Placards
In full view of the pilot, in the area of the air conditioner controls when the air conditioner is installed:

"WARNING - AIR CONDITIONER MUST BE OFF TO INSURE
NORMAL TAKEOFF CLIMB PERFORMANCE."

In full view of the pilot, to the right of the engine gauges (condenser door light):

"AIR COND DOOR
OPEN"

SECTION 3 - EMERGENCY PROCEDURES

No changes to the basic Emergency Procedures provided by Section 3 of this Pilot's Operating Handbook are necessary for this supplement.

SECTION 4 - NORMAL PROCEDURES

Prior to takeoff, the air conditioner should be checked for proper operation as follows:

(a) Check aircraft master switch "ON."
(b) Turn the air conditioner control switch to "ON" and the fan switch to one of the operating positions - the "AIR COND DOOR OPEN" warning light will turn on, thereby indicating proper air conditioner condenser door actuation.
(c) Turn the air conditioner control switch to "OFF" - the "AIR COND DOOR OPEN" warning light will go out, thereby indicating the air conditioner condenser door is in the up position.
(d) If the "AIR COND DOOR OPEN" light does not respond as specified above, an air conditioner system or indicator bulb malfunction is indicated and further investigation should be conducted prior to flight.

The above operational check may be performed during flight if an in flight failure is suspected.

The condenser door light is located to the right of the engine instrument cluster in front of the pilot. The door light illuminates when the door is open and is off when the door is closed.

SECTION 5 - PERFORMANCE

Operation of the air conditioner will cause slight decreases in cruise speed and range. Power from the engine is required to run the compressor, and the condenser door, when extended, causes a slight increase in drag. When the air conditioner is turned off there is normally no measurable difference in climb, cruise or range performance of the airplane.

NOTE

To insure maximum climb performance the air conditioner must be turned off manually before takeoff to disengage the compressor and retract the condenser door. Also the air conditioner must be turned off manually before the landing approach in preparation for a possible go-around.

Although the cruise speed and range are only slightly affected by the air conditioner operation, these changes should be considered in preflight planning. To be conservative, the following figures assume that the compressor is operating continuously while the airplane is airborne. This will be the case only in extremely hot weather.

(a) The decrease in true airspeed is approximately 5 KTS at all power settings.
(b) The decrease in range may be as much as 30 nautical miles for the 84 gallon capacity.

The climb performance is not compromised measurably with the air conditioner operating since the compressor is declutched and the condenser door is retracted, both automatically, when a full throttle position is selected. When the full throttle position is not used or in the event of a malfunction which would cause the compressor to operate and the condenser door to be extended, a decrease in rate of climb of as much as 100 fpm can be expected. Should a malfunction occur which prevents condenser door retraction when the compressor is turned off, a decrease in rate of climb of as much as 50 fpm can be expected.

THIS PAGE INTENTIONALLY LEFT BLANK

SUPPLEMENT 2

AUTOFLITE II AUTOPILOT INSTALLATION

SECTION 1 - GENERAL

This supplement supplies information necessary for the operation of the airplane when the optional AutoFlite II Autopilot is installed. The information contained within this supplement is to be used in conjunction with the complete handbook.

This supplement has been "FAA Approved" as a permanent part of this handbook and must remain in this handbook at all times when the optional AutoFlite II Autopilot is installed.

SECTION 2 - LIMITATIONS

(a) Autopilot operation prohibited above 175 KIAS. (Autopilot Vmo)
(b) Autopilot must be "OFF" for takeoff and landing.
(c) Autopilot use prohibited in seaplane configuration.

SECTION 3 - EMERGENCY PROCEDURES

(a) In case of malfunction, PRESS disconnect switch on pilot's control wheel.
(b) Rocker switch on instrument panel - OFF.
(c) Unit may be overpowered manually.
(d) In cruise configuration malfunction, 3 seconds delay results in 35° bank and 50 ft altitude loss.
(e) In approach configuration malfunction, 1 second delay results in 10° bank and 50 ft altitude loss.

SECTION 4 - NORMAL PROCEDURES

AUTOFLITE II PREFLIGHT INSPECTION

(a) AutoFlite master switch - ON.
(b) Rotate Turn Command Knob to left and right. Aircraft control wheels should rotate in corresponding directions.
(c) With AutoFlite II on, rotate aircraft control wheel to left and right. Only light forces should be required to override roll servo clutch.
(d) AutoFlite II master switch - OFF - rotate control wheel left and right to assure disengagement.

AUTOFLITE II IN-FLIGHT PROCEDURE

(a) Engagement
  (1) Check Turn Command Knob in center detent position.
  (2) AutoFlite II master switch - ON.

(b) Disengagement
  (1) AutoFlite II master switch - OFF.

(c) Heading Changes
  (1) Move Trim Knob on instrument for Drift Correction from a Constant Heading.
  (2) Move Turn Command Knob for left or right banked turns. Rotation of knob to stop will yield an appropriate bank angle to obtain an appropriate standard rate turn. Intermediate settings may be used for lesser turn rates.

(d) OMNI Tracker
  (1) Turn Command Knob - move to center detent position and push IN to engage tracker. Aircraft will track desired radial established on NAV 1 (or as selected, if equipped with a NAV Selector Switch).

> Tracker must be engaged within 10° of being "on course," i.e. VOR course needle centered and aircraft heading within a 10° of VOR course.

  (2) Trim Knob - push IN for high sensitivity. Use high sensitivity position for Localizer tracking and as desired for OMNI tracking.

(e) Maintain directional trim during all autopilot operations.

SECTION 5 - PERFORMANCE

No changes to the basic performance provided by Section 5 of this Pilot's Operating Handbook are necessary for this supplement.

SUPPLEMENT 3

AUTOCONTROL IIIB AUTOPILOT INSTALLATION

SECTION 1 - GENERAL

This supplement supplies information necessary for the operation of the airplane when the optional Piper AutoControl IIIB Autopilot is installed. The information contained within this supplement is to be used in conjunction with the complete handbook.

This supplement has been "FAA Approved" as a permanent part of this handbook and must remain in this handbook at all times when the optional Piper AutoControl IIIB Autopilot is installed.

SECTION 2 - LIMITATIONS

(a) Autopilot operation prohibited above 160 KIAS. (Autopilot Vmo)
(b) Autopilot must be "OFF" for takeoff and landing.

SECTION 3 - EMERGENCY PROCEDURES

(a) In an emergency the AutoControl IIIB can be disconnected by:
  (1) Pushing the roll ON-OFF Rocker Switch "OFF."
  (2) Pulling the Autopilot Circuit Breaker.
(b) The autopilot can be overpowered at either control wheel.
(c) An Autopilot runaway, with a 3 second delay in the initiation of recovery, while operating in a climb, cruise or descending flight could result in a 38° bank and 40 ft altitude loss.
(d) An Autopilot runaway, with a 1 second delay in the initiation of recovery, during an approach operation, coupled or uncoupled, could result in an 8° bank and 10 ft altitude loss.

SECTION 4 - NORMAL PROCEDURES

PREFLIGHT INSPECTION - AUTOPILOT

(a) Roll Section
  (1) Place Radio Coupler in "Heading" mode and place A/P ON/OFF switch in the "ON" position to engage roll section. Rotate roll command knob Left and Right and observe control wheel describes a corresponding Left and Right turn, then center knob.
  (2) Set proper D.G. Heading on D.G. and turn Heading Indice to aircraft heading. Engage "Heading" mode switch and rotate Heading Indice right and left. Aircraft control wheel should turn same direction as Indice. While D.G. indice is set for a left turn, grasp control wheel and override the servo to the right. Repeat in opposite direction for right turn.

(3) If VOR signal available check Omni mode on Radio Coupler by swinging Omni needle left and right slowly. Observe that control wheel rotates in direction of needle movement.
(4) Disengage by placing the A/P ON/OFF switch to the "OFF" position.

IN-FLIGHT

(a) Trim airplane (ball centered).

(b) Check air pressure vacuum to ascertain that the directional gyro and attitude gyro are receiving sufficient air.

(c) Roll Section
(1) To engage, center Roll knob, push AP "ON-OFF" switch to "ON" position. To turn, rotate console ROLL knob in desired direction. (Maximum angle of bank should not exceed 30° .)
(2) For heading mode, set directional gyro with magnetic compass. Push directional gyro HDG knob in, rotate bug to aircraft heading. Push console heading rocker (HDG) switch to "ON" position. To select a new aircraft heading, push D.G. heading knob "IN" and rotate, in desired direction of turn, to the desired heading.

NOTE

In HDG mode the maximum bank angles are limited to approximately 20° and single command, heading changes should be limited to 150°. (HDG Indice not more than 150° from actual aircraft heading.)

(d) VOR
(1) To Intercept:
a. Using OMNI Bearing Selector, dial desired course, inbound or outbound.
b. Set identical heading on Course Selector D.G.
c. After aircraft has stabilized, position coupler mode selector knob to OMNI mode. As aircraft nears selected radial, interception and crosswind correction will be automatically accomplished without further switching.

NOTE

If aircraft position is less than 45° from selected radial, aircraft will intercept before station. If position is more than 45°, interception will occur after station passage. As the aircraft nears the OMNI station, (1/2 mile) the zone of confusion will direct an "S" turn in alternate directions as the OMNI indicator needle swings. This alternate banking limited to the standard D.G. bank angle, is an indication of station passage.

(2) To select new course:
   a. To select a new course or radial, rotate the HDG indice to the desired HDG (match course).
   b. Rotate OBS to the new course. Aircraft will automatically turn to the intercept heading for the new course.

(3) To change stations:
   a. If same course is desired, merely tune receiver to new station frequency.
   b. If different course is desired, position coupler mode selector to HDG mode. Dial course selector D.G. to new course. Dial OBS to new course and position coupler mode selector to OMNI mode.

(e) VOR Approach

Track inbound to station as described in VOR navigation section. After station passage:

(1) Dial outbound course on Course Selector D.G., then dial same course on OBS.
(2) After established on outbound radial, position coupler mode selector to HDG mode and select outbound procedure turn heading. After 40 seconds to 1 minute select a turn in the desired direction with the Course Selector D.G. to the inbound procedure turn heading.
(3) Set OBS to inbound course.
(4) When aircraft heading is 45° to the inbound course, dial Course Selector D.G. to inbound course and position coupler mode selector to OMNI mode.

NOTE

For precise tracking over OMNI station, without "S" turn, position coupler mode selector to HDG mode just prior to station passage. If holding pattern is desired, position coupler mode selector to HDG mode at station passage inbound and select outbound heading in direction of turn. After elapsed time, dial inbound course on Course Selector D.G. When aircraft heading is 45° to radial, position coupler mode selector to OMNI mode.

(f) LOC Approach Only

(1) To intercept dial ILS outbound course on Course Selector D.G. When stabilized, position coupler mode selector to LOC REV mode.
(2) After interception and when beyond outer marker, position coupler mode selector to HDG mode and dial outbound procedure turn heading. After one minute, dial inbound procedure turn heading in direction of turn.
(3) When aircraft heading is 45° to ILS inbound course dial inbound course on Course Selector D.G. and position coupler mode selector to LOC NORM mode.
(4) At the missed approach point (M.A.P.), or when missed approach is elected, position coupler mode selector to HDG mode and execute missed approach procedure.

(g) LOC Approach - Back Course (Reverse)

(1) To intercept dial ILS Back Course outbound heading on Course Selector D.G. When stabilized, position coupler mode selector to LOC NORM mode.

(2) After interception and when beyond fix, position coupler mode selector to HDG and dial outbound procedure turn heading. After one minute, dial inbound procedure turn heading in direction of turn.

(3) When heading 45° to inbound course, dial inbound course on Course Selector D.G. and position coupler mode selector to LOC REV mode.

(4) Approximately 1/2 mile from runway, position coupler mode selector to HDG mode to prevent "S" turn over ILS station near runway threshold.

(5) Missed approach - same as Front Course. See (b) (4).

SECTION 5 - PERFORMANCE

No changes to the basic performance provided by Section 5 of the Pilot's Operating Handbook are necessary for this supplement.

SUPPLEMENT 4

ALTIMATIC IIIC AUTOPILOT INSTALLATION (SERIAL NUMBERS 32-7740001 THROUGH 32-7840202)

SECTION 1 - GENERAL

This supplement supplies information necessary for the operation of the airplane when the optional AltiMatic IIIC Autopilot is installed in accordance with STC SA3011SW. The information contained within this supplement is to be used "as described" in conjunction with the complete handbook.

This supplement has been "FAA Approved" as a permanent part of this handbook and must remain in this handbook at all times when the optional AltiMatic IIIC Autopilot is installed.

SECTION 2 - LIMITATIONS

(a) Autopilot operation prohibited above 175 KIAS. (Autopilot Vmo)
(b) Autopilot must be "OFF" during takeoff and landing.
(c) Required placard P/N 13A660-1 "Conduct Trim Check prior to flight (see P/O/H)" to be installed in clear view of pilot.

SECTION 3 - EMERGENCY PROCEDURES

This aircraft is equipped with a Master Disconnect/Interrupt Switch on the pilot's control wheel. When the switch button is depressed it will disconnect the autopilot. When depressed and held it will interrupt all Electric Elevator Trim Operations. Trim operations will be restored when the switch is released. If an autopilot or trim emergency is encountered, do not attempt to determine which system is at fault. Immediately depress and hold the Master Disconnect/Interrupt button. Turn off autopilot and trim master switch and retrim aircraft, then release the interrupt switch.

NOTE

During examination of this supplement, the pilot is advised to locate and identify the autopilot controls, the trim master switch and circuit breakers for both systems.

(a) In the event of an autopilot malfunction the autopilot can be:
(1) Overpowered at either control wheel.

CAUTION

Do not overpower autopilot pitch axis for periods longer than 3 seconds because the autotrim system will operate in a direction to oppose the pilot and will, thereby, cause an increase in the pitch overpower forces.

(2) Disconnected by depressing the Master Disconnect/Interrupt Switch.
(3) Disconnected by depressing the Trim Switch "AP OFF" bar.
(4) Disconnected by pushing the roll rocker switch "OFF."

(b) In the event of a trim malfunction:
(1) Depress and hold the Master Trim Interrupt Switch.
(2) Trim Master Switch - "OFF." Retrim aircraft as necessary using manual trim system.
(3) Release Master Interrupt Switch - be alert for possible trim action.
(4) Trim Circuit Breaker - Pull. Do not operate trim until problem is corrected.

(c) If a trim runaway occurs with the autopilot operating, the above procedure will disconnect the autopilot which will immediately result in higher control wheel forces. Be prepared to manually retrim, as necessary to eliminate undesirable forces.

(d) Altitude Loss During Malfunction:
(1) An autopilot malfunction during climb, cruise or descent with a 3 second delay in recovery initiation could result in as much as 35° of bank and a 400 ft altitude loss.
(2) An autopilot malfunction during an approach with a 1 second delay in recovery initiation could result in as much as 20° of bank and a 180 ft altitude loss. Maximum altitude loss measured in approach configuration and operating either coupled or uncoupled.

EMERGENCY OPERATION WITH OPTIONAL HSI
(Non-Slaved)

(a) Appearance of HDG Flag:
(1) Check air supply gauge (vac or pressure) for adequate air supply (4 in. Hg min.).
(2) Check NSD 360 circuit breaker.
(3) Observe display for proper operation.

Note: If heading card is not operational, autopilot should not be used.

(b) With card inoperative - VOR and Glide Slope displays are still functional; use card set to rotate card to aircraft heading for correct picture.
(c) Localizer - left-right information still usable. Flag information is disabled - compare needle with # 2 indicator for valid left-right needle operation.

SECTION 4 - NORMAL PROCEDURES

PREFLIGHT INSPECTION - AUTOPILOT

(a) Roll Section
   (1) Place Radio Coupler in "Heading" mode and place roll rocker switch "ON" to engage roll section. Rotate roll command knob left and right and observe that control wheel describes a corresponding left and right turn, then center knob.
   (2) Set proper D.G. Heading on D.G. and turn Heading Bug to aircraft heading. Engage "Heading" mode rocker switch and rotate heading bug right and left. Aircraft control wheel should turn same direction as bug. Grasp control wheel and manually override servo, both directions.
   (3) Disengage autopilot by depressing trim switch. Check aileron operation is free and autopilot is disconnected from controls.

(b) Pitch Section
   (1) Engage "Roll" rocker switch.
   (2) Center pitch command disc and engage "Pitch" rocker switch.
   (3) Rotate pitch command disc up and then down and check control yoke moves same direction. Check to see that servo can be overriden by hand at control wheel.

NOTE

Autopilot might not be able to raise elevators, on ground, without assistance from pilot.

   (4) Hold control yoke and disengage autopilot by pressing Master Autopilot Disconnect/Trim Interrupt Switch button. Check Roll and Pitch controls to assure autopilot has disconnected.

General

This aircraft is equipped with a Command Trim System designed to withstand any type of single malfunction, either mechanical or electrical, without uncontrolled operation resulting. The preflight check procedure is designed to uncover hidden failures that might otherwise go undetected. Proper operation of the electric elevator trim system is predicated on conducting the following preflight check before each flight. If the trim system fails any portion of the procedure, pull the trim circuit breaker out until trim system is repaired. Substitution of any trim system component for another model is not authorized. For emergency interrupt information, refer to Section 3 of this Supplement.

Command Electric Trim Switch

The Command Electric Trim Switch on the left hand portion of the pilot's control wheel has two functions:

   (1) When the top bar (AP OFF) is pressed, it disconnects the Autopilot.
   (2) When the top bar is pressed AND the rocker is moved forward, nose down trim will occur, when moved aft, nose up trim will occur.

(c) Pre-Flight: Command Trim - Before Each Flight
  (1) Check trim circuit breaker - IN.
  (2) Trim Master Switch - ON.
  (3) AP OFF - Check normal trim operation - UP. Grasp trim wheel and check override capability. Check nose down operation. Recheck override.
  (4) Activate center bar only - Push rocker fore and aft - only. Trim should not operate with either separate action.

(d) Autotrim - Before Each Flight
  (1) AP ON - (Roll and Pitch Sections) Check automatic operation by activating autopilot pitch command UP then DN. Observe trim operation follows pitch command direction.

NOTE

In autopilot mode, there will be approximately a 3 second delay between operation of pitch command and operation of trim.

  (2) Press center bar (AP OFF) - release - check autopilot disengagement.
  (3) Rotate trim wheel to check manual trim operation. Reset to takeoff position prior to takeoff.

AUTOPILOT IN-FLIGHT PROCEDURE

(a) Trim airplane (Ball Centered).

(b) Check air pressure or vacuum to ascertain that the directional gyro and attitude gyro are receiving sufficient air.

(c) Roll Section
  (1) To engage. Center ROLL knob, push ROLL rocker to "ON" position. To turn, rotate console ROLL knob in desired direction. (Maximum angle of bank should not exceed 30°.)
  (2) For heading mode, set directional gyro with magnetic compass. Push directional gyro HDG knob in, rotate to select desired heading. Push console heading rocker (HDG) to "ON" position. (Maximum angle to bank will be 20° with heading lock engaged.)

(d) Pitch Section (Roll section must be engaged prior to pitch section engagement).
  (1) Center pitch trim indicator with the pitch command disc.
  (2) Engage pitch rocker switch. To change attitude, rotate pitch command disc in the desired direction.

(e) Altitude Hold

Upon reaching desired or cruising altitude, engage altitude hold mode rocker switch. As long as Altitude Hold mode rocker is engaged, aircraft will maintain selected altitude. For maximum passenger comfort, rate of climb or descent should be reduced to approximately 500 FPM prior to altitude hold engagement. For accurate Altitude Holding below 85 KIAS lower flaps to takeoff position.

NOTE

Prior to disengaging Altitude Hold mode, rotate Pitch Command to center.

(f) Radio Coupling VOR-ILS with H.S.I. type instrument display. (Optional)

(1) VOR Navigation

a. Tune and identify VOR Station. Select desired course by rotating CRS knob of H.S.I.
b. Select OMNI mode on Radio Coupler.
c. Select HDG mode on autopilot console to engage coupler. Aircraft will turn to a 45° intercept angle to intercept the selected VOR course. Intercept angle magnitude depends on radio needle off - course magnitude, 100% needle deflection will result in 45° intercept angle, diminishing as the needle off-set diminishes.
d. NAV mode - NAV mode provides reduced VOR sensitivity for tracking weak, or noisy, VOR signals. NAV mode should be selected after the aircraft is established on course.

(2) ILS-LOC Front Course

a. Set inbound, front, localizer course on H.S.I.
b. Select LOC-Normal on Radio Coupler to intercept and track inbound on the localizer. Select LOC-REV to intercept and track the localizer course outbound to procedure turn area.
c. Engage HDG mode on autopilot console to engage coupler.

(3) ILS - Back Course

a. Set inbound, front, localizer course on H.S.I.
b. Select LOC-REV, on radio coupler to intercept and track inbound on the back localizer course. Select LOC-NORM to intercept and track outbound on the back course to the procedure turn area.
c. Engage HDG mode on autopilot console to engage coupler.

(g) Radio Coupling - VOR/ILS with standard directional gyro. (Optional)

Radio Coupler operation in conjunction with a standard directional gyro and VOR/LOC display differs from operation with an integrated display (H.S.I.) only in one respect. The HDG bug is used as the radio course datum and therefore must be set to match the desired VOR/ILS course as selected on the O.B.S.

(1) For VOR Intercepts and Tracking:

Select the desired VOR Course and set the HDG bug to the same heading. Select OMNI mode on the coupler and engage HDG mode on the autopilot console.

(2) For ILS Front Course Intercepts and Tracking:

Tune the localizer frequency and place the HDG bug on the inbound, front course heading. Select LOC-NORM mode on the coupler and engage HDG mode on the autopilot console.

(3) For LOC Back Course Intercepts and Tracking:

Tune the localizer frequency and place the HDG bug on the inbound course heading to the airport. Select LOC-REV mode on the coupler and engage HDG mode on the autopilot console.

(h) Coupled Approach Operations

(1) VOR or LOC

a. After arrival at the VOR Station, track outbound to the procedure turn area as described in Section 4 (f) or (g) as appropriate. Slow to 95 to 104 KIAS, while inbound to F.A.F. and lower flaps to takeoff position (10° extension).

b. Use HDG mode and Pitch or Altitude Hold modes as appropriate during procedure turn.

c. At the F.A.F. inbound, return to pitch mode for control of descent.

d. At the M.D.A. Select Altitude Hold mode and add power for level flight. Monitor altimeter to assure accurate altitude control is being provided by the autopilot.

e. Go Around. For missed approach select desired pitch attitude with pitch command disc and disengage altitude hold mode. This will initiate the pitch up attitude change. Immediately add takeoff power and monitor Altimeter and rate of climb for positive climb indication. After climb is established, retract flaps and gear. Adjust attitude as necessary for desired airspeed and select HDG mode for turn from the VOR final approach course.

(2) ILS - Front Course Approach With Glide Slope Capture. (Optional)

a. Track inbound to L.O.M as described in Section 4 (f) or (g) above and in Altitude Hold mode.

b. Inbound to L.O.M slow to 95 to 104 KIAS and lower flaps to takeoff position (10° extension).

c. Automatic Glide Slope capture will occur at Glide Slope intercept if the following conditions are met:
   1. Coupler in LOC-Normal mode.
   2. Altitude Hold mode engaged (Altitude Rocker on Console).
   3. Under Glide Slope for more than 20 seconds.
   4. Localizer radio frequency selected on NAV Receiver.

d. At Glide Slope Intercept immediately reduce power to maintain 95 to 104 KIAS on final approach. Glide Slope capture is indicated by lighting of the green Glide Slope engage Annunciator Lamp and by a slight pitch down of the aircraft.

e. Monitor localizer and Glide Slope raw data throughout approach. Adjust power as necessary to maintain correct final approach airspeed. All power changes should be of small magnitude and smoothly applied for best tracking performance. Do not change aircraft configuration during approach while autopilot is engaged.

f. Conduct missed approach manever as described in (h) (1) e. above.

NOTE

Glide Slope Coupler will not automatically decouple from Glide Slope. Decoupling may be accomplished by any of the following means:

1. Disengage Altitude Mode.
2. Switch Radio Coupler to HDG Mode.
3. Disengage Autopilot.

SECTION 5 - PERFORMANCE

No changes to the basic performance provided by Section 5 of the Pilot's Operating Handbook are necessary for this supplement.

THIS PAGE INTENTIONALLY LEFT BLANK

SUPPLEMENT 5

ALTIMATIC IIIC AUTOPILOT INSTALLATION (SERIAL NUMBERS 32-7940001 AND UP)

SECTION 1 - GENERAL

This supplement supplies information necessary for the operation of the airplane when the optional AltiMatic IIIC Autopilot is installed. The information contained within this supplement is to be used in conjunction with the complete handbook.

This supplement has been "FAA Approved" as a permanent part of this handbook and must remain in this handbook at all times when the optional AltiMatic IIIC is installed.

SECTION 2 - LIMITATIONS

(a) Autopilot operation prohibited above 170 KIAS. (Autopilot Vmo)
(b) Autopilot must be "OFF" during takeoff and landing.
(c) Required placard P/N 13A660-1 "Conduct Trim Check prior to flight (see P/O/H)" to be installed in clear view of pilot.

SECTION 3 - EMERGENCY PROCEDURES

This aircraft is equipped with a Master Disconnect/Interrupt Switch on the pilot's control wheel. When the switch button is depressed it will disconnect the autopilot. When depressed and held it will interrupt all Electric Elevator Trim Operations. Trim operations will be restored when the switch is released. If an autopilot or trim emergency is encountered, do not attempt to determine which system is at fault. Immediately depress and hold the Master Disconnect/Interrupt button. Turn off autopilot and trim master switch and retrim aircraft, then release the interrupt switch.

NOTE

During examination of this supplement, the pilot is advised to locate and identify the autopilot controls, the trim master switch and circuit breakers for both systems.

(a) In the event of an autopilot malfunction the autopilot can be:
(1) Overpowered at either control wheel.

CAUTION

Do not overpower autopilot pitch axis for periods longer than 3 seconds because the autotrim system will operate in a direction to oppose the pilot and will, thereby, cause an increase in the pitch overpower forces.

(2) Disconnected by depressing the Master Disconnect/Interrupt Switch.
(3) Disconnected by depressing the Trim Switch "AP OFF" bar.
(4) Disconnected by pushing the roll rocker switch "OFF."

(b) In the event of a trim malfunction:
(1) Depress and hold the Master Trim Interrupt Switch.
(2) Trim Master Switch - "OFF." Retrim aircraft as necessary using manual trim system.
(3) Release Master Interrupt Switch - be alert for possible trim action.
(4) Trim Circuit Breaker - Pull. Do not operate trim until problem is corrected.
(5) If the trim system operates only in one direction, pull the circuit breaker and do not operate the trim system until corrective action is taken. Monitor autopilot operation closely when operating without trim follow-up.

(c) If a trim runaway occurs with the autopilot operating, the above procedure will disconnect the autopilot which will immediately result in higher control wheel forces. Be prepared to manually retrim, as necessary to eliminate undesirable forces.

(d) Altitude Loss During Malfunction:
(1) An autopilot malfunction during climb, cruise or descent with a 3 second delay in recovery initiation could result in as much as 35° of bank and a 400 ft altitude loss.
(2) An autopilot malfunction during an approach with a 1 second delay in recovery initiation could result in as much as 20° of bank and a 180 ft altitude loss. Maximum altitude loss measured in approach configuration and operating either coupled or uncoupled.

EMERGENCY OPERATION WITH OPTIONAL NSD 360A (HSI)
(Slaved and/or Non-Slaved)

(a) Appearance of HDG Flag:
(1) Check air supply gauge (vac or pressure) for adequate air supply (4 in. Hg min.).
(2) Check NSD 360A circuit breaker.
(3) Observe display for proper operation.

(b) To disable heading card - pull circuit breaker and use magnetic compass for directional data.

Note: If heading card is not operational, autopilot should not be used.

(c) With card disabled - VOR and Glide Slope displays are still functional; use card set to rotate card to aircraft heading for correct picture.

(d) Slaving Failure - (i.e. failure to self-correct for gyro drift):
(1) Check gyro slaving switch is set to No. 1 position (if equipped with Slave No. 1 or No. 2 switch) or "Slaved" position when equipped with Slaved and Free Gyro Mode Switch.
(2) Check for HDG flag.
(3) Check compass circuit breaker.
(4) Reset heading card while observing slaving meter.

NOTE

A dead slaving meter needle or a needle displaced fully one direction indicates a slaving system failure.

(5) Select Slaving Amplifier No. 2, if equipped. If not equipped, proceed with step 7 below.
(6) Reset heading card while checking slaving meter. If proper slaving indication is not obtained, proceed with step 7 below.
(7) Switch to free gyro mode and periodically set card as an unslaved gyro.

NOTE

In the localizer mode, the "TO-FROM" arrows may remain out of view, depending upon the design of the NAV converter used in the installation.

SECTION 4 - NORMAL PROCEDURES

PREFLIGHT INSPECTION - AUTOPILOT

(a) Roll Section
  (1) Place Radio Coupler in "Heading" mode and place roll rocker switch "ON" to engage roll section. Rotate roll command knob left and right and observe that control wheel describes a corresponding left and right turn, then center knob.
  (2) Set proper D.G. Heading on D.G. and turn Heading Bug to aircraft heading. Engage "Heading" mode rocker switch and rotate Heading Bug right and left. Aircraft control wheel should turn same direction as bug. Grasp control wheel and manually override servo, both directions.
  (3) Disengage autopilot by depressing trim switch. Check aileron operation is free and autopilot is disconnected from controls.

(b) Pitch Section
  (1) Engage "Roll" rocker switch.
  (2) Center pitch command disc and engage "Pitch" rocker switch.
  (3) Rotate pitch command disc up and then down and check control yoke moves same direction. Check to see that servo can be overriden by hand at control wheel.

NOTE

Autopilot might not be able to raise elevators, on ground, without assistance from pilot.

  (4) Hold control yoke and disengage autopilot by pressing Master Autopilot Disconnect/Trim Interrupt Switch button. Check Roll and Pitch controls to assure autopilot has disconnected.

General

This aircraft is equipped with a Command Trim System designed to withstand any type of single malfunction, either mechanical or electrical, without uncontrolled operation resulting. The preflight check procedure is designed to uncover hidden failures that might otherwise go undetected. Proper operation of the electric elevator trim system is predicated on conducting the following preflight check before each flight. If the trim system fails any portion of the procedure, pull the trim circuit breaker out until trim system is repaired. Substitution of any trim system component for another model is not authorized. For emergency interrupt information, refer to Section 3 of this Supplement.

Command Electric Trim Switch

The Command Electric Trim Switch on the left hand portion of the pilot's control wheel has two functions:
  (1) When the top bar (AP OFF) is pressed, it disconnects the Autopilot.
  (2) When the top bar is pressed AND the rocker is moved forward, nose down trim will occur, when moved aft, nose up trim will occur.

(c) Pre-Flight: Command Trim - Before Each Flight
  (1) Check trim circuit breaker - IN.
  (2) Trim Master Switch - ON.
  (3) AP OFF - Check normal trim operation - UP. Grasp trim wheel and check override capability. Check nose down operation. Recheck override.
  (4) Activate center bar only - Push rocker fore and aft - only. Trim should not operate with either separate action.

(d) Autotrim - Before Each Flight
  (1) AP ON - (Roll and Pitch Sections) Check automatic operation by activating autopilot pitch command UP then DN. Observe trim operation follows pitch command direction.

NOTE

In autopilot mode, there will be approximately a 3 second delay between operation of pitch command and operation of trim.

  (2) Press center bar (AP OFF) - release - check autopilot disengagement.
  (3) Rotate trim wheel to check manual trim operation. Reset to takeoff position prior to takeoff.

AUTOPILOT IN-FLIGHT PROCEDURE

(a) Trim airplane (Ball Centered).

(b) Check air pressure or vacuum to ascertain that the directional gyro and attitude gyro are receiving sufficient air.

(c) Roll Section
  (1) To engage. Center ROLL knob, push ROLL rocker to "ON" position. To turn, rotate console ROLL knob in desired direction.
  (2) For heading mode, set directional gyro with magnetic compass. Push directional gyro HDG knob in, rotate to select desired heading. Push console heading rocker (HDG) to "ON" position. (Maximum angle to bank will be 20° with heading lock engaged.)

(d) Pitch Section (Roll section must be engaged prior to pitch section engagement).
  (1) Center pitch trim indicator with the pitch command disc.
  (2) Engage pitch rocker switch. To change attitude, rotate pitch command disc in the desired direction.

(e) Altitude Hold

Upon reaching desired or cruising altitude, engage altitude hold mode rocker switch. As long as Altitude Hold mode rocker is engaged, aircraft will maintain selected altitude. For maximum passenger comfort, rate of climb or descent should be reduced to approximately 500 FPM prior to altitude hold engagement. For accurate Altitude Holding below 87 KIAS lower flaps to takeoff position.

NOTE

Prior to disengaging Altitude Hold mode, rotate Pitch Command to center.

(f) Radio Coupling VOR-ILS with H.S.I. type instrument display. (Optional)

(1) VOR Navigation

a. Tune and identify VOR Station. Select desired course by rotating CRS knob of H.S.I.
b. Select OMNI mode on Radio Coupler.
c. Select HDG mode on autopilot console to engage coupler. Aircraft will turn to a 45° intercept angle to intercept the selected VOR course. Intercept angle magnitude depends on radio needle off - course magnitude, 100% needle deflection will result in 45° intercept angle, diminishing as the needle off-set diminishes.
d. NAV mode - NAV mode provides reduced VOR sensitivity for tracking weak, or noisy, VOR signals. NAV mode should be selected after the aircraft is established on course.

(2) ILS-LOC Front Course

a. Set inbound, front, localizer course on H.S.I.
b. Select LOC-Normal on Radio Coupler to intercept and track inbound on the localizer. Select LOC-REV to intercept and track the localizer course outbound to procedure turn area.
c. Engage HDG mode on autopilot console to engage coupler.

(3) ILS - Back Course

a. Set inbound, front, localizer course on H.S.I.
b. Select LOC-REV, on radio coupler to intercept and track inbound on the back localizer course. Select LOC-NORM to intercept and track outboard on the back course to the procedure turn area.
c. Engage HDG mode on autopilot console to engage coupler.

(g) Radio Coupling - VOR/ILS with standard directional gyro. (Optional)

Radio Coupler operation in conjunction with a standard directional gyro and VOR/LOC display differs from operation with an integrated display (H.S.I.) only in one respect. The HDG bug is used as the radio course datum and therefore must be set to match the desired VOR/ILS course as selected on the O.B.S.

(1) For VOR Intercepts and Tracking:

Select the desired VOR Course and set the HDG bug to the same heading. Select OMNI mode on the coupler and engage HDG mode on the autopilot console.

(2) For ILS Front Course Intercepts and Tracking:

Tune the localizer frequency and place the HDG bug on the inbound, front course heading. Select LOC-NORM mode on the coupler and engage HDG mode on the autopilot console.

(3) For LOC Back Course Intercepts and Tracking:

Tune the localizer frequency and place the HDG bug on the inbound course heading to the airport. Select LOC-REV mode on the coupler and engage HDG mode on the autopilot console.

(h) Coupled Approach Operations

(1) VOR or LOC

a. After arrival at the VOR Station, track outbound to the procedure turn area as described in Section 4 (f) or (g) as appropriate. Slow to 95 to 104 KIAS, while inbound to F.A.F. and lower flaps to takeoff position (10° extension).

b. Use HDG mode and Pitch or Altitude Hold modes as appropriate during procedure turn.

c. At the F.A.F. inbound, return to pitch mode for control of descent.

d. At the M.D.A. Select Altitude Hold mode and add power for level flight. Monitor altimeter to assure accurate altitude control is being provided by the autopilot.

e. Go-Around. For missed approach select desired pitch attitude with pitch command disc and disengage Altitude Hold mode. This will initiate the pitch up attitude change. Immediately add takeoff power and monitor Altimeter and rate of climb for positive climb indication. After climb is established, retract flaps and gear. Adjust attitude as necessary for desired airspeed and select HDG mode for turn from the VOR final approach course.

(2) ILS - Front Course Approach With Glide Slope Capture. (Optional)

a. Track inbound to L.O.M. as described in Section 4 (f) or (g) and in Altitude Hold mode.

b. Inbound to L.O.M. slow to 95 to 104 KIAS and lower flaps to takeoff position (10° or 25° extension).

c. Automatic Glide Slope capture will occur at Glide Slope intercept if the following conditions are met:

1. Coupler in LOC-Normal mode.
2. Altitude Hold mode engaged (Altitude Rocker on Console).
3. Under Glide Slope for more than 30 seconds.
4. Localizer radio frequency selected on NAV Receiver.

d. At Glide Slope Intercept immediately reduce power to maintain approximately 90 to 95 KIAS on final approach. Glide Slope capture is indicated by lighting of the green Glide Slope engage Annunciator Lamp and by a slight pitch down of the aircraft.

e. Monitor localizer and Glide Slope raw data throughout approach. Adjust power as necessary to maintain correct final approach airspeed. All power changes should be of small magnitude and smoothly applied for best tracking performance. Do not change aircraft configuration during approach while autopilot is engaged.

f. Conduct missed approach maneuver as described in (h) (l) e. above.

NOTE

Glide Slope Coupler will not automatically decouple from Glide Slope. Decoupling may be accomplished by any of the following means:

1. Disengage Altitude Mode.
2. Switch Radio Coupler to HDG Mode.
3. Disengage Autopilot.

SECTION 5 - PERFORMANCE

No changes to the basic performance provided by Section 5 of the Pilot's Operating Handbook are necessary for this supplement.

SUPPLEMENT 6

PIPER ELECTRIC PITCH TRIM

SECTION 1 - GENERAL

This supplement supplies information necessary for the operation of the airplane when the optional Piper Electric Pitch Trim is installed. The information contained within this supplement is to be used in conjunction with the complete handbook.

This supplement has been "FAA Approved" as a permanent part of this handbook and must remain in this handbook at all times when the optional Piper Electric Pitch Trim is installed.

SECTION 2 - LIMITATIONS

No changes of the basic limitations provided by Section 2 of this Pilot's Operating Handbook are necessary for this supplement.

SECTION 3 - EMERGENCY PROCEDURES

In case of malfunction, disengage electric pitch trim by operating push button trim switch on instrument panel.

In emergency, electric pitch trim may be overpowered using manual pitch trim.

In cruise configuration, malfunction results in 10° pitch change and 50 ft altitude variation.

SECTION 4 - NORMAL PROCEDURES

The electric trim system may be turned ON or OFF by a switch located above the ignition switch. The pitch trim may be changed when the electric trim system is turned on either by moving the manual pitch trim control wheel or by operating the trim control switch on the pilot's control yoke.

SECTION 5 - PERFORMANCE

No changes to the basic performance provided by Section 5 of this Pilot's Operating Handbook are necessary for this supplement.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

SECTION 10

SAFETY TIPS

SECTION 10

SAFETY TIPS

10.1 GENERAL

This section provides safety tips of particular value in the operation of the Cherokee Six.

10.3 SAFETY TIPS

(a) Learn to trim for takeoff so that only a very light back pressure on the control wheel is required to lift the airplane off the ground.

(b) Trying to pull the airplane off the ground at too low an airspeed decreases the controllability of the airplane in the event of engine failure.

(c) Flaps may be lowered at airspeeds up to 109 KIAS. To reduce flap operating loads, it is desirable to have the airplane at a slower speed before extending the flaps. The flap step will not support weight if the flaps are in any extended position. The flaps must be placed in the "UP" position before they will lock and support weight on the step.

(d) Before attempting to reset any circuit breaker, allow a two to five minute cooling off period.

(e) Before starting the engine, check that all radio switches, light switches and pitot heat switch are in the off position so as not to create an overloaded condition when the starter is engaged.

(f) Strobe lights should not be operating when flying through overcast and clouds, since reflected light can produce spacial disorientation. Do not operate strobe lights when taxiing in the vicinity of other aircraft.

(g) The rudder pedals are suspended from a torque tube which extends across the fuselage. The pilot should become familiar with the proper positioning of his feet on the rudder pedals so as to avoid interference with the torque tube when moving the rudder pedals or operating the toe brakes.

(h) In an effort to avoid accidents, pilots should obtain and study the safety related information made available in FAA publications such as regulations, advisory circulars, Aviation News, AIM and safety aids.

(i) Prolonged slips or skids which result in excess of 2000 feet of altitude loss, or other radical or extreme maneuvers which could cause uncovering of the fuel outlet must be avoided as fuel flow interruption may occur when tank being used is not full.

THIS PAGE INTENTIONALLY LEFT BLANK