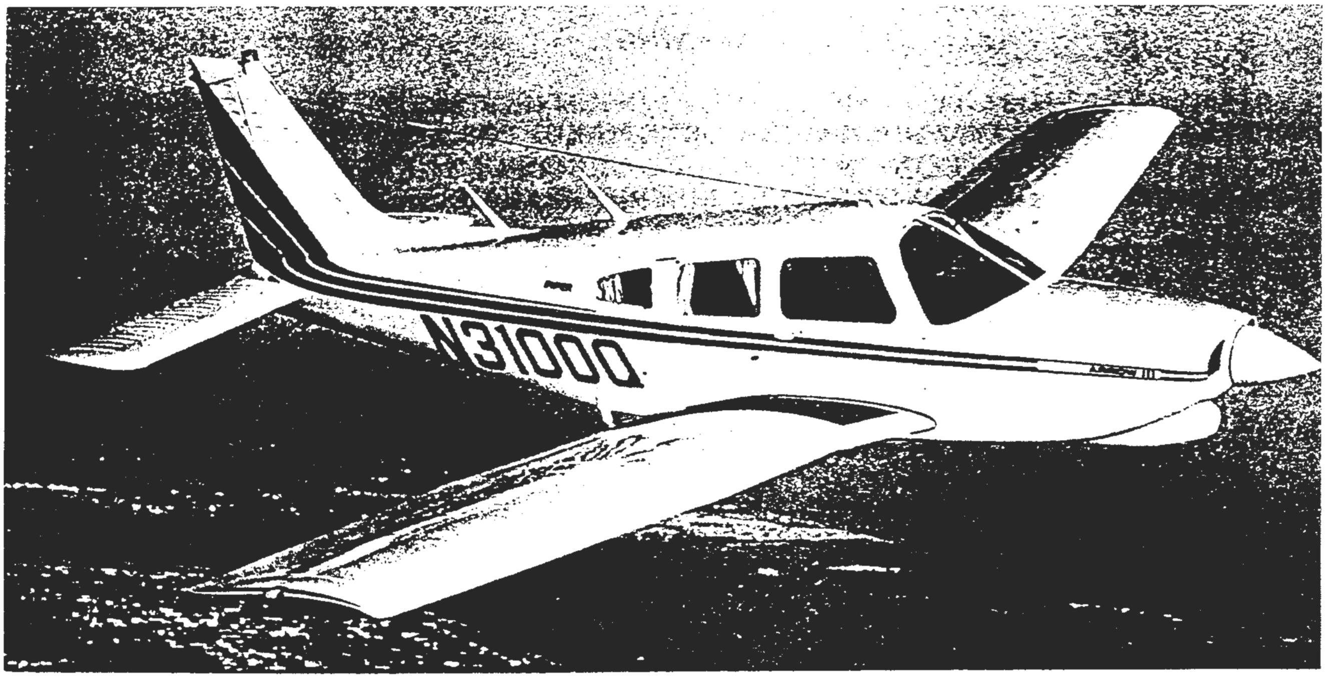
PILOT'S OPERATING HANDBOOK

PIPER CHEROKEE TURBO ARROW III



FAA APPROVED IN NORMAL CATEGORY BASED ON CAR 3 AND FAR PART 21, SUBPART J. THIS HANDBOOK INCLUDES THE MATERIAL REQUIRED TO BE FURNISHED TO THE PILOT BY CAR 3 AND FAR PART 21, SUBPART J AND CONSTITUTES THE APPROVED AIRPLANE FLIGHT MANUAL AND MUST BE CARRIED IN THE AIRPLANE AT ALL TIMES.

AIRPLANE SERIAL NO. 28R7703090

AIRPLANE REGISTRATION NO. N3090Q

PA-28R-201T
REPORT: VB-800

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

DATE OF APPROVAL: DECEMBER 20, 1976

HANDBOOK PART NO. 761 636

PIPER

WARNING

EXTREME CARE MUST BE EXERCISED TO LIMIT THE USE OF THIS HANDBOOK TO APPLICABLE AIRCRAFT. THIS HANDBOOK IS VALID FOR USE WITH THE AIRPLANE IDENTIFIED ON THE FACE OF THE TITLE PAGE. SUBSEQUENT REVISIONS SUPPLIED BY PIPER AIRCRAFT CORPORATION MUST BE PROPERLY INSERTED.

Published by
PUBLICATIONS DEPARTMENT
Piper Aircraft Corporation
Issued: December 20, 1976

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Intermountain SLC Piper Bill 322-1645

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DUPLICATE

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Issued: December 20, 1976
Revised: May 18, 1981

APPLICABILITY

The aircraft serial number eligibility bracket for application of this handbook is 28R-7703001 through 28R-7803373. The specific application of this handbook is limited to the Piper PA-28R-201T 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 revision are given below:

Title ii through v, 1-1 through 1-14, 2-1 through 2-10, 3-1 through 3-16, 4-1 through 4-20, 5-1 through 5-32, 6-1 through 6-56, 7-1 through 7-28, 8-1 through 8-16, 9-1 through 9-16, 10-1 through 10-2.

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS

Current Revisions to the PA-28R-201T Cherokee Turbo Arrow III Pilot's Operating Handbook, REPORT: VB-800 issued December 20, 1976.

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 1 - 761 636 (PR770128)	6-4 6-44 7-3 8-i, 8-15	Revised Figure 6-3. Revised item 195. Revised para. 7.5 (added winterization reference). Added para 8.29 (Winterization).	Ward Evans Ward Evans Jan. 28, 1977
Rev. 2 - 761 636 (PR770407)	1-6 2-5 6-53 7-3 7-28 9-7 9-8 9-9	Revised (b) heading to read "Meteorological." Revised para. 2.25. Added Piper Dwg. Nos. to items 287 and 289. Revised fuel injection description in para. 7.5. Revised ELT test info in NOTE. Added STC No. to Section 1 - General; revised (a), (c) and (d) in Section 3 - Emergency Procedures. Revised item (c) (2) and (d) (1) NOTE. Added STC No. to Section 1 - General; revised (a) (1) and (d) in Section 3 - Emergency Procedures.	Ward Evans Ward Evans April 7, 1977
Rev. 3 - 761 636 (PR770713)	1-11, 1-12, 1-13, 1-14 3-3 3-8 3-9 4-6 4-16 6-17 6-45 6-46 6-47 6-48 6-49 6-53 6-54 7-6 7-18	Revised Conversion Factors Revised airspeeds under Engine Power Loss In Flight and Power Off Landing. Revised airspeed under para. 3.11, Engine Power Loss In Flight. Revised airspeed under para. 3.13, Power Off Landing. Revised Climb procedure. Revised para. 4.33, Climb. Added item 3. Added new item 213; revised item nos.; relocated item to page 6-46. Added item from pg. 6-46; revised item nos.; added new items; relocated items to pg. 6-47. Added new items; added items from pg. 6-46; relocated items to pg. 6-48. Added new items; added items from pg. 6-47. Revised item nos.; revised item 273; added item 281. Revised item nos.; revised items 325 and 329; added items from pg. 6-54. Revised item nos.; relocated items to pg. 6-53; added new items; revised item 351. Revised airspeed under para. 7.9, Landing Gear. Added info. to para. 7-19, Pitot Static System	Ward Evans Ward Evans July 13, 1977

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS (cont)

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 4 - 761 636 (PR780310)	iv	Added page 7-18 to Rev. 3.	
	1-3	Added second engine model to 1.3.	
	1-4	Revised footnote in 1.13.	
	2-2	Added second engine model to 2.7.	
	4-4, 4-5	Revised Starting Eng. in Cold Weather (With Std. Primer) procedure.	
	4-10	Revised Preflight procedures (oil check procedures).	
	4-11	Revised starter operation in para. 4.13 and 4.15.	
	4-12	Revised starter operation in para. 4.17.	
	4-13	Revised para. 4.19.	
	4-17	Deleted eng. model no. from para. 4.35.	
	6-1	Revised wording in para. 6.1.	
	6-19	Added eng. model no. to item 5.	
	6-44	Revised item 201.	
	6-54	Added model nos. to item 354; revised model no. in item 361.	
	7-3	Deleted eng. model no. in para. 7.5.	
	7-25	Added CAUTION to para. 7.27.	Ward Evans
	7-27	Revised ELT description in para. 7.37.	Ward Evans
	8-11	Deleted eng. model no. in para. 8.19.	March 10, 1978
Rev. 5 - 761 636 (PR790205)	1-6	Corrected spelling.	
	1-12	Revised ft-lb and kg conversions.	
	1-13	Corrected spelling.	
	2-2	Revised items 2.7 (c) and (k).	
	4-3	Deleted alternator belt check from preflight.	
	4-11	Revised para. 4.13 and 4.15 info.	
	7-6, 7-7	Revised para. 7.9 info.	
	7-17	Revised para. 7.15 info.	Ward Evans
	7-18	Revised para. 7.19 info.	Ward Evans
	8-9	Revised nomenclature item 7.	Feb. 5, 1979
Rev. 6 - 761 636 (PR810518)	ii	Revised Warning.	
	iii	Added serial no. effectivities.	
	2-1	Revised para. 2.1.	
	3-1	Revised para. 3.1.	
	3-4	Added info. to para. 3.3.	
	3-12	Added info. to para. 3.21.	

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS (cont)

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 6 - 761 636 (PR810518) (cont)	4-1	Revised para. 4.1 General info.	
	6-1	Revised para. 6.1 General info.	
	6-3	Added Caution notice to para. 6.3 (a)(3).	Ward Evans
	6-25	Revised item no. 25.	Ward Evans
	7-15	Revised and upgraded Note to Warning notice.	May 18, 1981
Rev. 7 - 761 636 (PR840430)	v	Revised Table of Contents.	
	1-3	Revised para. 1.7.	
	1-7	Deleted MEA.	
	2-2	Revised para. 2.7 (g).	
	2-4	Revised para. 2.13.	
	3-i	Revised Table of Contents.	
	3-1	Revised para. 3.1.	
	3-5	Revised para. 3.3 info.	
	4-i	Added Table of Contents.	
	4-ii	Add pg.; added info. from pg. 4-i.	
	4-3	Revised para. 4.5.	
	4-4	Revised para. 4.5 info.	
	4-5	Revised para. 4.5 info.	
	4-9	Revised para. 4.9.	
	4-10	Revised para. 4.11.	
	4-14	Revised para. 4.25 and para. 4.27.	
	4-15	Revised para. 4.29.	
	4-18	Revised para. 4.41.	
	4-19	Revised para. 4.47.	
	4-20	Deleted info.; revised para. 4.49.	
	5-1	Revised para. 5.3.	
	5-3	Revised para. 5.5.	
	6-1	Revised para. 6.1.	
	6-3	Revised para. 6.3.	
	6-6	Revised para. 6.5.	
	6-7	Revised Fig. 6-5.	
	6-9, 6-10	Revised Fig. 6-7.	
	6-11	Revised Fig. 6-9.	
	6-12	Revised Fig. 6-11.	
	6-17	Revised para. 6.9.	
	7-25	Revised para. 7.31.	
	8-3	Revised para. 8.3.	
	8-4	Revised para. 8.5.	
	8-11	Revised para. 8.21 (b).	
	8-13	Revised para. 8.27 (a)(5).	
	10-i	Revised Table of Contents.	Ward Evans
	10-1	Revised Title; revised para. 10.1 and para. 10.3.	Ward Evans
	10-2	Revised Title.	April 30, 1984

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 8 - 761 636 (PR870131)	2-8	Revised para. 2.27.	
	3-3, 3-5	Revised para. 3.3.	
	3-7	Revised para. 3.9.	
	3-9, 3-10	Revised para. 3.13.	
	3-13	Revised para. 3.25.	
		Revised para. 3.29.	
	4-6	Revised para. 4.5.	
	4-15	Revised para. 4.29.	
	4-16	Revised para. 4.31.	
		Revised para. 4.33.	
	4-19, 4-20	Revised para. 4.47.	
	7-4	Revised fig. 7-1.	
	7-6	Revised fig. 7-3.	
		Revised para. 7.9.	
	7-7	Revised para. 7.9.	
	7-8	Revised fig. 7-5.	
	7-9	Revised fig. 7-7.	D.H. Trompler
	7-10	Revised fig. 7-9.	5/7/87 Date
Rev. 9 - 761 636 (PR050131)	iii	Added Warning.	
	iv-c	Added Rev. 9 to L of R.	
	2-2	Revised para. 2.7.	
	3-5	Revised para. 3.3.	
	3-13	Revised para. 3.29.	
	8-1	Revised para. 8.1.	
	8-2	Moved info. from page 8-1.	Linda J. Dicken
	8-3	Revised para. 8.3.	Jan. 31, 2005
Rev. 10 - 761-636 (PR111117)	ii	Revised Copyright Info.	
	iv-c	Added Rev. 10 to L of R.	
	iv-d	Revised page layout.	
	3-i	Revised T of C.	
	3-3	Added Turbocharger Failure.	
		Relocated text to page 3-3a.	
	3-3a	Added page.	
	3-3b	Added page.	
	3-6	Added text from page 3-7.	
		Added Para. 3.8.	
	3-7	Relocated text to page 3-6.	Wayne E. Gaulzetti
		Added Para. 3.8 text.	November 17, 2011

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 11 - 761-636 (PR121219)	ii	Revised Copyright Info.	
	iv-d	Added Rev. 11 to T of C.	
	3-5	Revised Emergency Landing Gear Extension checklist.	
	4-5	Revised Before Takeoff checklist.	
	4-6	Revised Approach and Landing checklist.	
	4-15	Revised Para. 4.29.	
	4-17	Revised Para. 4.37.	
	7-6	Revised Para. 7.9.	
	7-7	Revised Para. 7.9. Relocated text to page 7-7a.	
	7-7a	Added page.	Eric A. Wright
	7-7b	Added page.	December 19, 2012

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SECTION 1

GENERAL

SECTION 1

GENERAL

1.1 INTRODUCTION

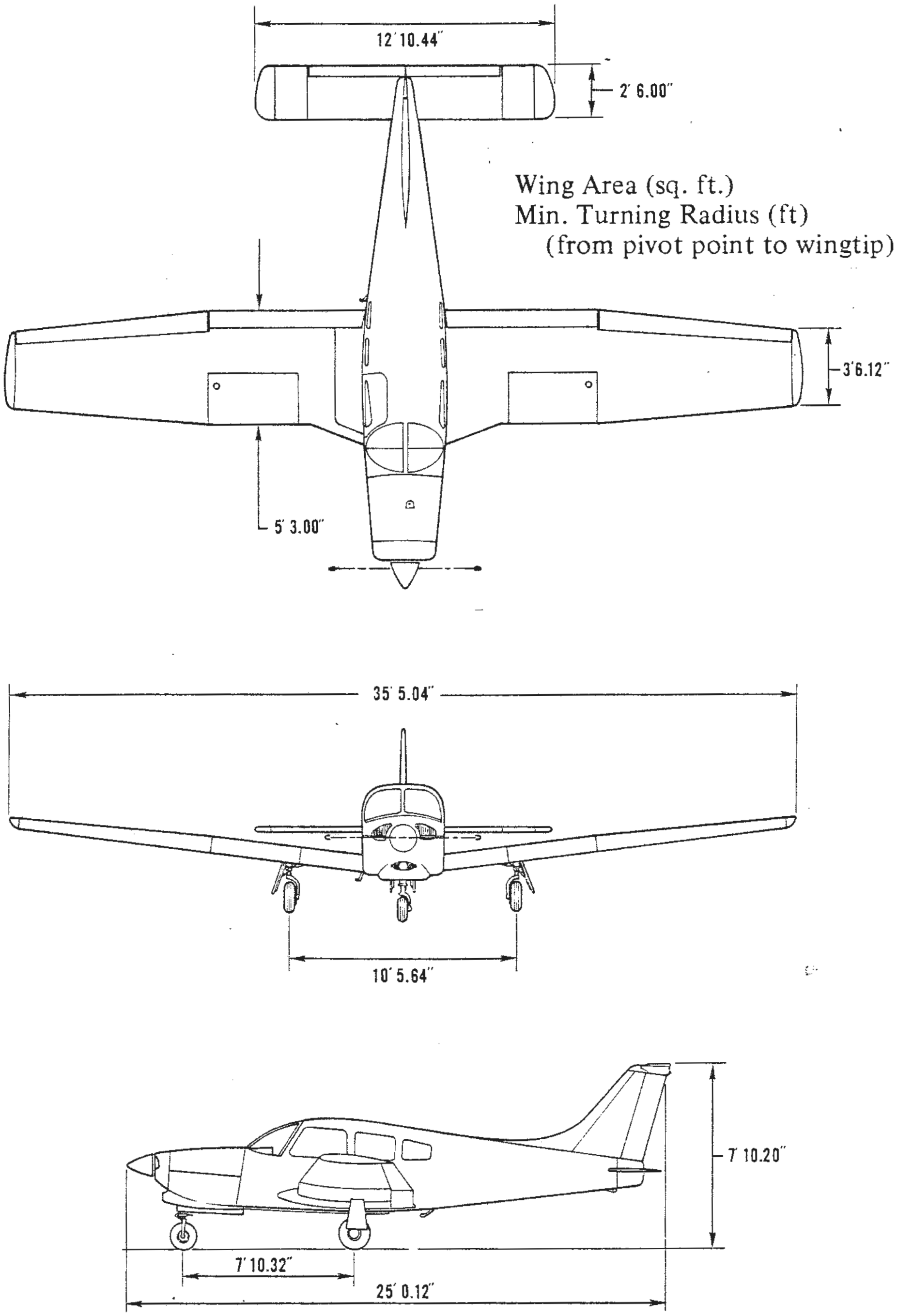
This Pilot's Operating Handbook is designed for maximum utilization as an operating guide for the pilot. It includes the material required to be furnished to the pilot by C.A.R. 3 and FAR Part 21 Subpart J. It also contains supplemental data supplied by the airplane manufacturer.

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.)	170.0
Min. Turning Radius (ft) (from pivot point to wingtip)	31.0

THREE VIEW

Figure 1-1

1.3 ENGINES

(a)	Number of Engines	1
(b)	Engine Manufacturer	Teledyne Continental
(c)	Engine Model Number	TSIO-360-F or TSIO-360-FB
(d)	Rated Horsepower	200 Sea Level to 12,000 Ft. Density Altitude
(e)	Rated Speed (rpm)	2575
(f)	Maximum Manifold Pressure (inches mercury)	41
(g)	Bore (inches)	4.438
(h)	Stroke (inches)	3.875
(i)	Displacement (cubic inches)	360
(j)	Compression Ratio	7.5:1
(k)	Engine Type	Six Cylinder, Direct Drive, Horizontally Opposed, Air Cooled, Turbosupercharged and Fuel Injected

1.5 PROPELLERS

(a)	Number of Propellers	1
(b)	Propeller Manufacturer	Hartzell
(c)	Blade Model	F8459A-8R
(d)	Number of Blades	2
(e)	Hub Model	BHC-C2YF-1BF
(f)	Propeller Diameter (inches)	
	(1) Maximum	76
	(2) Minimum	75
(g)	Propeller Type	Constant Speed, Hydraulically Actuated

1.7 FUEL

AVGAS ONLY

(a)	Fuel Capacity (U.S. gal) (total)	77
(b)	Usable Fuel (U.S. gal) (total)	72
(c)	Fuel Grade, Aviation	
	(1) Minimum Octane	Grade 100LL - Blue or 100/130 - Green
	(2) Specified Octane	100LL Blue or 100/130 - Green
	(3) Alternate Fuels	Refer to latest revision of Continental Service Bulletin "Fuel and Oil Grades"

1.9 OIL

(a)	Oil Capacity (U.S. quarts)		8
(b)	Oil Specification		MHS-24A
(c)	Oil Viscosity	SINGLE	MULTI
	(1) Above 40°F Ambient Air (Sea Level)	SAE 50	See Teledyne Continental TSIO-360-F Operator's Manual
	(2) Below 40°F Ambient Air (Sea Level)	SAE 30	

1.11 MAXIMUM WEIGHTS

(a)	Maximum Takeoff Weight (lbs)	2900
(b)	Maximum Landing Weight (lbs)	2900
(c)	Maximum Weights in Baggage Compartment	200

1.13 STANDARD AIRPLANE WEIGHTS*

(a)	Standard Empty Weight (lbs): Weight of a standard airplane including unusable fuel, full operating fluids and full oil.	1645
(b)	Maximum Useful Load (lbs.): The difference between the Maximum Takeoff Weight and the Standard Empty Weight.	1255

1.15 BAGGAGE SPACE

(a)	Compartment Volume (cubic feet)	24
(b)	Entry Width (inches)	22
(c)	Entry Height (inches)	20

1.17 SPECIFIC LOADINGS

(a)	Wing Loading (lbs per sq ft)	17
(b)	Power Loading (lbs per hp)	14.5

*These values are approximate and vary from one aircraft to another. Refer to Figure 6-5 for the Standard Empty Weight value and the Useful Load value 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_{LE}	Maximum Landing Gear Extended Speed is the maximum speed at which an aircraft can be safely flown with the landing gear extended.
V_{LO}	Maximum Landing Gear Operating Speed is the maximum speed at which the landing gear can be safely extended or retracted.
V_{NE}/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.
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 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.

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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	0.6818	mph
(ft./sec.)	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	277.4	cu. in.
(Imperial gal.)	1.201	U.S. gal.
	4.546	l
gallons, U.S. dry	268.8	cu. in.
(U.S. gal. dry)	1.556×10^{-1}	cu. ft.
	1.164	U.S. gal.
	4.405	l
gallons, U.S. liquid	231	cu. in.
(U.S. gal.)	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	0.1	kg/m
(g/cm)	6.721×10^{-2}	lb./ft.
	5.601×10^{-3}	lb./in.
grams per cubic	1000	kg/m^3
centimeter (g/cm^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	0.033421	atm
at 0°C (in. Hg)	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	3.9683	BTU
(kg-cal)	3087	ft.-lb.
	426.9	m-kg
kilograms per cubic	0.06243	lb./cu. ft.
meter (kg/m^3)	0.001	g/cm^3
kilograms per hectare (kg/ha)	0.892	lb./acre
kilograms per square	0.9678	atm
centimeter (kg/cm^2)	28.96	in. Hg
	14.22	lb./sq. in.
	2048	lb./sq. ft.

MULTIPLY	BY	TO OBTAIN
kilograms per square meter (kg/m²)	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

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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 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.	183	186
Maximum Structural Cruising Speed (V_{NO}) - Do not exceed this speed except in smooth air and then only with caution.	146	148
Design Maneuvering Speed (V_A) - Do not make full or abrupt control movements above this speed.		
At 2900 LBS. G.W.	119	121
At 1865 LBS. G.W.	96	96

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.

SPEED	KIAS	KCAS
Maximum Flaps Extended Speed (V_{FE}) - Do not exceed this speed with the flaps extended.	103	104
Maximum Landing Gear Extension Speed - Do not exceed this speed when extending the landing gear.	129	130
Maximum Landing Gear Retraction Speed - Do not exceed this speed when retracting the landing gear.	107	109
Maximum Landing Gear Extended Speed (V_{LE}) - Do not exceed this speed with the landing gear extended.	129	130

2.5 AIRSPEED INDICATOR MARKINGS

MARKING	IAS
Red Radial Line (Never Exceed)	183 KTS
Yellow Arc (Caution Range - Smooth Air Only)	146 KTS to 183 KTS
Green Arc (Normal Operating Range)	63 KTS to 146 KTS
White Arc (Flap Down)	56 KTS to 103 KTS

2.7 POWER PLANT LIMITATIONS

(a) Number of Engines	1
(b) Engine Manufacturer	Teledyne Continental
(c) Engine Model No.	TSIO-360-F or TSIO-360-FB
(d) Engine Operating Limits	
(1) Maximum Horsepower	200
(2) Maximum Rotation Speed (RPM)	2575
(3) Maximum Manifold Pressure (In. Mercury)	41
(4) Maximum Oil Temperature	240°F
(e) Oil Pressure	
Minimum (red line)	10 PSI
Maximum (red line)	100 PSI
(f) Fuel Pressure	
Maximum (red line)	19 PSI
(g) Fuel Grade (AVGAS ONLY) (minimum octane)	100LL - Blue or 100/130 - Green
(h) Number of Propellers	1
(i) Propeller Manufacturer	Hartzell
(j) Propeller Hub and Blade Model	BHC-C2YF-1BF/F8459A-8R
(k) Propeller Diameter	
Minimum	75 IN.
Maximum	76 IN.
(l) Blade Angle Limits	
Low Pitch Stop	14.2 $\pm$ .2°
High Pitch Stop	29 $\pm$ 1°

2.9 POWER PLANT INSTRUMENT MARKINGS

(a)	Tachometer	
	Green Arc (Normal Operating Range)	500 to 2000 RPM and 2200 to 2575 RPM
	Yellow Arc (Avoid continuous operation above 32" Hg. manifold pressure)	2000 to 2200 RPM
	Red Line (Maximum Continuous Power)	2575 RPM
(b)	Oil Temperature	
	Green Arc (Normal Operating Range)	100° to 240° F
	Red Line (Maximum)	240°F
(c)	Oil Pressure	
	Green Arc (Normal Operating Range)	30 PSI to 80 PSI
	Yellow Arc (Caution Range) (Idle)	10 PSI to 30 PSI
	Yellow Arc (Caution Range) (Start and Warm Up)	80 PSI to 100 PSI
	Red Line (Minimum)	10 PSI
	Red Line (Maximum)	100 PSI
(d)	Fuel Pressure	
	Green Arc (Normal Operating Range)	3.5 PSI to 19 PSI
	Red Line (Maximum)	19 PSI
(e)	Exhaust Gas Temperature (EGT)	
	Green Arc (Normal Operating Range)	1200° F to 1650°F
	Red Line (Maximum)	1650°F
(f)	Manifold Pressure	
	Green Arc (Normal Operating Range)	10 IN. to 41 IN. HG.
	Red Line (Maximum)	41 IN. HG.

2.11 WEIGHT LIMITS

(a)	Maximum Weight	2900 LBS
(b)	Maximum Baggage	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
2900	86.0	90.0
2240	78.0	90.0

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 SOLE RESPONSIBILITY OF THE PILOT IN COMMAND TO ENSURE THAT THE AIRPLANE IS PROPERLY LOADED AND IS WITHIN THE ALLOWABLE WEIGHT AND C.G. LIMITS.

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 OPERATIONS

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 — 77 U.S. GAL

(b) Unusable Fuel — 5 U.S. GAL
The unusable fuel for this airplane has been determined as 2.5 gallons in each wing tank in critical flight attitudes.

(c) Usable Fuel — 72 U.S. GAL
The usable fuel in this airplane has been determined as 36.0 gallons in each wing tank.

(d) Fuel remaining when the quantity indicators read zero cannot be used safely in flight.

2.23 OPERATING ALTITUDE LIMITATIONS

Flight above 20,000 feet is not approved. Flight up to and including 20,000 feet is approved if equipped with oxygen in accordance with F.A.R. 23.1441 and avionics in accordance with F.A.R. 91 or F.A.R. 135.

2.25 NOISE LEVEL

The noise level of this aircraft is 68.8 dBA.

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.

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2.27 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."

THIS AIRCRAFT APPROVED FOR NIGHT IFR 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 - Set
Auxiliary Fuel Pump - Off	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

Fuel on Proper Tank	Auxiliary Fuel Pump - Off	Gear Down (129 KIAS Max)
Seat Backs Erect	Mixture - Rich	Flaps - Set (103 KIAS Max)
Fasten Belts/Harness	Propeller - Set	Air Conditioner - Off

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
119 KIAS AT 2900
LBS. (SEE P.O.H.)

On the instrument panel in full view of the pilot:

"DEMONSTRATED CROSSWIND COMPONENT 17 KTS"

On the instrument panel in full view of the pilot:

"NO ACROBATIC MANEUVERS, INCLUDING SPINS, APPROVED."

On instrument panel in full view of the pilot:

"GEAR DOWN	129 KIAS (MAX)"
"GEAR UP	107 KIAS (MAX)"
"EXTENDED	129 KIAS (MAX)"

Near emergency gear lever:

"EMERGENCY DOWN"

"OVERRIDE ENGAGED AUTO-EXT-OFF
LOCK PIN ON SIDE
TO ENGAGE OVERRIDE:
PULL LEVER FULL UP, PUSH LOCK PIN
TO RELEASE OVERRIDE:
PULL LEVER FULL UP & RELEASE"

Near gear selector switch:

"GEAR UP	107 KIAS MAX"
"DOWN	129 KIAS MAX"

Adjacent to upper door latch:

"ENGAGE LATCH BEFORE FLIGHT"

On the instrument panel in full view of the pilot:

"WARNING – TURN OFF STROBE LIGHTS WHEN IN CLOSE PROXIMITY TO GROUND 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 inside of baggage compartment door:

"BAGGAGE MAXIMUM 200 LBS. SEE WEIGHT AND BALANCE DATA FOR BAGGAGE LOADING BETWEEN 150 LBS AND 200 LBS."

Adjacent to fuel tank filler caps:

> "FUEL – 100/130 AVIATION GRADE – MIN. USABLE CAPACITY 36 GAL."
>
> "USABLE CAPACITY TO BOTTOM OF FILLER NECK INDICATOR 25 GAL."

Above fuel quantity gauges:

> "FUEL REMAINING WHEN QUANTITY INDICATOR READS ZERO CANNOT BE USED SAFELY IN FLIGHT."

On the instrument panel in full view of the pilot:

> "AVOID CONTINUOUS GROUND OPERATION 1700-2100 RPM IN CROSS/TAIL WIND OVER 10 KTS."
>
> "AVOID CONTINUOUS OPERATION 2000-2200 RPM ABOVE 32" MANIFOLD PRESSURE."

On the aft baggage closeout:

> "MAXIMUM BAGGAGE 200 LBS. NO HEAVY OBJECTS ON HAT SHELF."

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SECTION 3

EMERGENCY PROCEDURES

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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 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 in Section 9 (Supplements).

The first portion of this section consists of an abbreviated emergency checklist 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 a course of action for coping with the particular condition described, but are not a substitute for sound judgment and common sense. 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.

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3.3 EMERGENCY PROCEDURES CHECK LIST

ENGINE FIRE DURING START

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

TURBOCHARGER FAILURE

CAUTION

If a turbocharger failure is the result of loose, disconnected or burned through exhaust system components, a potentially serious fire hazard exists as well as the risk of carbon monoxide migration into the passenger compartment of the aircraft. If a failure within the exhaust system is suspected in flight, immediately reduce power to idle (or as low a power setting as possible) and LAND AS SOON AS POSSIBLE. If a suspected exhaust system failure occurs prior to takeoff, DO NOT FLY THE AIRCRAFT.

NOTE

A turbocharger malfunction may result in an overly rich fuel mixture, which could result in a partial power loss and/or a rough running engine. In worst-case conditions a complete loss of engine power may result.

COMPLETE LOSS OF ENGINE POWER

If a suspected turbocharger or turbocharger control system failure results in a complete loss of engine power, the following procedure is recommended:

Mixture ....IDLE CUTOFF
Throttle ....CRUISE
Propeller Control ....TAKEOFF
Mixture ....ADVANCE SLOWLY until until engine restarts and adjust for smooth engine operation.

Reduce power and land as soon as possible.

PARTIAL LOSS OF ENGINE POWER

If the turbocharger wastegate fails in the OPEN position, a partial loss of engine power may result. The following procedure is recommended if a suspected turbocharger or turbocharger wastegate control failure results in a partial loss of engine power.

Throttle...AS REQUIRED
Propeller Control...............................AS REQUIRED
Mixture...AS REQUIRED
Land as soon as possible

ENGINE POWER OVERBOOST

If the turbocharger wastegate control fails in the CLOSED position, an engine power overboost condition may occur. The following procedure is recommended for an overboost condition:

Throttle ....REDUCE as necessary to keep manifold pressure within limits.

NOTE

Expect manifold pressure response to throttle movements to be sensitive.

Propeller...AS REQUIRED
Mixture...AS REQUIRED
Land as soon as possible

ENGINE POWER LOSS DURING TAKEOFF

If sufficient runway remains for a normal landing, leave gear down and land straight ahead.

If area ahead is rough, or if it is necessary to clear obstructions:
Gear selector switch ....UP
Emergency gear lever (on aircraft equipped with backup gear extender) ....locked in OVERRIDE ENGAGED position

If sufficient altitude has been gained to attempt a restart:
Maintain safe airspeed.
Fuel selector..switch to tank containing fuel
Auxiliary fuel pump ....unlatch, HI

3.3 EMERGENCY PROCEDURES CHECK LIST

Mixture ....check RICH
Alternate air ....OPEN
Emergency gear lever ....as required
If power is not regained, proceed with power off landing.

ENGINE POWER LOSS IN FLIGHT

Fuel selector...switch to tank containing fuel
Auxiliary fuel pump ....unlatch, HI
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
Auxiliary fuel pump..OFF
If power is not restored prepare for power off landing.
Trim for 97 KIAS.

POWER OFF LANDING

On aircraft equipped with the backup gear extender, lock the emergency gear lever in the OVERRIDE ENGAGED position before the airspeed drops below 106 KIAS to prevent the landing gear from free-falling.
Trim for 97 KIAS.
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 75 KIAS for shortest landing.

GEAR DOWN EMERGENCY LANDING

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

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

GEAR UP EMERGENCY LANDING

In the event a gear up landing is required, proceed as follows:
Flaps ....as desired
Throttle...close
Mixture ....idle cut-off
Ignition switches ....OFF
Master switch ....OFF
Fuel selector...OFF
Seat belt and harness...tight
Contact surface at minimum possible airspeed.

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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
Auxiliary 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

Auxiliary fuel pump ....unlatch, HI
Fuel selector ....check on full tank

ENGINE DRIVEN FUEL PUMP FAILURE

Throttle ....retard
Auxiliary fuel pump ....unlatch, HI
Throttle..reset (75% power or below)

CAUTIONS

If normal engine operation and fuel flow is not immediately re-established, the auxiliary fuel pump should be turned off. The lack of a fuel flow indication while in the HI auxiliary fuel pump position could indicate a leak in the fuel system, or fuel exhaustion.

DO NOT actuate the auxiliary fuel pump unless vapor suppression is required (LO position) or the engine driven fuel pump fails (HI position). The auxiliary pump has no standby function. Actuation of the HI switch position when the engine is operating normally, may cause engine roughness and/or power loss.

If the auxiliary fuel pump switch or primer switch fails causing the auxiliary fuel pump to be activated in the HI mode while the engine driven fuel pump is operating normally, engine roughness and/or power loss could occur. Should this condition exist; pull out the fuel pump pull-type circuit breaker, if so equipped or shut off the master switch.

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.

If battery is fully discharged, the gear will have to be lowered using the emergency gear extension procedure. Position lights will not illuminate.

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 2575 rpm

EMERGENCY LANDING GEAR EXTENSION

Prior to emergency extension procedure:
Master switch ....check ON
Circuit breakers .... check
Panel lights ....Off (in daytime)
Gear indicator bulbs .... check
Emergency Gear Extension Lever .... Up position

NOTE

For aircraft equipped with the backup gear extender, the Emergency Gear Extension Lever should be in the normal/ disengaged position.

If landing gear does not check down and locked:
Airspeed .... reduce below 88 KIAS
Landing gear selector switch .... gear DOWN position
If gear has failed to lock down on aircraft equipped with the backup gear extender, raise emergency gear lever to Override Engaged position.
If gear has still failed to lock down, move and ***hold*** the emergency gear lever down to the Emergency Down position.
If gear has still failed to lock down, yaw the airplane abruptly from side to side with the rudder.

If the nose gear will not lock down using the above procedure, slow the aircraft to the lowest safe speed attainable using the lowest power setting required for safe operation and accomplish the following:
Emergency gear lever (on aircraft equipped with the backup gear extender)....................Override Engaged position
Landing gear selector switch ......gear DOWN position
If landing gear does not check down, recycle gear through up position, and then select gear DOWN.

SPIN RECOVERY

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

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

ENGINE ROUGHNESS

Mixture............................ adjust for max. smoothness
Alternate air .... OPEN
Fuel selector .... switch tanks
Engine gauges .... check
Magneto switch ....L then R then 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.

EMERGENCY DESCENT

A malfunction of the oxygen system requires an immediate descent to an altitude at or below 12,500 feet.

NOTE

Time of useful consciousness at 20,000 ft is approximately 10 minutes. In the event an emergency descent becomes necessary: CLOSE the throttle and move the propeller control full FORWARD. Adjust the mixture control as necessary to attain smooth operation. Extend the landing gear and flaps at 103 KIAS and maintain this airspeed.

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.

3.8 TURBOCHARGER FAILURE

CAUTION

If a turbocharger failure is the result of loose, disconnected or burned through exhaust system components, a potentially serious fire hazard exists as well as the risk of carbon monoxide migration into the passenger compartment of the aircraft. If a failure within the exhaust system is suspected in flight, immediately reduce power to idle (or as low a power setting as possible) and LAND AS SOON AS POSSIBLE. If a suspected exhaust system failure occurs prior to takeoff, DO NOT FLY THE AIRCRAFT.

NOTE

A turbocharger malfunction may result in an overly rich fuel mixture, which could result in a partial power loss and/or a rough running engine. In worst-case conditions a complete loss of engine power may result.

COMPLETE LOSS OF ENGINE POWER

If a suspected turbocharger or turbocharger control system failure results in a complete loss of engine power, the following procedure is recommended. Retard the mixture control to the IDLE CUTOFF position. If necessary, reset the throttle to cruise power position and the propeller control to the full forward position. Slowly advance the mixture until the engine restarts and adjust for smooth engine operation. Reduce the power to the minimum required and land as soon as possible.

3.8 TURBOCHARGER FAILURE (Continued)

PARTIAL LOSS OF ENGINE POWER

If the turbocharger wastegate fails in the OPEN position, a partial loss of engine power may result. The following procedure is recommended if a suspected turbocharger or turbocharger wastegate control failure results in a partial loss of engine power.

Should a partial loss of engine power occur (i.e. wastegate fails open), the throttle, propeller and mixture controls can be set as required for flight. Monitor all engine gauges and land as soon as possible to have the cause of the power loss investigated.

ENGINE POWER OVERBOOST

If the turbocharger wastegate control fails in the CLOSED position, an engine power overboost condition may occur. If an overboost condition occurs, REDUCE the THROTTLE as necessary to keep the manifold pressure within limits.

NOTE

Expect manifold pressure response to throttle movements to be sensitive.

Set the propeller and mixture control as necessary. Land as soon as possible.

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, leave the landing gear down and land straight ahead.

If the area ahead is rough, or if it is necessary to clear obstructions, move the gear selector switch to the UP position. On aircraft equipped with the backup gear extender, lock the emergency gear lever in the OVERRIDE ENGAGED position.

If sufficient altitude has been gained to attempt a restart, maintain a safe airspeed and switch the fuel selector to another tank containing fuel. Place the auxiliary fuel pump to * HI. Check that the mixture is RICH. The alternate air should be OPEN.

On aircraft equipped with the backup extender, the landing gear will extend automatically when engine power fails at speeds below approximately 103 KIAS. The glide distance with the landing gear extended is roughly halved. If the situation dictates, the landing gear can be retained in the retracted position by locking the emergency gear lever in the OVERRIDE ENGAGED position.

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).

*The HI position on the auxiliary fuel pump switch is guarded and must be unlatched before it can be activated.

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 97 KIAS should be maintained.

If altitude permits, switch the fuel selector to another tank containing fuel and turn the auxiliary fuel pump to*"HI." 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 auxiliary 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 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).

*The "HI" position on the auxiliary fuel pump switch is guarded and must be unlatched before it can be activated.

3.13 POWER OFF LANDING

If loss of power occurs at altitude, trim the aircraft for best gliding angle (97 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 1.6 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 75 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.

Whether to attempt a landing with gear up or down depends on many factors. If the field chosen is obviously smooth and firm, and long enough to bring the plane to a stop, the gear should be down. If there are stumps or rocks or other large obstacles in the field, the gear in the down position will better protect the occupants of the aircraft. If, however, the field is suspected to be excessively soft or short, or when landing in water of any depth, a wheels-up landing will normally be safer and do less damage to the airplane.

Don't forget that at airspeeds below approximately 103 KIAS the gear will free fall, and will take six to eight seconds to be down and locked. If a gear up landing is desired, it will be necessary to lock the override lever in the "OVERRIDE ENGAGED" position before the airspeed drops to 106 KIAS to prevent the landing gear from inadvertently free failing.

Touchdown should normally be made at the lowest possible airspeed.

(a) Gear Down Emergency Landing

When committed to a gear down emergency 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.

Always remember that the automatic gear mechanism will extend the gear below approximately 103 KIAS with power off. Be prepared to lock the emergency gear lever in the "OVERRIDE ENGAGED" position before the airspeed drops to 106 KIAS to prevent the landing gear from inadvertently free falling, unless gear extension is desired.

NOTE

If the master switch is "OFF," the gear cannot be retracted.

(b) Gear Up Emergency Landing

In the event a gear up landing is required lock the emergency gear lever in "Override Engaged" position before the airspeed drops to 106 KIAS to prevent the landing gear from inadvertently free falling. Wing flaps should be extended as desired.

When committed to a gear up landing, CLOSE the throttle and shut "OFF" the master and ignition switches. Turn "OFF" the fuel selector valve.

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

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 auxiliary 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

The most probable cause of loss of fuel pressure is either fuel depletion in the fuel tank selected, or failure of the engine driven fuel pump. If loss of fuel pressure occurs, check that the fuel selector is on a tank containing fuel; place auxiliary fuel pump on "HI" until fuel pressure recovers, then turn OFF.

If loss of fuel pressure is due to failure of the engine driven fuel pump, the auxiliary fuel pump system can supply sufficient fuel pressure for engine power up to approximately 75%. Any combination of RPM and Manifold Pressure defined in the Power Setting Table may be used, but leaning may be required for smooth operation at altitudes above 15,000 feet, or for RPM below 2300. Normal cruise, descent and approach procedures should be used.

If failure of the engine driven fuel pump is suspected, retard throttle and unlatch the auxiliary fuel pump and place in "HI" position. The throttle can then be reset at 75% power or below.

CAUTION

If normal engine operation and fuel flow is not immediately re-established, the auxiliary fuel pump should be turned off. The lack of a fuel flow indication while on the HI auxiliary fuel pump position could indicate a leak in the fuel system, or fuel exhaustion.

DO NOT actuate the auxiliary fuel pump unless vapor suppression is required (LO position) or the engine driven fuel pump fails (HI position). The auxiliary pump has no standby function. Actuation of the HI switch position when the engine is operating normally may cause engine roughness and/or power loss.

3.21 ENGINE DRIVEN FUEL PUMP FAILURE

If an engine driven fuel pump failure is indicated, immediately retard the throttle. The auxiliary fuel pump switch should be unlatched and the HI position selected. The throttle should then be reset at 75% power or below.

CAUTIONS

If normal engine operation and fuel flow is not immediately re-established, the auxiliary fuel pump should be turned off. The lack of a fuel flow indication while on the HI auxiliary fuel pump position could indicate a leak in the fuel system, or fuel exhaustion.

DO NOT actuate the auxiliary fuel pump unless vapor suppression is required (LO position) or the engine driven fuel pump fails (HI position). The auxiliary pump has no standby function. Actuation of the HI switch position when the engine is operating, normally may cause engine roughness and/or power loss.

If the auxiliary fuel pump switch or primer switch fails causing the auxiliary fuel pump to be activated in the HI mode while the engine driven fuel pump is operating normally, engine roughness and/or power loss could occur. Should this condition exist; pull out the fuel pump pull-type circuit breaker, if so equipped or shut off the master switch.

3.23 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.

3.25 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.

3.27 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 2575 RPM.

3.29 EMERGENCY LANDING GEAR EXTENSION

Prior to initiating the emergency extension procedure check to insure that the master switch is "ON" and that the circuit breakers have not opened. If it is daytime the panel lights should be turned OFF. Check the landing gear indicators for faulty bulbs.

If the landing gear does not check down and locked, reduce the airspeed below 88 KIAS. Move the landing gear selector switch to the "DOWN" position. If the gear has failed to lock down, raise the emergency gear lever to the "OVERRIDE ENGAGED" position.

If the gear has still failed to lock down, move the emergency gear lever to the "EMERGENCY DOWN" position.

If the gear has still failed to lock down, yaw the airplane abruptly from side to side with the rudder.

If the nose gear will not lock down using the above procedure, slow the airplane to the lowest safe speed attainable using the lowest power setting required for safe operation and raise the emergency gear lever to the "OVERRIDE ENGAGED" position. Move the landing gear selector switch to the gear "DOWN" position. If the landing gear does not check down, recycle the gear through the "UP" position and then select the "DOWN" position.

3.31 SPIN RECOVERY

Intentional spins are prohibited in this airplane. If a spin is inadvertently entered, immediately apply full rudder opposite to the direction of rotation. Move the control wheel full forward while neutralizing the ailerons. Move the throttle to "IDLE." When the rotation stops, neutralize the rudder and ease back on the control wheel as required to smoothly regain a level flight attitude.

3.33 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 bottom 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 arm rest while moving the latch handle to the latched position. If both latches are open, close the side latch then the top latch.

3.35 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."

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.

3.37 EMERGENCY DESCENT

A malfunction of the oxygen system requires an immediate descent to an altitude at or below 12,500 feet.

NOTE

Time of useful consciousness at 20,000 ft. is approximately 10 minutes. In the event an emergency descent becomes necessary, CLOSE the throttle and move the propeller control full FORWARD. Adjust the mixture control as necessary to attain smooth operation. Extend the landing gear and flaps at 103 KIAS and maintain this airspeed.

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SECTION 4

NORMAL PROCEDURES

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SECTION 4

NORMAL PROCEDURES

4.1 GENERAL

This section clearly describes the recommended procedures for the conduct of normal operations for the Cherokee Turbo Arrow III. All of the required (FAA regulations) procedures and those necessary for operation of the airplane as determined by the operating and desgin 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 lengthly 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	
gear up, flaps up	96 KIAS
gear down, flaps up	78 KIAS
(b) Best Angle of Climb Speed	
gear up, flaps up	78 KIAS
gear down, flaps up	71 KIAS
(c) Turbulent Air Operating Speed (See Subsection 2.3)	119 KIAS
(d) Maximum Flap Speed	103 KIAS
(e) Landing Final Approach Speed (Flaps 40°)	75 KIAS
(f) Maximum Demonstrated Crosswind Velocity	17 KTS

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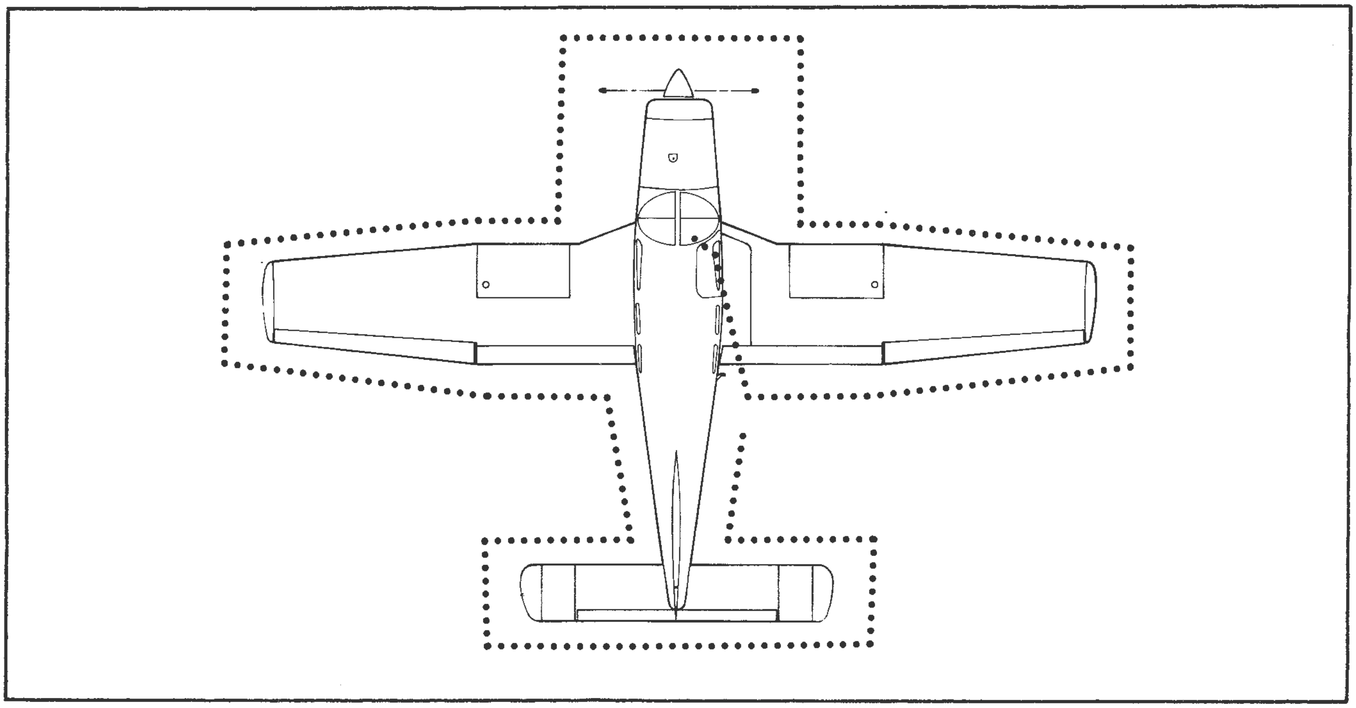

WALK-AROUND

Figure 4-1

4.5 NORMAL PROCEDURE CHECKLIST

PREFLIGHT

Control .... release belts
Master switch .... ON
Fuel quantity gauges .... check
Master switch .... OFF
Ignition .... OFF
Exterior .... check for damage
Control surface .... check for interference - free of ice, snow, frost
Hinges .... check for interference
Wings .... free of ice, snow, frost
Stall warning .... check
Navigation lights .... check
Fuel tanks .... check supply visually - secure caps
Fuel tank sumps .... drain and check for water, sediment and proper fuel
Fuel vents .... open
Main gear struts .... proper inflation (2.5 ± ,25 in.)
Tires .... check
Brake blocks .... check
Fuselage static vents .... clear

Pitot head .... remove cover - holes clear
Windshield .... clean
Propeller and spinner .... check
Engine baffle seals .... check
Fuel and oil .... check for leaks
Oil .... check level
Dipstick .... properly seated
Cowling .... secure
Inspection covers .... secure
Nose wheel tire .... check
Nose gear strut .... proper inflation (2.75 ± .25 in.)
Air inlets .... clear
Tow bar and control locks .... stow
Baggage .... stowed properly - secure
Baggage door .... close and secure
Fuel strainer .... drain and check for water, sediment and proper fuel
Primary flight controls .... proper operation
Cabin doors .... close and secure
Required papers .... on board
Seat belts and harness .... fastened - check inertia reel

BEFORE STARTING ENGINE

Parking brake . . . . set
Propeller . . . . full INCREASE rpm
Fuel selector . . . . desired tank
Alternate air . . . . OFF

STARTING ENGINE (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

Fuel selector . . . . ON
Mixture . . . . RICH
Throttle . . . . half travel
Propeller . . . . FORWARD
Master switch . . . . ON
Propeller . . . . clear
Starter . . . . engage
Primer button . . . . ON as required
Throttle . . . . retard when engine starts
Oil pressure . . . . check
Alternator . . . . check
Gyro vacuum . . . . check

STARTING ENGINE (AIRPLANE EQUIPPED WITH OPTIONAL ENGINE PRIMER SYSTEM)

Fuel selector . . . . ON
Mixture . . . . full RICH
Throttle . . . . full FORWARD
Prop control . . . . full FORWARD
Master switch . . . . ON
Auxiliary fuel pump . . . . OFF
Primer . . . . ON
See Figure 4-3 for Priming Time
Throttle . . . . CLOSE
Starter . . . . engage immediately
At temperatures below +20°F continue priming while cranking until engine starts.

When engine starts firing - open throttle very slowly to raise engine speed to 1000 RPM. As engine speed accelerates through 500 RPM, release starter.
Primer . . . . release
Auxiliary fuel pump . . . . low only as necessary to obtain smooth engine operation (1-3 minutes will be required when temp. is below 20°F)
Oil pressure . . . . check
Alternator . . . . check
Gyro vacuum . . . . check

STARTING ENGINE WHEN FLOODED

Mixture . . . . idle cut-off
Throttle . . . . full FORWARD
Propeller . . . . FORWARD
Master switch . . . . ON
Auxiliary fuel pump . . . . OFF
Propeller . . . . clear
Starter . . . . engage

When engine fires:
Throttle . . . . retard
Mixture . . . . advance slowly

STARTING ENGINE IN COLD WEATHER (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

Fuel selector . . . . ON
Mixture . . . . IDLE CUTOFF
Throttle . . . . full FORWARD
Prop control . . . . full FORWARD
Master switch . . . . ON
Auxiliary fuel pump . . . . ON HIGH BOOST
Starter . . . . engage
Mixture . . . . full FORWARD for 3 sec.
Throttle . . . . full FORWARD to full AFT
Mixture . . . . full FORWARD for 3 sec.
full AFT for 3 sec.
full FORWARD for 3 sec.

When engine fires:
Starter .... leave engaged
Auxiliary fuel pump .... ON LOW BOOST
Primer button .... tap until rhythmic firing
Starter .... release
Throttle .... half travel
Oil pressure .... check

If engine begins to falter:
Primer button .... tap
Throttle .... 1000 RPM
Auxiliary fuel pump .... OFF after start complete

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 .... 900 to 1200 RPM

TAXIING

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

GROUND CHECK

Parking brake .... set
Propeller .... full INCREASE
Throttle .... 1800 to 2000 RPM
Magnetos .... max. drop 150 RPM - max. diff 50 RPM
Vacuum .... 4.8" Hg. to 5.1" Hg.
Oil temperature .... 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 oil temperature is at least 100°F.
Auxiliary fuel pump .... OFF
Fuel pressure .... check
Throttle .... retard
Manifold pressure line .... drain

BEFORE TAKEOFF

Master switch .... ON
Flight instruments .... check
Fuel selector .... proper tank
Auxiliary fuel pump .... OFF
Engine gauges .... check
Alternate air .... CLOSED
Seat backs .... erect
Mixture .... set
Prop .... set
Belts/harness .... fastened
Empty seats .... seat belts snugly fastened
Flaps .... set
Trim tab .... set
Emergency Gear Extension Lever .... UP POSITION

NOTE

For aircraft equipped with the backup gear extender, the Emergency Gear Extension Lever should be in the normal/disengaged position.

Controls .... free
Doors .... latched
Air conditioner .... OFF
Parking brake .... release

TAKEOFF

NORMAL

Flaps .... set
Tab .... set
Accelerate to 70 to 77 KIAS.
Control wheel .... back pressure to rotate to climb attitude

SHORT FIELD, OBSTACLE CLEARANCE

Flaps .... 25° (second notch)
Accelerate to 53 to 64 KIAS depending on aircraft weight.
Control wheel .... back pressure to rotate to climb attitude
After breaking ground, accelerate to 59 to 68 KIAS depending on aircraft weight.
Gear (OVERRIDE ENGAGED on aircraft equipped with backup gear extender) .... UP
Accelerate to best flaps up angle of climb speed - 78 KIAS, slowly retract the flaps and climb past the obstacle.
Accelerate to best flaps up rate of climb speed - 96 KIAS.

SOFT FIELD

Flaps .... 25° (second notch)
Accelerate to 53 to 64 KIAS depending on aircraft weight.
Control wheel .... back pressure to rotate to climb attitude
After breaking ground, accelerate to 59 to 68 KIAS depending on aircraft weight.
Gear (OVERRIDE ENGAGED on aircraft equipped with backup gear extender .... UP
Accelerate to best flaps up rate of climb speed 96 KIAS
Flaps .... retract slowly

TAKEOFF CLIMB

Mixture .... full RICH
Prop speed .... 2575 RPM
Manifold pressure .... DO NOT EXCEED 41 in. Hg.

Climb speed
Best angle .... 78 KIAS
Best rate .... 96 KIAS

CRUISE CLIMB

Mixture .... full RICH

Prop speed .... 2450 RPM
Manifold pressure .... 33 in. Hg.
Climb speed .... 104 KIAS

CRUISING

Reference performance charts, Teledyne Continental Operator's Manual and power setting table.
Normal max power 75%
Power .... set per power table
Mixture .... adjust

APPROACH AND LANDING

Fuel selector .... proper tank
Seat backs .... erect
Belts/harness .... fasten
Mixture .... set
Propeller .... set
Emergency Gear Extension Lever .... UP POSITION

NOTE

For aircraft equipped with the backup gear extender, the Emergency Gear Extension Lever should be in the normal/disengaged position.

Gear .... down - 129 KIAS max
Flaps .... set - 103 KIAS max
Air conditioner .... OFF
Trim to 75 KIAS.

STOPPING ENGINE

Flaps .... retract
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

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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 distance and in-flight performance. A weather briefing should be obtained for the intended flight path, and any other factors relating to a 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.

Upon entering the cockpit, release the seat belts securing the control whel. Turn "ON" the master switch and check the fuel quantity gauges for sufficient fuel. After the fuel quantity check is made turn the master switch "OFF" and check that the ignition switch is "OFF."

To begin the exterior walk-around, check for external damage and operational interference of the control surfaces or hinges. Insure that the wings and control surfaces are free of snow, ice, frost or any other foreign materials.

An operational check of the stall warning system and navigation lights should now be made. Turn the master switch "ON." Lift the detector while checking to determine if the horn is actuated and check that the navigation lights are illuminated. The master switch should be returned to the "OFF" position after the checks are complete.

A visual check of the fuel tank quantity should be performed. Remove the filler cap from each tank and visually check the supply. Be sure to secure the caps properly after the check is complete.

The fuel system tank sumps and strainer should be drained and checked daily prior to the first flight and after refueling for water, sediment and proper fuel. Each fuel tank is equipped with an individual quick drain located at the lower inboard rear corner of the tank. The fuel strainer is located on the lower left side of the fire wall, and the strainer drain is accessible through a hole in the lower cowl approximately 3 inches forward of the fire wall.

CAUTION

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

Check all the fuel tank vents to make sure they are open.

Next, complete a check of the landing gear. Check the main gear shock struts for proper inflation. There should be 2.5 ± .25 inches of strut exposure under a normal static load. The nose gear should be checked for 2.75 ± .25 inches of strut exposure. Check all tires for cuts and wear and insure proper inflation. Make a visual check of the brake blocks for wear or damage.

Remove the cover from the pitot head on the underside of the left wing. Check the pitot head to make sure the holes are open and clear of obstructions. Check static vent holes on both sides of aft fuselage to make sure the holes are open and clear of obstructions.

Don't forget to clean and check the windshield.

The propeller and spinner should be checked for defects or nicks.

Check the air inlets for foreign matter.

Looking through the nose cowl air inlets, visually check the cylinder baffle seals on the left and right side for proper installation. The seals should roll up against the inner surface of the upper cowl. They should NOT be rolled down below the baffles.

Check for any obvious fuel or oil leaks. Check the oil level (six to eight quarts). Make sure that the dipstick has properly seated after checking.

CAUTION

Check and insure that the oil filler cap is securely tightened and secure the inspection door.

Stow the tow bar and check the baggage for proper storage and security. The baggage compartment doors should be closed and secure.

Upon entering the aircraft, ascertain that all primary flight controls operate properly. Close and secure the cabin door and check that all the required papers are in order and in the airplane.

Fasten the seat belts and shoulder harness and check the function of the inertia reel by pulling sharply on the strap. Fasten seat belts on empty seats.

4.11 BEFORE STARTING ENGINE

Before starting the engine the parking brake should be set and the propeller lever moved to the full "INCREASE" rpm position. The fuel selector should then be moved to the desired tank.

4.13 STARTING ENGINE (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

The first step in starting is to move the fuel selector to the ON position. Advance the mixture control to full RICH, open the throttle half travel and move the propeller control full FORWARD. Turn ON the master switch. After ensuring that the propeller is clear, engage the starter by rotating the magneto switch clockwise. The primer button should be used (ON) as required. For cold weather starts, refer to Paragraph 4.19 - Starting Engines in Cold Weather. When the engine starts, retard the throttle and monitor the oil pressure gauge. If no oil pressure is indicated within 30 seconds, shut down the engine and have it checked. In cold weather it may take somewhat longer for an oil pressure indication. After the engine has started, check the alternator for sufficient output and the gyro pressure gauge for a reading between 4.8 and 5.1 Hg.

NOTE

To prevent starter damage, limit starter cranking to 30 second periods. If the engine does not start within that time, allow a cooling period of several minutes before engaging starter again. Do not engage the starter immediately after releasing it. This practice may damage the starter mechanism.

4.15 STARTING ENGINE (AIRPLANE EQUIPPED WITH OPTIONAL ENGINE PRIMER SYSTEM)

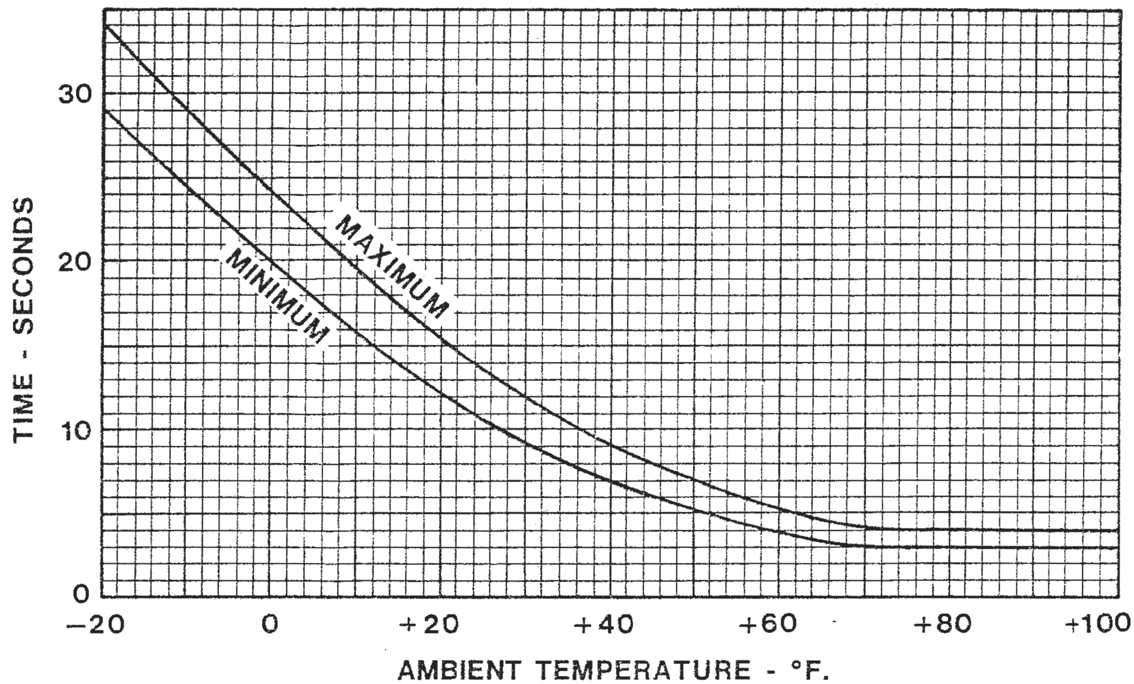
NOTE

Engine starts can be accomplished down to ambient temperatures of +20°F with engine equipped with standard (massive electrode) spark plugs. Below that temperature fine wire spark plugs are highly recommended to ensure engine starts, and are a necessity at +10°F and below. In addition, the use of external electrical power source is also recommended when ambient temperatures are below +20°F.

Upon entering the cockpit, begin starting procedure by moving the fuel selector to ON. Advance the mixture to full RICH and the throttle and prop controls to full FORWARD. Turn the master switch ON. The electric fuel boost pump should be OFF. Push primer switch and hold for the required priming time (see Figure 4-3). Close throttle and immediately engage starter by rotating the magneto switch clockwise. With ambient temperatures above +20° F, starts may be made by discontinuing priming before engaging starter. With ambient temperatures below +20° F, starts should be made by continuing to prime during cranking period. Do not release starter until engine accelerates through 500 RPM, then SLOWLY advance throttle to obtain 1000 PRM. Release primer and immediately place auxiliary fuel pump switch to LO. Auxiliary fuel pump operation will be required for one to three minutes initial engine warm-up.

NOTE

When cold weather engine starts are made without the use of engine preheating or other precautions (refer to TCM Operator's Manual), longer than normal elapsed time may be required before an oil pressure indication is observed.



OPTIONAL ENGINE PRIMER SYSTEM - PRIMING TIME VS. AMBIENT TEMPERATURE

Figure 4-3

4.17 STARTING ENGINE WHEN FLOODED

If an engine is flooded, move the mixture control to idle cut-off and advance the throttle and propeller controls full forward. Turn ON the master switch. The auxiliary fuel pump should be OFF. After ensuring that the propeller is clear, engage the starter by rotating the magneto switch clockwise. When the engine fires, retard the throttle and advance the mixture slowly.

4.19 STARTING ENGINE IN COLD WEATHER (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

NOTE

As cold weather engine operations are decidedly more demanding, it may become necessary to utilize the starting procedure listed below in low ambient temperatures. (See Continental Engine Operator's Manual for Cold Weather Operating Recommendations.)

NOTE

It may be necessary to apply an external power source to facilitate engine cranking if the aircraft's battery is deficient of charge.

Prior to attempting the start, turn the propellers through by hand three times. Upon entering the cockpit, begin the starting procedure by moving the fuel selector to ON. Advance the throttle and prop controls to full forward. Move the mixture control to idle cutoff. Turn ON the master switch. The auxiliary fuel pump should be ON in the HIGH position. Engage the starter (rotate magneto switch clockwise) and advance the mixture control to full RICH simultaneously. Begin moving the throttle control back and forth from full forward to full aft. Place the mixture control in idle cutoff after about 3 seconds of cranking. Leave the mixture control in idle cutoff for 3 seconds of cranking and then advance to full RICH for about 3 seconds. Repeat this procedure until the engine begins to fire.

When the engine begins firing, place the auxiliary fuel pump switch to the LOW position, leave the starter engaged and tap the primer periodically until a rhythmic firing pattern is observed. When a rhythmic pattern is attained, release the starter switch and position the throttle at half travel. Tap the primer button if the engine begins to falter during this period and adjust the throttle to a 1,000 RPM idle speed.

The auxiliary fuel pump may be turned OFF as soon as it is determined that the engine will continue to run without it.

4.21 STARTING 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.

4.23 WARM-UP

Warm-up the engine at 900 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 oil temperature is at least 100°F and throttle may be opened to 41 inches manifold pressure 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.

4.25 TAXIING

Before attempting to taxi the airplane, ground personnel should be instructed and approved by a qualified person authorized by the owner. The chocks should be removed and the parking brake released. 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.

4.27 GROUND CHECK

Set the parking brake. The magnetos should be checked at 1800 to 2000 RPM with the propeller set at high RPM. Drop off on either magneto should not exceed 150 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 between 4.8 and 5.1 inches 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 200 RPM to 300 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.

Drain the manifold pressure line by running the engine at 1000 RPM and depressing the drain valve located behind and below the manifold pressure gauge for 5 seconds. Do not depress the valve when the manifold pressure exceeds 25 inches Hg.

4.29 BEFORE TAKEOFF

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

After takeoff on aircraft equipped with the backup gear extender, if the gear selector switch is placed in the gear up position before reaching the airspeed at which the system no longer commands gear down*, the gear will not retract. For obstacle clearance on takeoff and for takeoffs from high altitude airports, the landing gear can be retracted after lift-off at the pilot's discretion by placing the gear selector switch in the "UP" position and then locking the emergency gear lever in the "OVERRIDE ENGAGED" position. If desired, the "OVERRIDE ENGAGED" position can be selected and locked before takeoff, and the gear will then retract as soon as the gear selector switch is placed in the "UP" position. Care should always be taken not to retract the gear prematurely, or the aircraft could settle back onto the runway. If the override lock is used for takeoff, it should be disengaged as soon as sufficient airspeed and terrain clearance are obtained, to return the gear system to normal operation. For normal operation, the pilot should extend and retract the gear with the gear selector switch located on the instrument panel, just as he would if the backup gear extender system was not installed.

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). 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. The Emergency Gear Extension Lever should be in the up position to permit normal gear operation. If the Emergency Gear Extension lever is not in the fully up position prior to gear retraction, the landing gear may not retract when the landing gear switch is selected up. For aircraft equipped with the backup gear extender, the Emergency Gear Extension Lever should be in the normal/disengaged position to permit normal gear retraction. Ensure 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 ensure normal takeoff performance.

Release the parking brake.

*Approximately 78 KIAS at sea level to approximately 97 KIAS at 20,000 ft with a straight line variation between.

4.31 TAKEOFF

The normal takeoff technique is conventional for the Cherokee Turbo Arrow III. 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 70 to 77 KIAS depending on the weight of the aircraft and ease back on the control wheel to rotate to climb attitude.

The procedure used for a short field takeoff with an obstacle clearance or a soft field takeoff differs slightly from the normal technique. The flaps should be lowered to 25° (second notch). Allow the aircraft to accelerate to 53 to 64 KIAS depending on the aircraft weight and rotate the aircraft to climb attitude. After breaking ground, accelerate to 59 to 68 KIAS, depending on aircraft weight and select gear up*. Continue to climb while accelerating to the flaps-up rate of climb speed, 96 KIAS is no obstacle is present or 78 KIAS if obstacle clearance is a consideration. Slowly retract the flaps while climbing out.

4.33 CLIMB

On climb-out after takeoff, it is recommended that the best angle of climb speed (78 KIAS) be maintained only if obstacle clearance is a consideration. The best rate of climb speed (96 KIAS) should be maintained with full power on the engines until adequate terrain clearance is obtained. At this point, engine power should be reduced to 33 inches manifold pressure and 2450 RPM (approximately 75% power) for cruise climb. A cruise climb speed of 104 KIAS or higher is also recommended. This combination of reduced power and increased climb speed provides better engine cooling, less engine wear, reduced fuel consumption, lower cabin noise level, and better forward visibility.

When reducing power the throttle should be retarded first, followed by the propeller control. The mixture control should remain at full rich during the climb. Cylinder head temperatures should be monitored during climb and should be kept below 460° at all times. During climbs under hot weather conditions, it may be necessary to use LO auxiliary fuel pump for vapor suppression.

Consistent operational use of cruise climb power settings is strongly recommended since this practice will make a substantial contribution to fuel economy and increased engine life, and will reduce the incidence of premature engine overhauls.

NOTE

On aircraft equipped with the backup gear extender, during climbs at best angle of climb speed at any altitude and best rate of climb speed above approximately 15,000 feet density altitude it may be necessary to select "OVERRIDE ENGAGED" to prevent the landing gear from extending automatically during the climb. This altitude decreases with reduced climb power and increases with increased climb speed.

*If desired, on aircraft equipped with the backup gear extender "OVERRIDE ENGAGED" position can be selected and locked before takeoff, and the gear will then retract as soon as the gear selector switch is placed in the up position. In this case care should be taken not to retract the gear prematurely, or the aircraft could settle back onto the runway. If the override lock is used for takeoff, it should be disengaged as soon as sufficient terrain clearance is obtained, to return the gear system to normal operation.

4.35 CRUISING

When leveling off at cruise altitude, the pilot may reduce to a cruise power setting in accordance with the Power Setting Table in this Manual. The mixture should be leaned in accordance with the recommendations for the engine in the Teledyne Continental Operator's Manual which is provided with the aircraft.

For maximum service life, cylinder head temperature should be maintained below 400°F during high performance cruise operation and below 350°F during economy cruise operation. If cylinder head temperatures become too high during flight, reduce them by enriching the mixture, by reducing power, or by use of any combination of these methods.

Following level-off for cruise, the airplane should be trimmed.

The pilot should monitor weather conditions while flying and should be alert to conditions which might lead to icing. If induction system icing is expected, place the alternate air control in the "ON" position.

During flight, keep account of time and fuel used in connection with power settings to determine how the fuel flow and fuel quantity gauging systems are operating. If the fuel flow indication is considerably higher than the fuel actually being consumed, a fuel nozzle may be clogged and require cleaning.

There are no mechanical uplocks in the landing gear system. In the event of a hydraulic system malfunction, the landing gear will free-fall to the gear down position. The true airspeed with gear down is approximately 75% of the gear retracted airspeed for any given power setting. Allowances for the reduction in airspeed and range should be made when planning extended flight between remote airfields or flight over water.

In order to keep the airplane in best lateral trim during cruise flight, the fuel should be used alternately from each tank at one hour intervals.

4.37 APPROACH AND LAN DING

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 "OFF" the air conditioner. The mixture should be set in the full "RICH" position. Set the propeller at full "INCREASE" rpm to facilitate ample power for an emergency go-around.

Prior to landing gear operation, the Emergency Gear Extension Lever should be in the up position to permit normal gear extension or retraction in the event of a go-around. For aircraft equipped with the backup gear extender, the Emergency Gear Extension Lever should be in the normal/disengaged position. The landing gear may be extended at speeds below 129 KIAS. The airplane should be trimmed to a final approach speed of about 75 KIAS with flaps extended. The flaps can be lowered at speeds up to 103 KIAS, if desired.

The mixture control should be kept in full "RICH" position to insure maximum acceleration if it should be necessary to open the throttle again.

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. Reduce the speed during the flareout and contact the ground close to the stalling speed. 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.

4.39 STOPPING ENGINE

At the pilot's discretion, the flaps should be raised.

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."

4.41 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. Set the parking brake. If the temperature is below freezing and the brakes are wet, they should not be set if there is a possibility of the brakes freezing. Wheel chocks should be used to properly block the wheels. 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.

4.43 STALLS

The stall characteristics of the Cherokee Turbo Arrow III 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 Turbo Arrow III with power off and full flaps is 56 KIAS. With the flaps up this speed is increased 7 KTS. Loss of altitude during stalls can be as great as 500 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.

4.45 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.

4.47 LANDING GEAR

This airplane is equipped with an airspeed - power sensing system (back-up gear extender) which extends the landing gear under low airspeed - power conditions* even though the pilot may not have selected gear down. This system will also prevent retraction of the landing gear by normal means when the airspeed - power values are below a predetermined minimum. To override this system or to hold the emergency gear lever in the "OVERRIDE ENGAGED" position without maintaining manual pressure on the emergency gear lever, pull the lever full up and push the lock pin in. To release the override, pull lever up and then release.

For normal operation, the pilot should extend and retract the gear with the gear selector switch located on the instrument panel, just as he would if the back-up gear extender system were not installed.

The pilot should become familiar with the function and significance of the landing gear position indicators and warning lights.

The red gear warning light on the instrument panel and the horn operate simultaneously in flight when the throttle is reduced to where the manifold pressure is approximately 14 inches of mercury or below, and the gear selector switch is not in the "DOWN" position. This warning will also occur during flight when the back-up gear extended system has lowered the landing gear and the gear selector switch is not in the "DOWN" position and the manifold pressure is reduced below approximately 14 inches of mercury.

*Approximately 103 KIAS at any altitude, power off.

The red gear warning light on the instrument panel and the horn will also operate simultaneously on the ground when the master switch is "ON" and the gear selector switch is in the "UP" position and the throttle is in the retarded position.

The three green lights on the instrument panel operate individually as each associated gear is locked in the extended position.

WARNING

Panel lights' dimmer switch must be off to obtain gear and overboost lights full intensity during daytime flying. When aircraft is operated at night and panel lights' dimmer switch is turned on, gear lights and overboost light will automatically dim.

The yellow "Auto Ext. OFF" light immediately below the gear selector switch flashes whenever the emergency gear lever is in the "OVERRIDE ENGAGED" position.

4.49 WEIGHT AND BALANCE

It is the sole responsibility of the pilot in command to determine that the airplane is properly loaded and is within the allowable weight and 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 Turbo Arrow III 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.

WARNING

Performance information derived by extrapolation beyond the limits shown on the charts should not be used for flight planning purposes.

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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 licensed at 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	1810 lbs.
(2)	Occupants (2 x 170 lbs.)	340 lbs.
(3)	Baggage and Cargo	128 lbs.
(4)	Fuel (6 lb./gal. x 77)	462 lbs.
(5)	Takeoff Weight	2740 lbs.
(6)	Landing Weight (a)(5) minus (g)(1), (2740 lbs. minus 360 lbs.)	2380 lbs.

Our takeoff weight is below the maximum of 2900 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 and Takeoff Ground Roll 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	4990 ft.	2000 ft.
(2)	Temperature	20°C	30°C
(3)	Wind Component	6 KTS	0 KTS
(4)	Runway Length Available	5000 ft.	4600 ft.
(5)	Runway Required	3750 ft.*	1470 ft.**

NOTE

The remainder of the performance charts used in this flight planning 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 Fuel, Distance, and Time to Climb graph (Figure 5-17). After the fuel, distance and time for the cruise pressure altitude and outside air temperature values have been established, apply the existing conditions at the departure field to graph (Figure 5-17). 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 fuel, distance and time 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	8500 ft.
(2)	Cruise OAT	10°C
(3)	Time to Climb (12 min. minus 8 min.)	4 min.***
(4)	Distance to Climb (20 nautical miles minus 13 nautical miles)	7 nautical miles***
(5)	Fuel to Climb (4 gal. minus 2.5 gal.)	1.5 gal.***

*reference Figure 5-11
**reference Figure 5-35
***reference Figure 5-17

(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 fuel, distance and time for descent (Figure 5-31). 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 fuel, distance and time values from the graph (Figure 5-31). Now, subtract the values obtained from the field conditions from the values obtained from the cruise conditions to find the true fuel, distance and time 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 (10 min. minus 4 min.)	6 min.*
(2) Distance to Descend (24 nautical miles minus 10 nautical miles)	14 nautical miles*
(3) Fuel to Descend (2 gal. minus 1 gal.)	1 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 Power Setting Table (Figure 5-19) 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 Speed Power graph (Figure 5-21 or 5-23).

Calculate the cruise fuel flow for the cruise power setting (75% Power Best Economy for this example) from the information provided by the Best Economy Range chart (Figure 5-27).

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	745 nautical miles
(2) Cruise Distance (e)(1) minus (c)(4) minus (d)(2), (745 nautical miles minus 7 nautical miles minus 14 nautical miles)	724 nautical miles
(3) Cruise Power (Best Economy)	75% rated power
(4) Cruise Speed	151 KTS TAS**
(5) Cruise Fuel Consumption	12 GPH***
(6) Cruise Time (e)(2) divided by (e)(4), (724 nautical miles divided by 151 KTS)	4.79 hrs. (4 hrs. 47 min.)
(7) Cruise Fuel (e)(5) multiplied by (e)(6), (12 GPH multiplied by 4.79 hrs.)	57.5 gal.

*reference Figure 5-31
**reference Figure 5-25
***reference Figure 5-27

(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), (.07 hrs. plus .10 hrs. plus 4.79 hrs.)
(4 min. plus 6 min. plus 4 hrs. & 47 min.) 4.96 hrs.

(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), (1.5 gal. plus 1 gal. plus 57.5 gal.) 60 gal.
(60 gal. multiplied by 6 lb./gal.) 360 lbs.

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5.7 PERFORMANCE GRAPHS

LIST OF FIGURES

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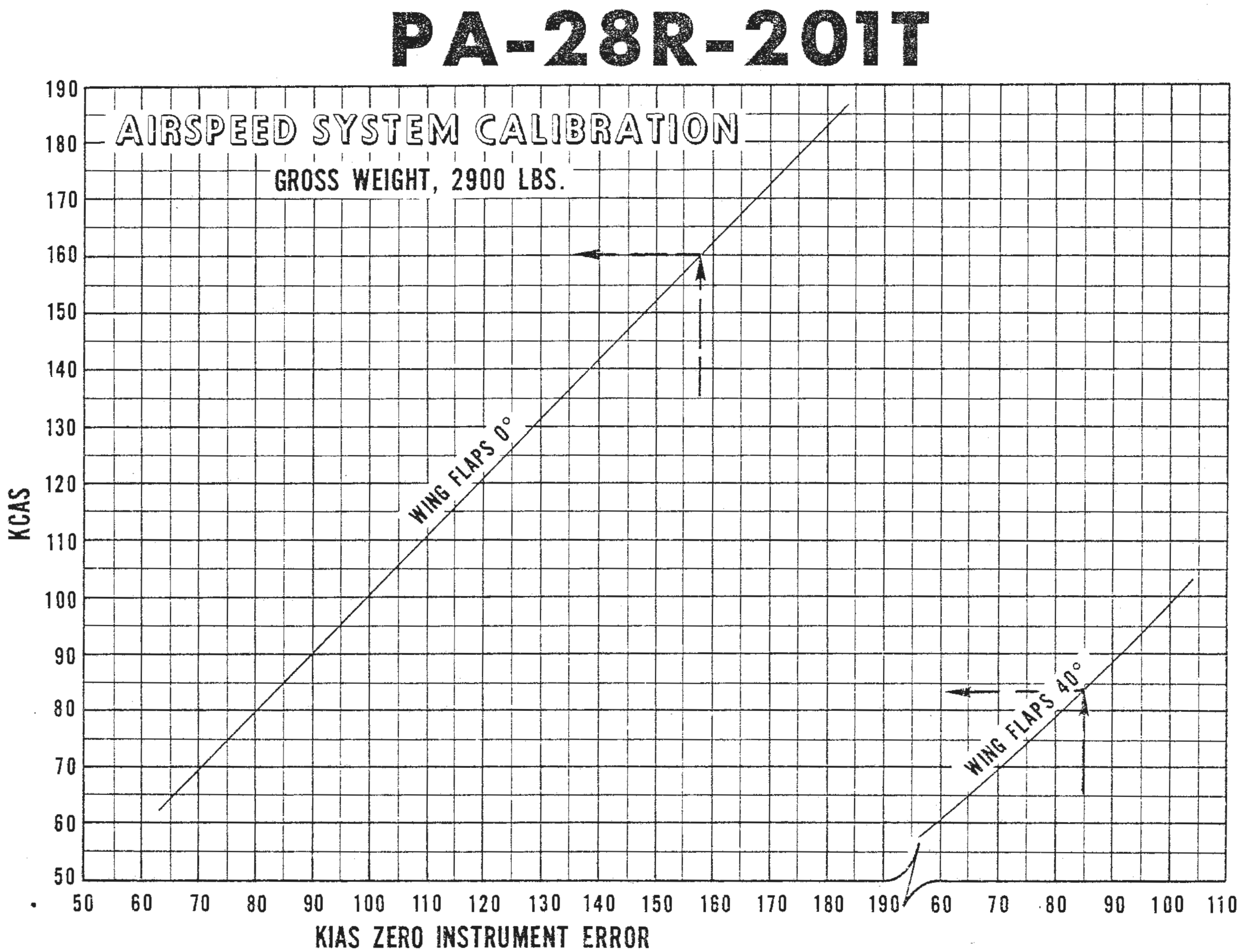
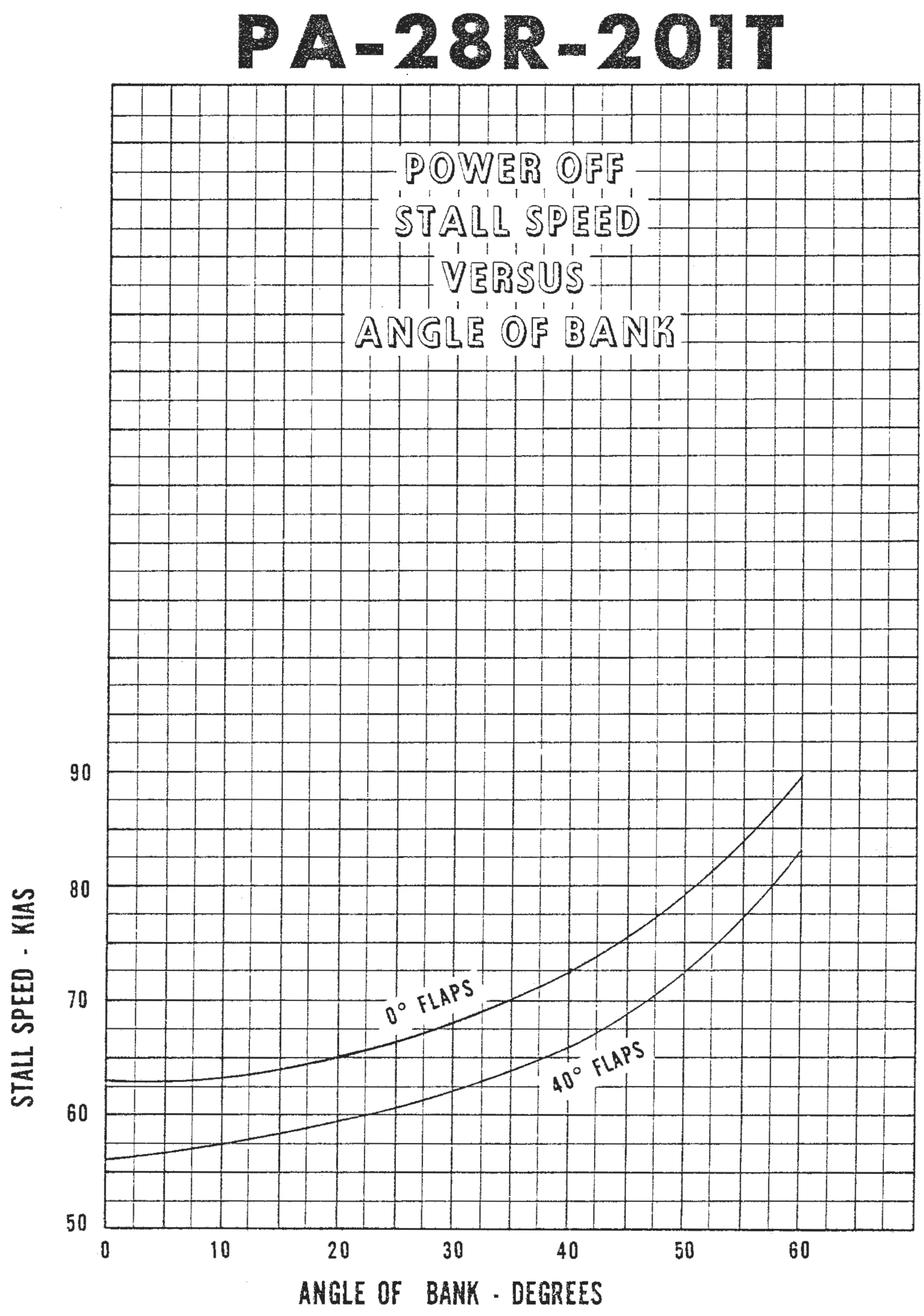


Exampie:
158 KIAS = 160 KCAS

Example:
85 KIAS = 83 KCAS

AIRSPEED SYSTEM CALIBRATION

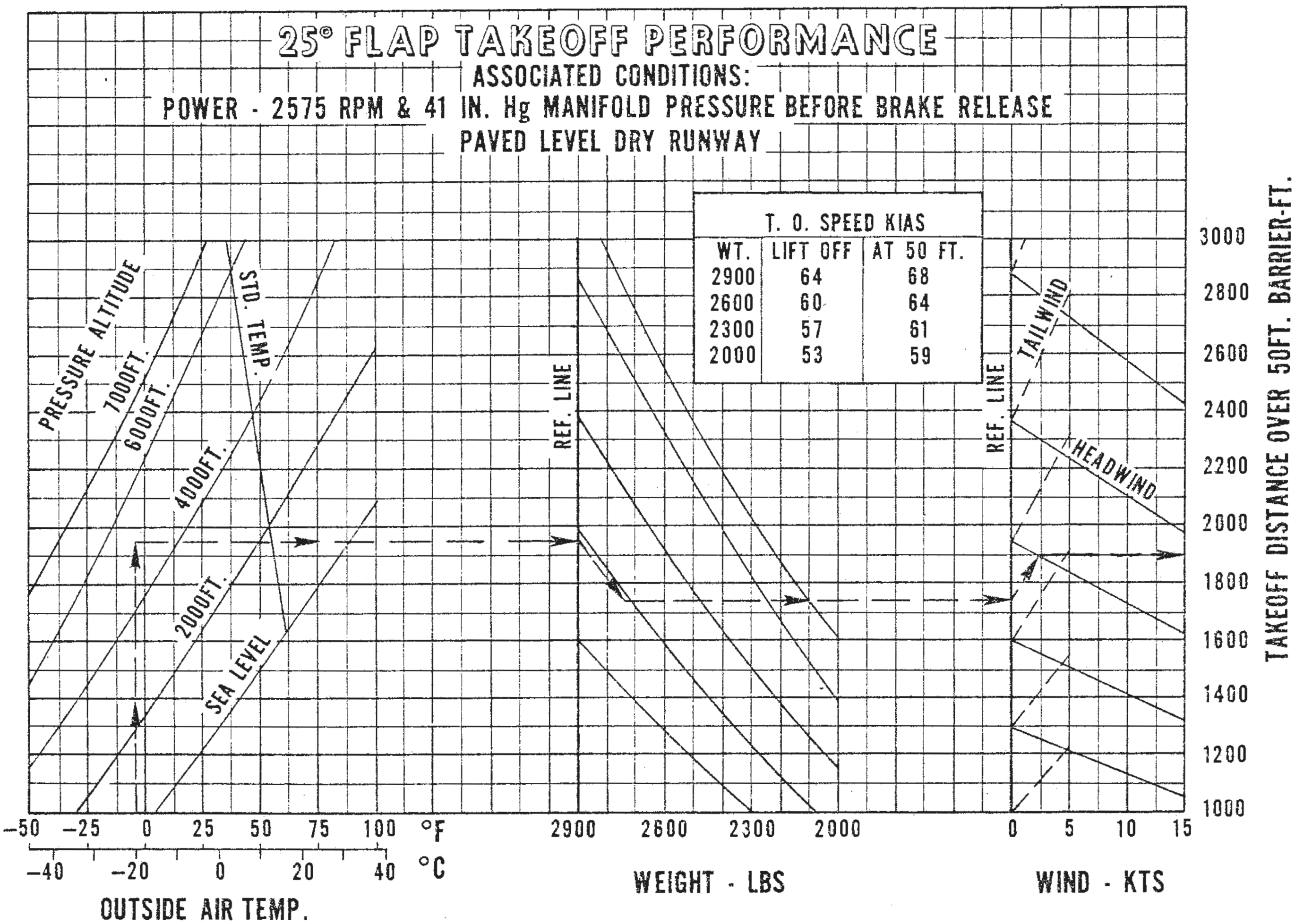
Figure 5-1



POWER OFF STALL SPEED VERSUS ANGLE OF BANK

Figure 5-3

PA-28R-201T



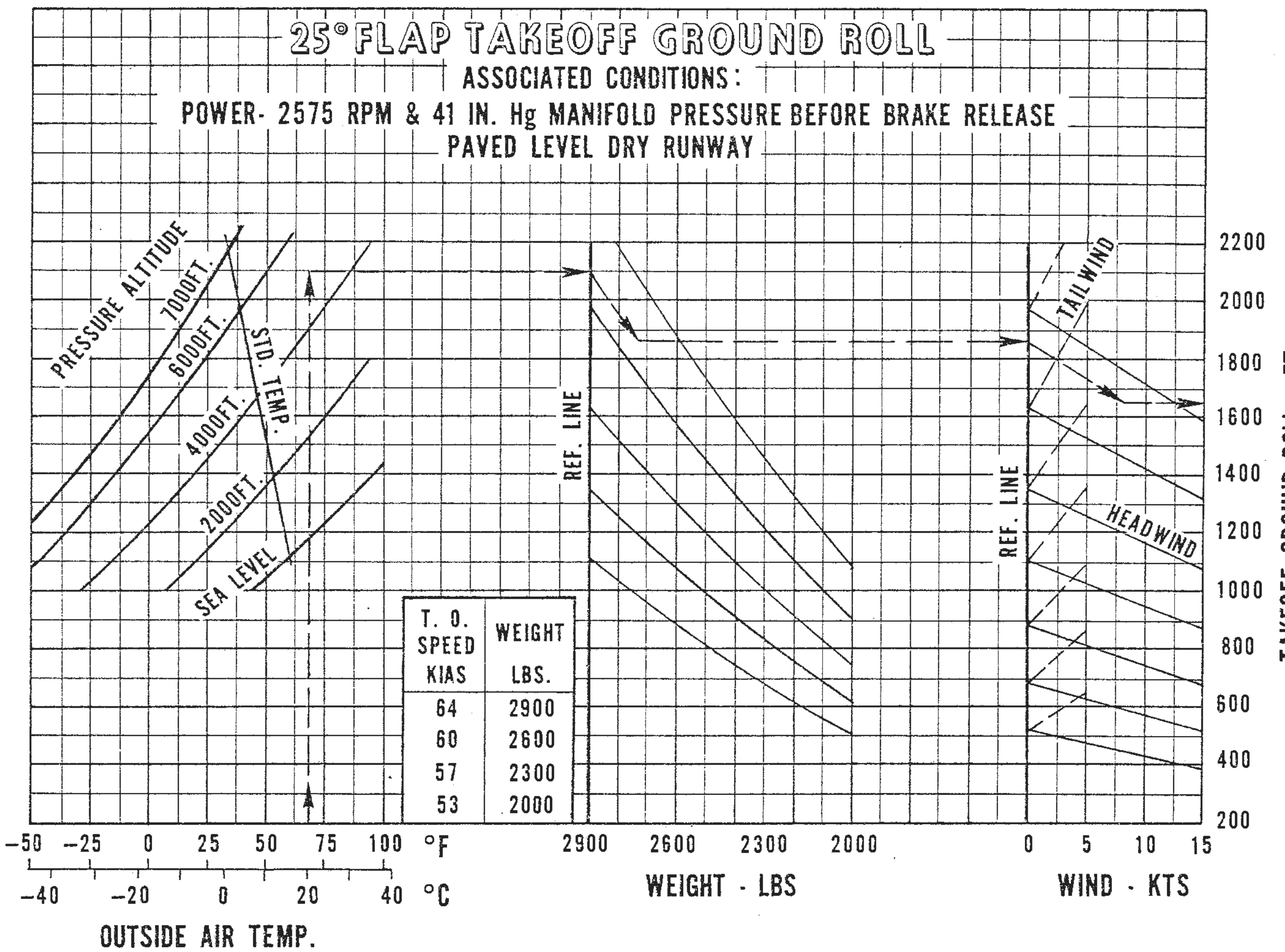
T. O. SPEED KIAS		
WT.	LIFT OFF	AT 50 FT.
2900	64	68
2600	60	64
2300	57	61
2000	53	59

Example:
- Pressure altitude: 5000 ft.
- OAT: -20°C
- Gross weight: 2740 lbs.
- Wind: 3 knots (tailwind)
- Takeoff distance: 1900 ft.

25° FLAP TAKEOFF PERFORMANCE

Figure 5-5

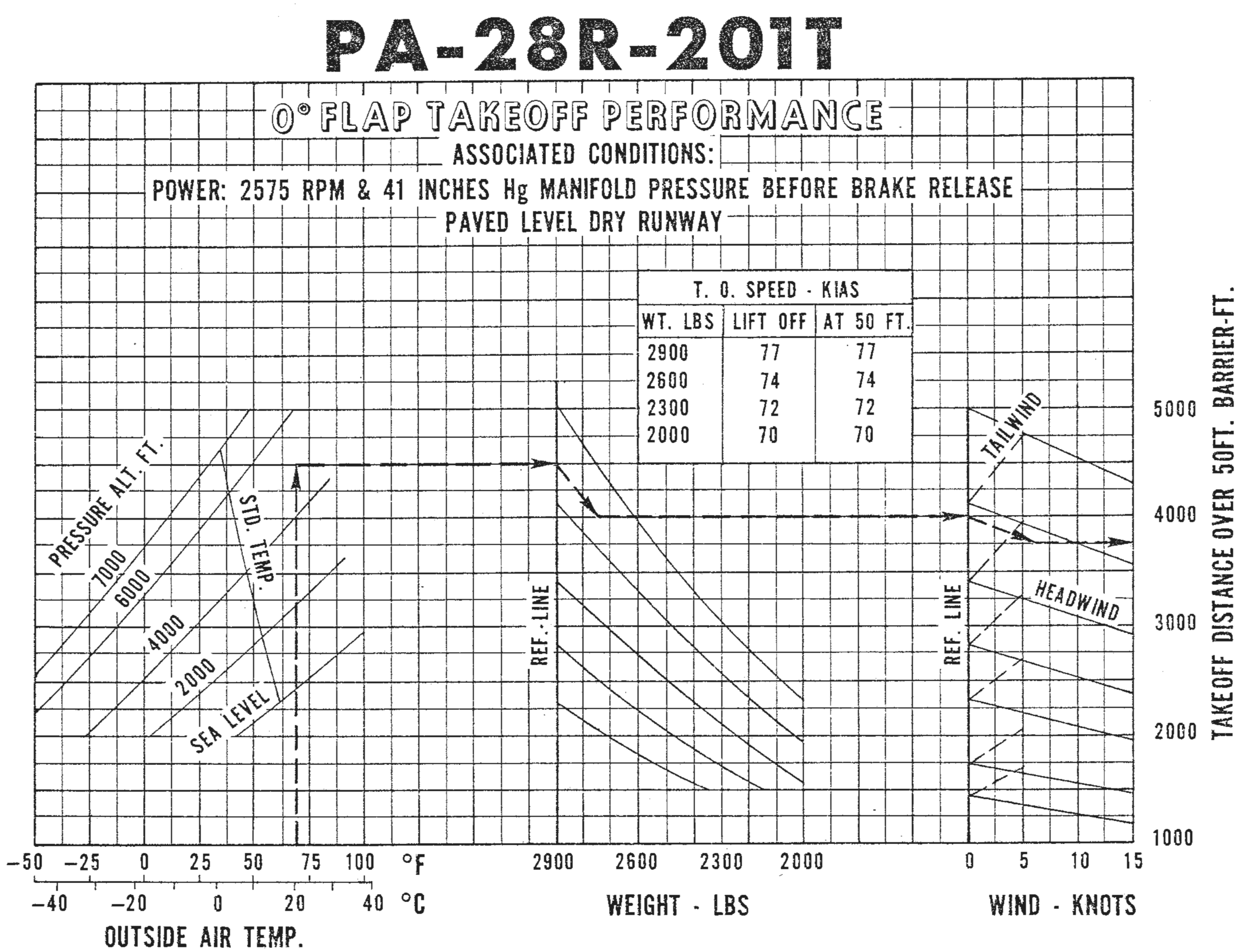
PA-28R-201T



Example:
- Pressure altitude: 5000 ft.
- OAT: 20°C
- Gross weight: 2740 lbs.
- Wind: 8 knots (headwind)
- Takeoff ground roll: 1650 ft.

25° FLAP TAKEOFF GROUND ROLL

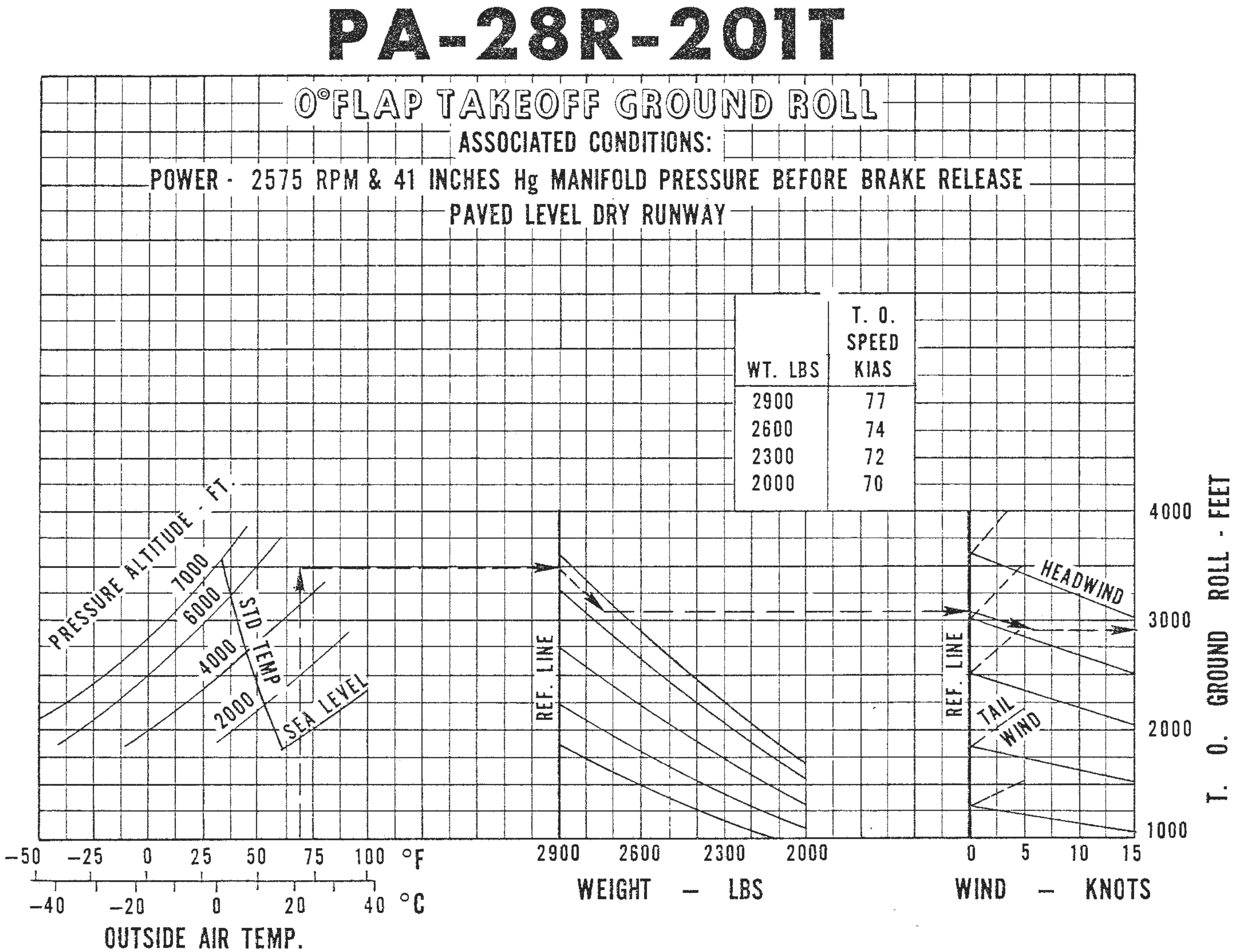
Figure 5-7



Example:
Pressure altitude: 4990 ft.
OAT: 20°C
Gross weight: 2740 lbs.
Surface wind: 6 knots (headwind)
Takeoff distance: 3750 ft.

0° FLAP TAKEOFF PERFORMANCE

Figure 5-9

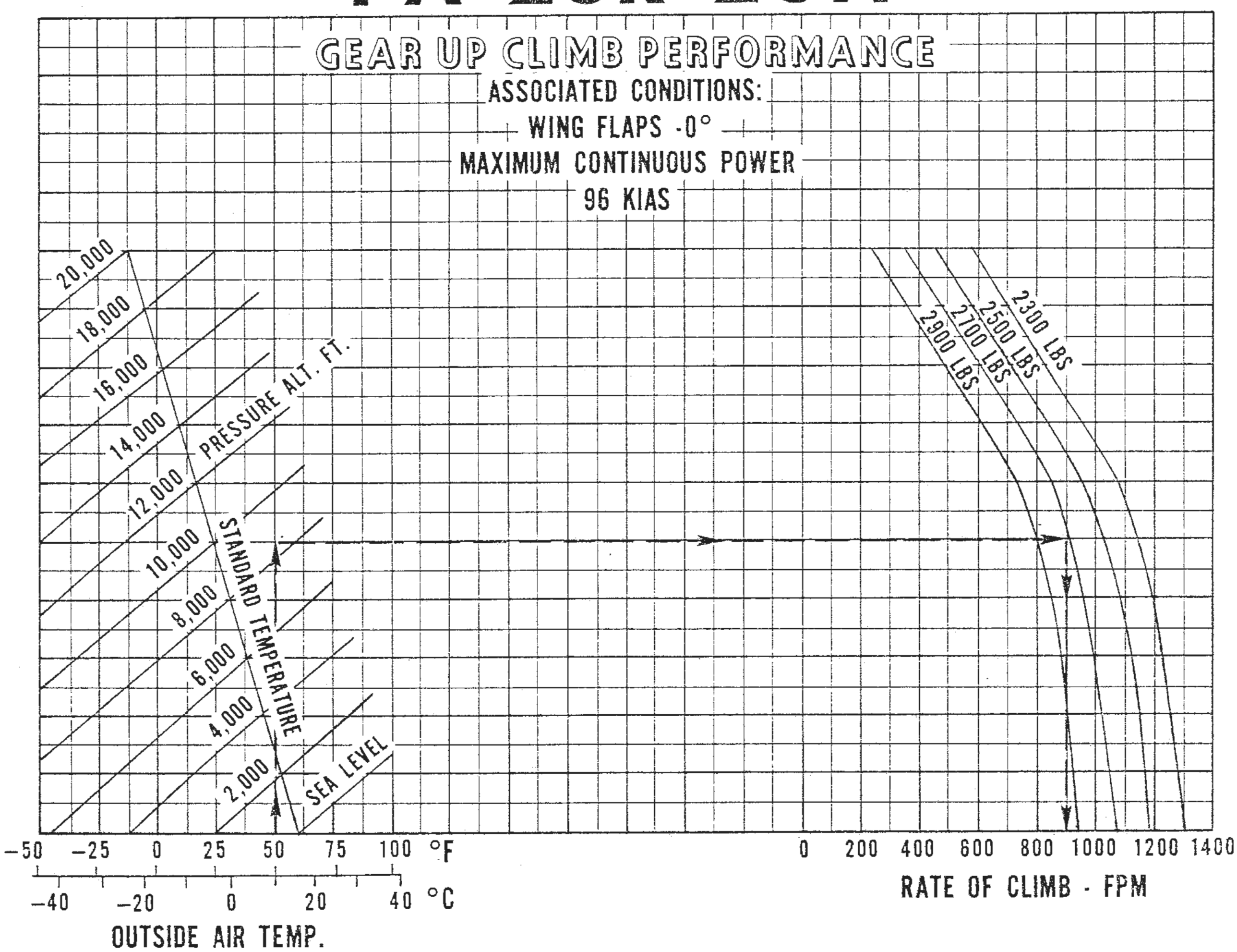


Example:
- Pressure altitude: 5000 ft.
- OAT: 20°C
- Gross weight: 2740 lbs.
- Wind: 6 knots (headwind)
- Takeoff ground roll: 2900 ft.

0° FLAP TAKEOFF GROUND ROLL

Figure 5-11

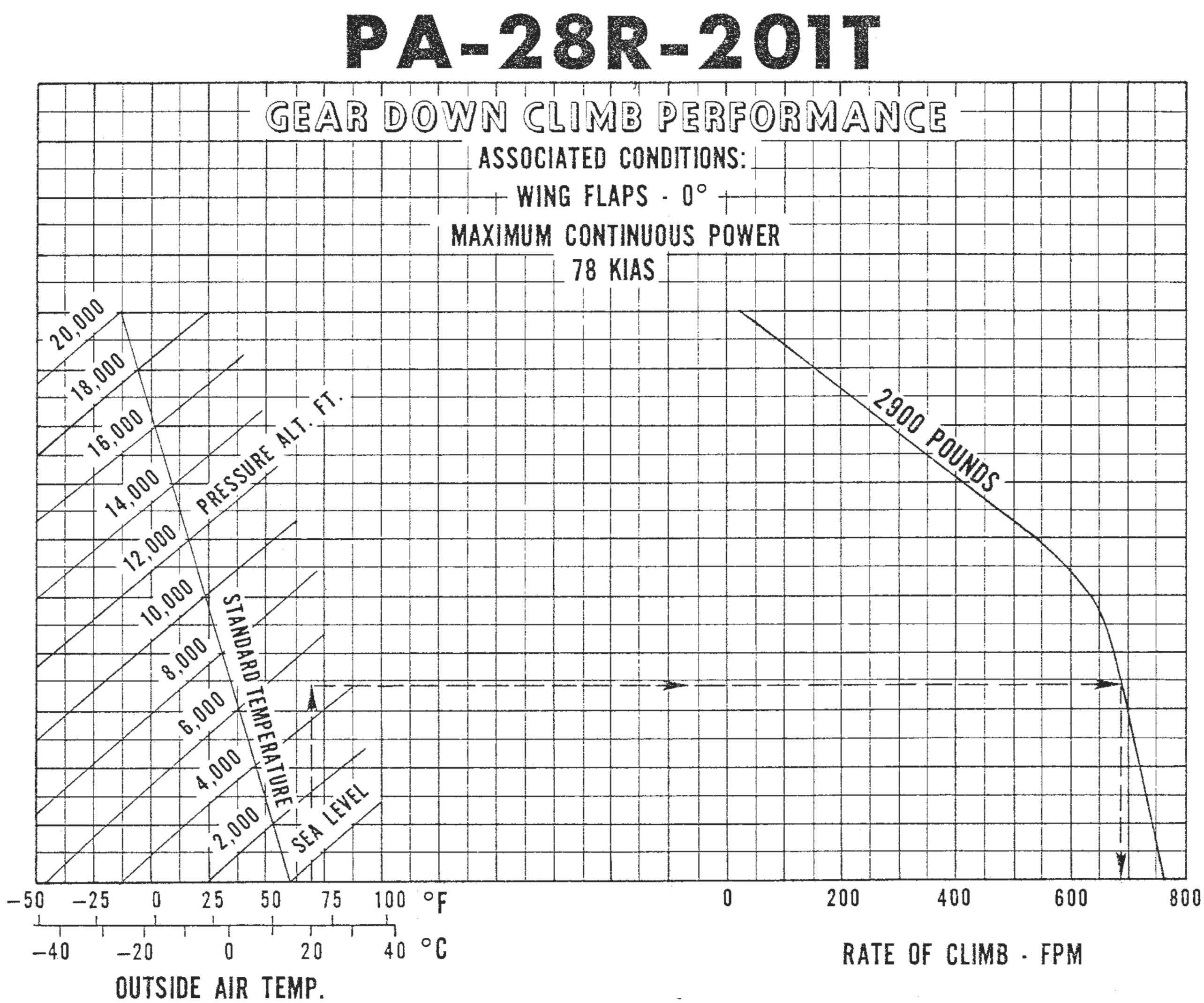
PA-28R-201T



Example:
- Pressure altitude: 8500 ft.
- OAT: 10°C
- Gross weight: 2740 lbs.
- Rate of climb: 900 FPM

GEAR UP CLIMB PERFORMANCE

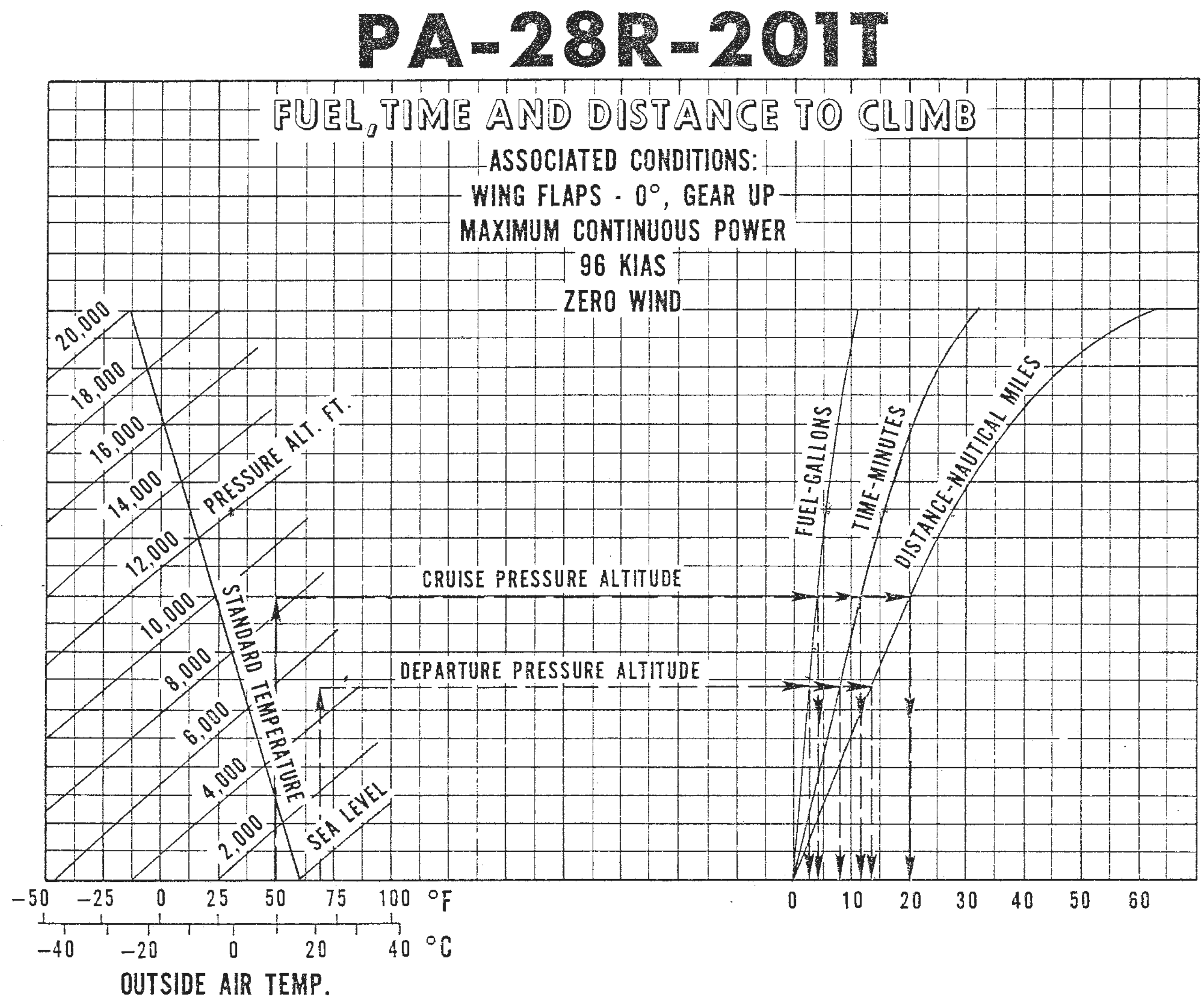
Figure 5-13



Example:
Pressure altitude: 5000 ft.
OAT: 20°C
Gross weight: 2740 lbs.
Gear down rate of climb: 690 FPM

GEAR DOWN CLIMB PERFORMANCE

Figure 5-15



Example:
Departure pressure altitude: 5000 ft.
Departure OAT: 20°C
Cruise pressure altitude: 8500 ft.
Cruise OAT: 10°C
Fuel to climb: (4 minus 2.5) = 1.5 gal.
Time to climb: (12 minus 8) = 4 min.
Distance to climb: (20 minus 13) = 7 nautical miles

FUEL, TIME AND DISTANCE TO CLIMB
Figure 5-17

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POWER SETTING TABLE – T.C.M. TSIO 360F SERIES

PRESS. ALT. FEET	STD. ALT. TEMP. °F	55% POWER 2200	2300	2400	2500	2575	65% POWER 2200	2300	2400	2500	2575	75% POWER 2200	2300	2400	2500	2575
	RPM	MANIFOLD PRESSURE – INCHES MERCURY														
S.L.	59	29.0	27.7	26.8	26.0	25.0	32.8	31.1	30.0	29.2	28.2		34.8	33.8	32.8	31.5
2000	52	29.0	27.7	26.8	26.0	25.0	32.8	31.1	30.0	29.2	28.2		34.8	33.8	32.8	31.5
4000	45	29.0	27.7	26.8	26.0	25.0	32.8	31.1	30.0	29.2	28.2		34.8	33.8	32.8	31.5
6000	38	29.0	27.7	26.8	26.0	25.0	32.8	31.1	30.0	29.2	28.2		34.8	33.8	32.8	31.5
8000	31	29.0	27.7	26.8	26.0	25.0		31.1	30.0	29.2	28.2			33.8	32.8	31.5
10000	23	29.0	27.7	26.8	26.0	25.0		31.1	30.0	29.2	28.2			33.8	32.8	31.5
12000	16		27.7	26.8	26.0	25.0			30.0	29.2	28.2				32.8	31.5
14000	9		27.7	26.8	26.0	25.0			30.0	29.2	28.2				32.8	31.5
16000	2			26.8	26.0	25.0				29.2	28.2					31.5
18000	-5				26.0	25.0				29.2	28.2					31.5
20000	-12				26.0	25.0					28.2					31.5

For each 6°F above std. temp. add 0.4" MAP.
For each 6°F below std. temp. subtract 0.4" MAP.

APPROXIMATE FUEL FLOW	
BEST ECONOMY	BEST POWER
55% Power 9.2 GPH 65% Power 10.8 GPH 75% Power 12. GPH	55% 11. GPH 65% 12.7 GPH 75% 14. GPH

NOTE: Fuel flow will vary with altitude; therefore, cruise fuel control must be accomplished by adjusting EGT (peak EGT for best economy and peak EGT plus 100°F rich for best power) rather than leaning to an indicated fuel flow.

POWER SETTING TABLE
Figure 5-19

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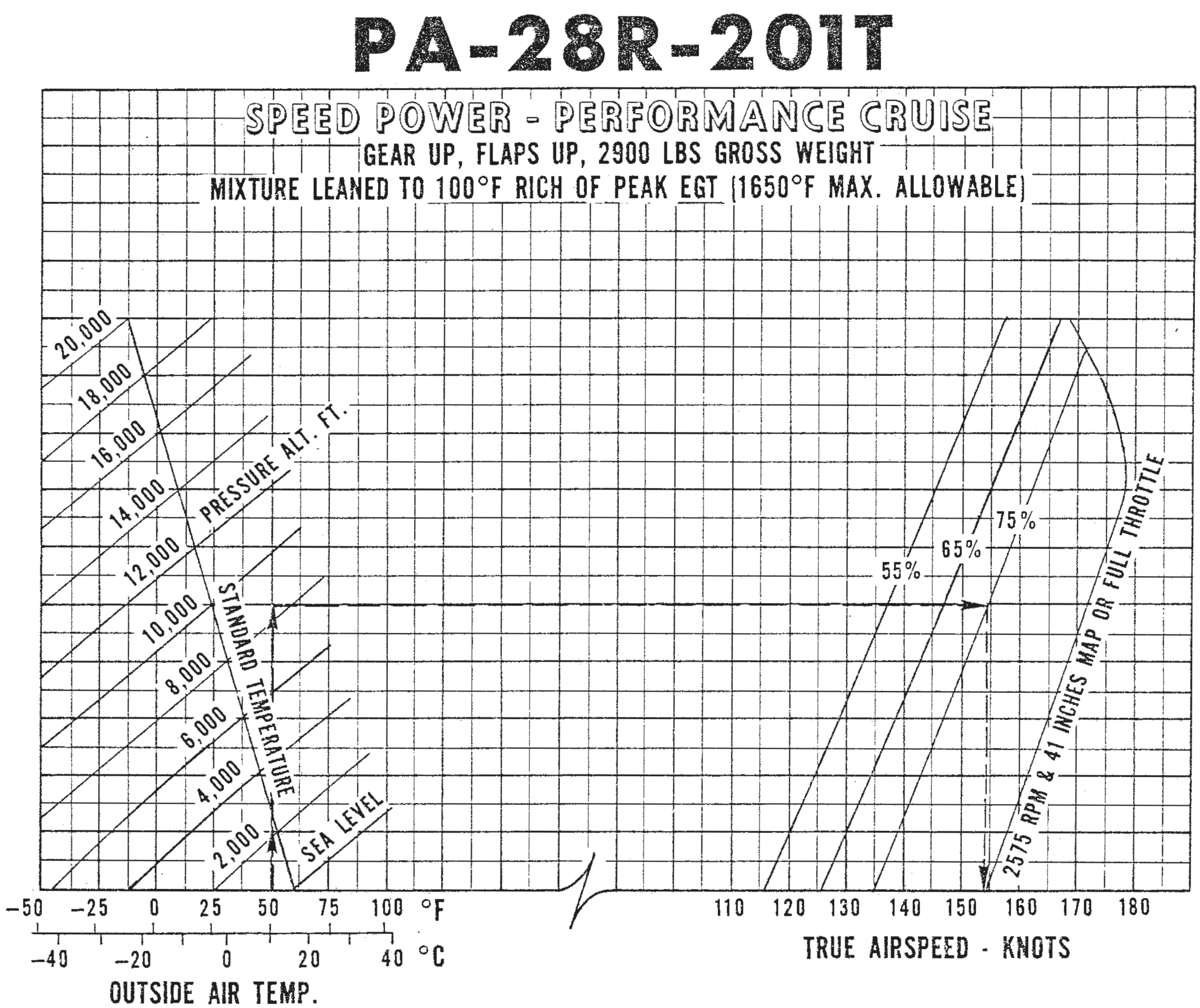
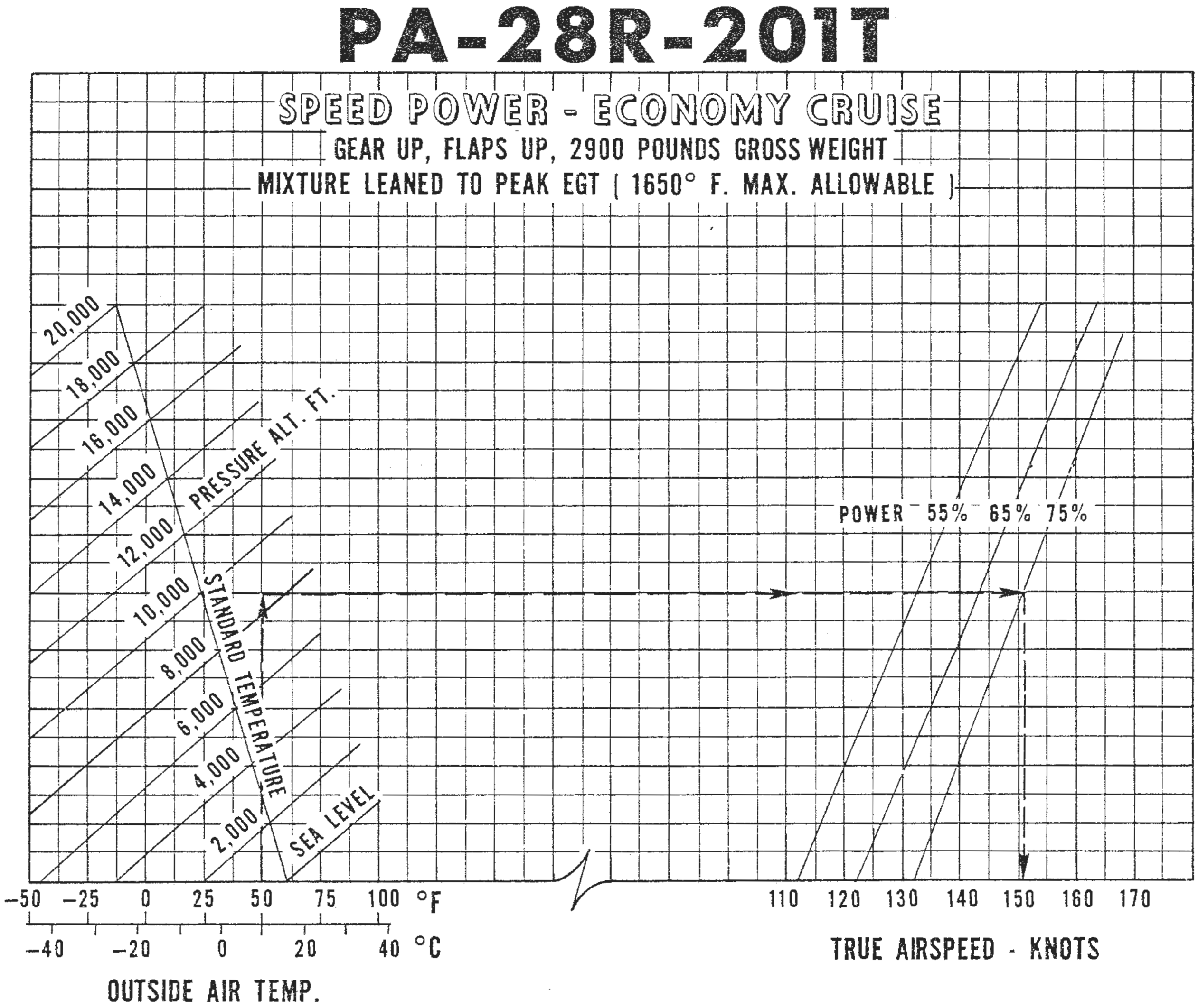


Example:
Cruise pressure altitude: 8500 ft.
Cruise OAT: 10°C
Power: 75%
True airspeed: 154 knots

SPEED POWER - PERFORMANCE CRUISE

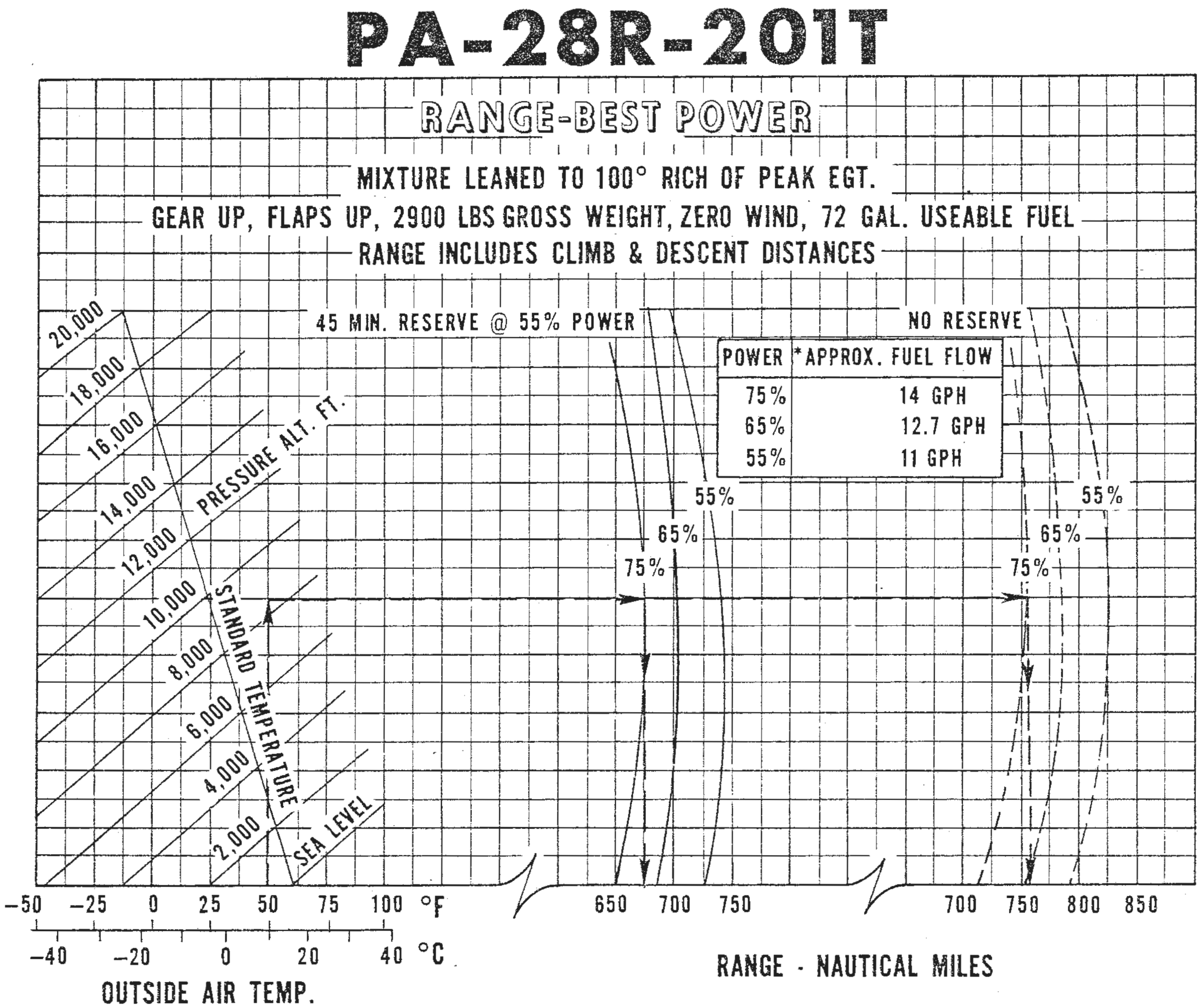
Figure 5-21



Example:
Cruise pressure altitude: 8500 ft.
Cruise OAT: 10°C
Power: 75%
True airspeed: 151 knots

SPEED POWER - ECONOMY CRUISE

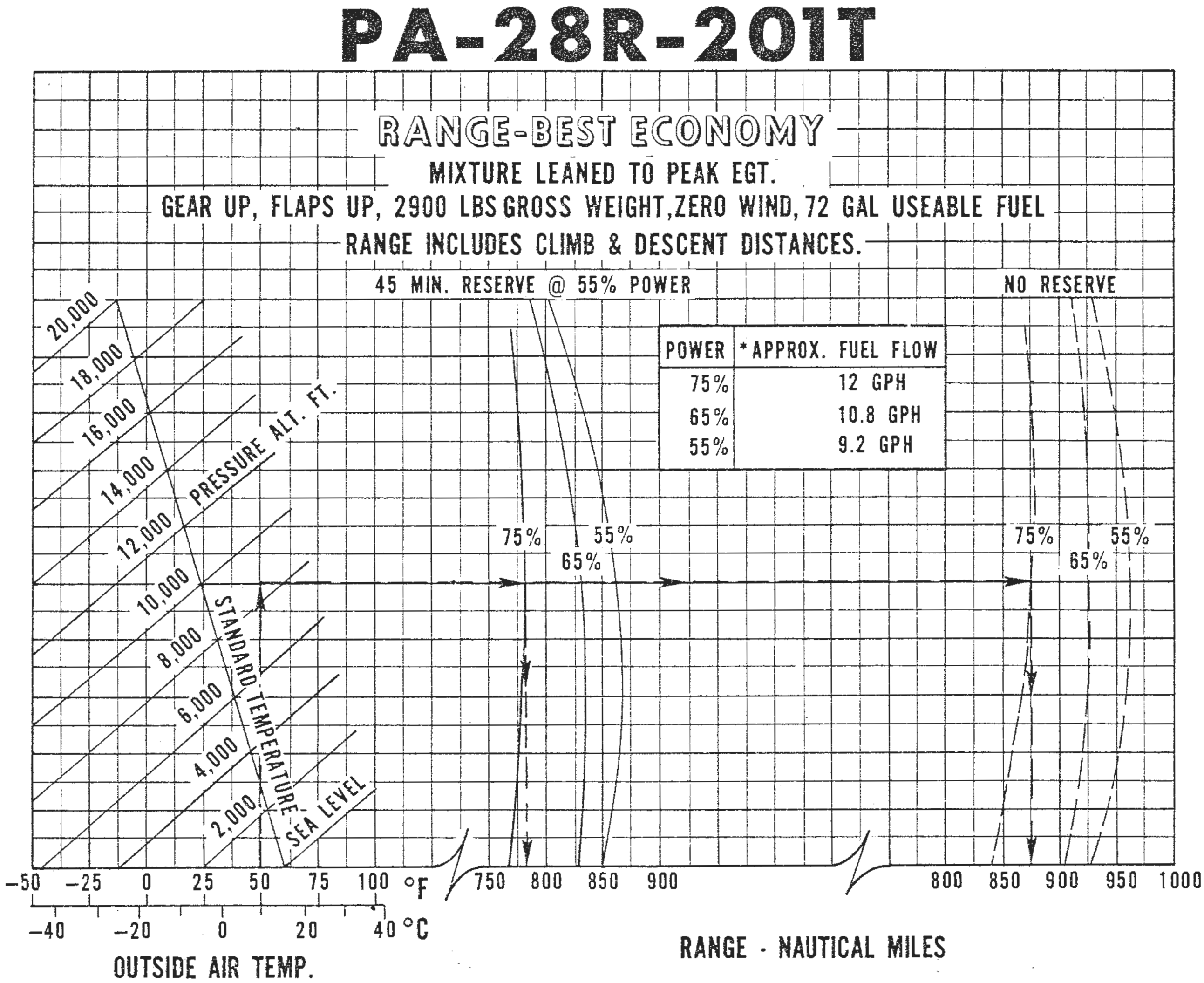
Figure 5-23



*Fuel flow will vary with altitude, therefore, cruise fuel control is accomplished by EGT rather than fuel flow.

Example:
Cruise pressure altitude: 8500 ft.
Cruise OAT: 10°C
Power: 75%
Range: 675 N.M. with reserve, 755 N.M. no reserve

RANGE - BEST POWER MIXTURE
Figure 5-25

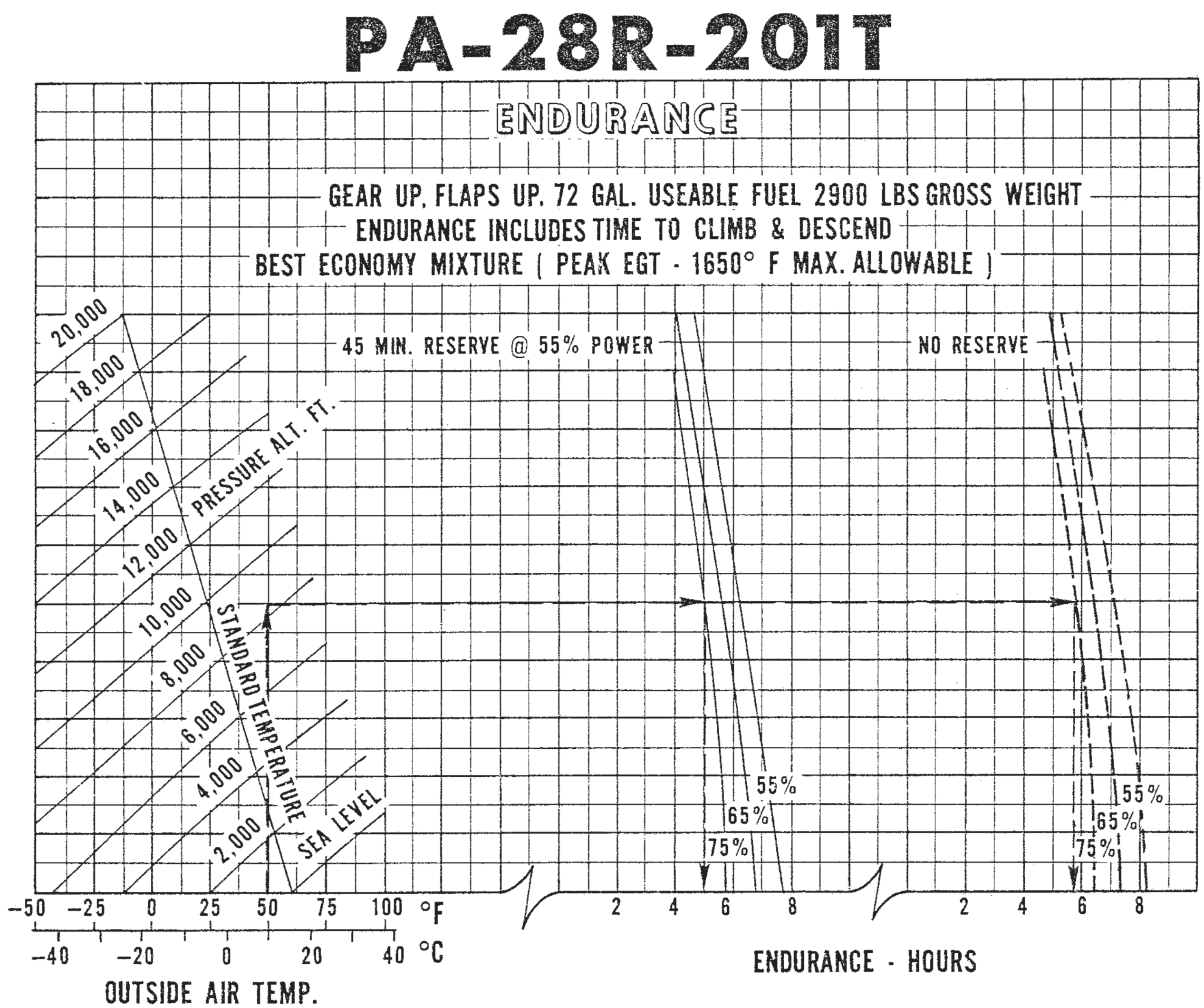


*Fuel flow will vary with altitude, therefore, cruise fuel control is accomplished by EGT rather than fuel flow.

Example:
Cruise pressure altitude: 8500 ft.
Cruise OAT: 10°C
Power: 75%
Range: 785 N.M. with reserve, 875 N.M. no reserve

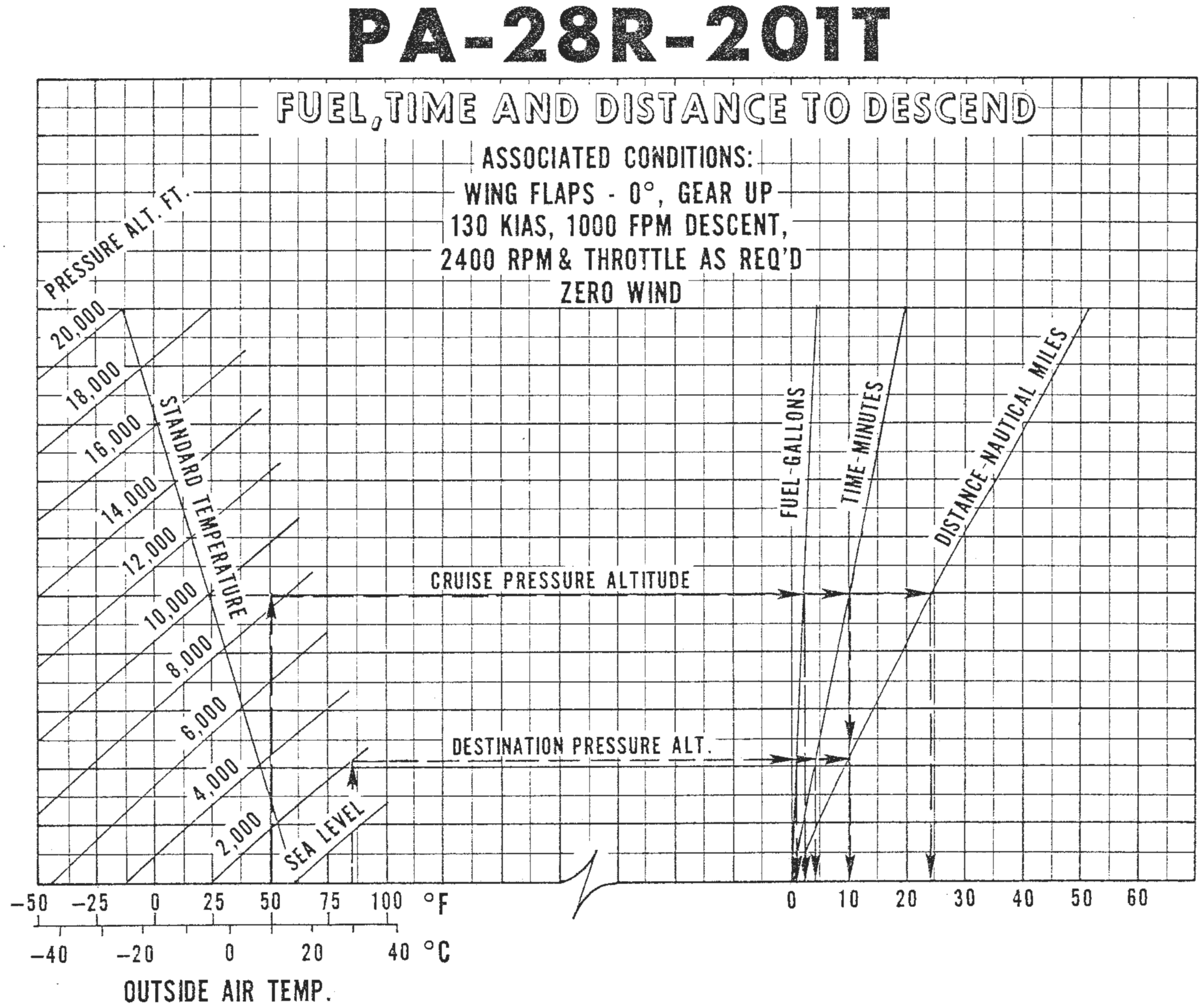
RANGE - BEST ECONOMY MIXTURE

Figure 5-27



Example:
Cruise pressure altitude: 8500 ft.
Cruise OAT: 10°C
Power: 75%
Endurance: 5 hours with reserve, 5.75 hours no reserve

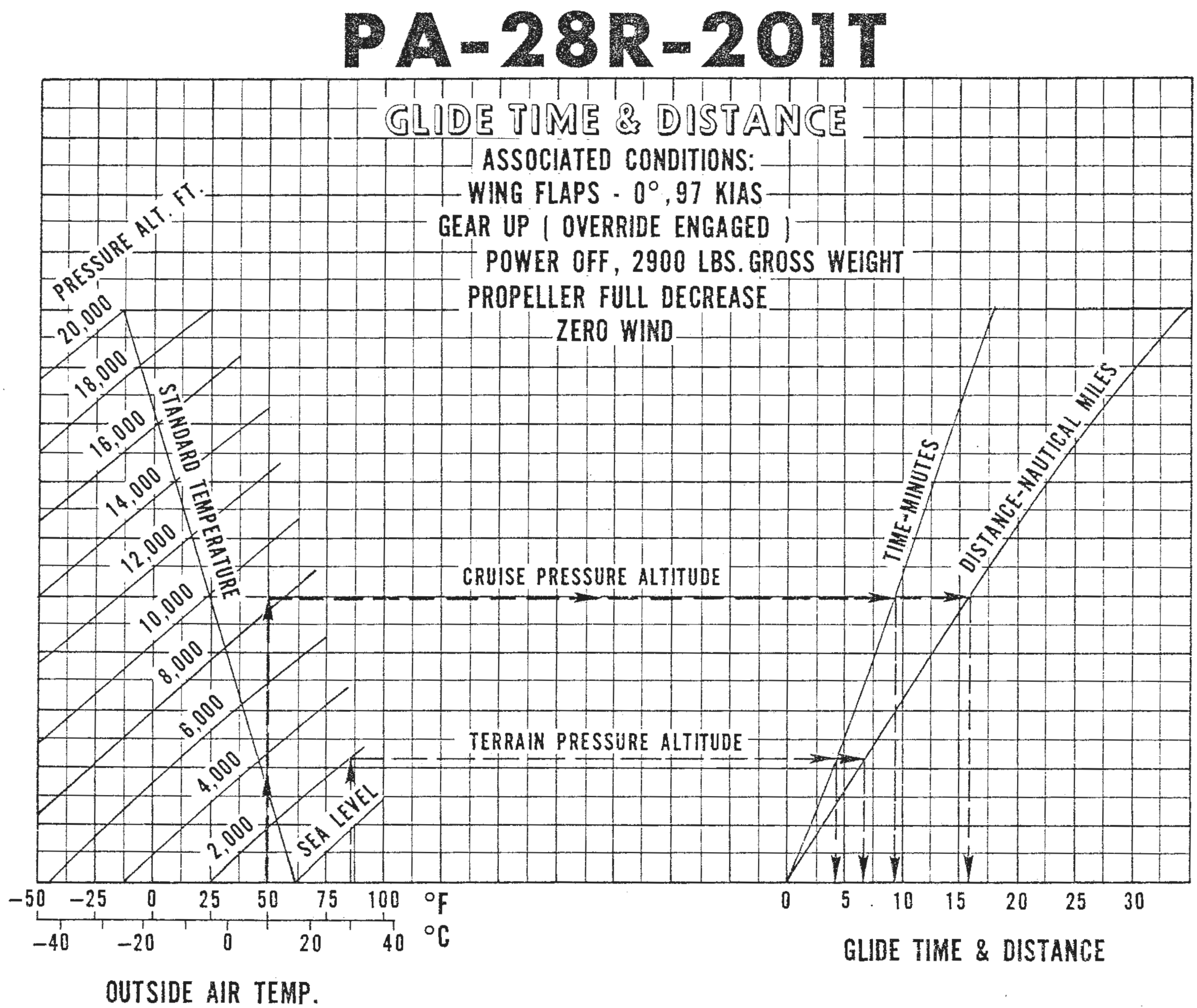
ENDURANCE
Figure 5-29



Example:
Cruise pressure altitude: 8500 ft.
Cruise OAT: 10°C
Destination pressure altitude: 2000 ft.
Destination OAT: 30°C
Fuel to descend: (2 minus 1) = 1 gal.
Time to descend: (10 minus 4) = 6 min.
Distance to descend: (24 minus 10) = 14 nautical miles

FUEL, TIME AND DISTANCE TO DESCEND

Figure 5-31

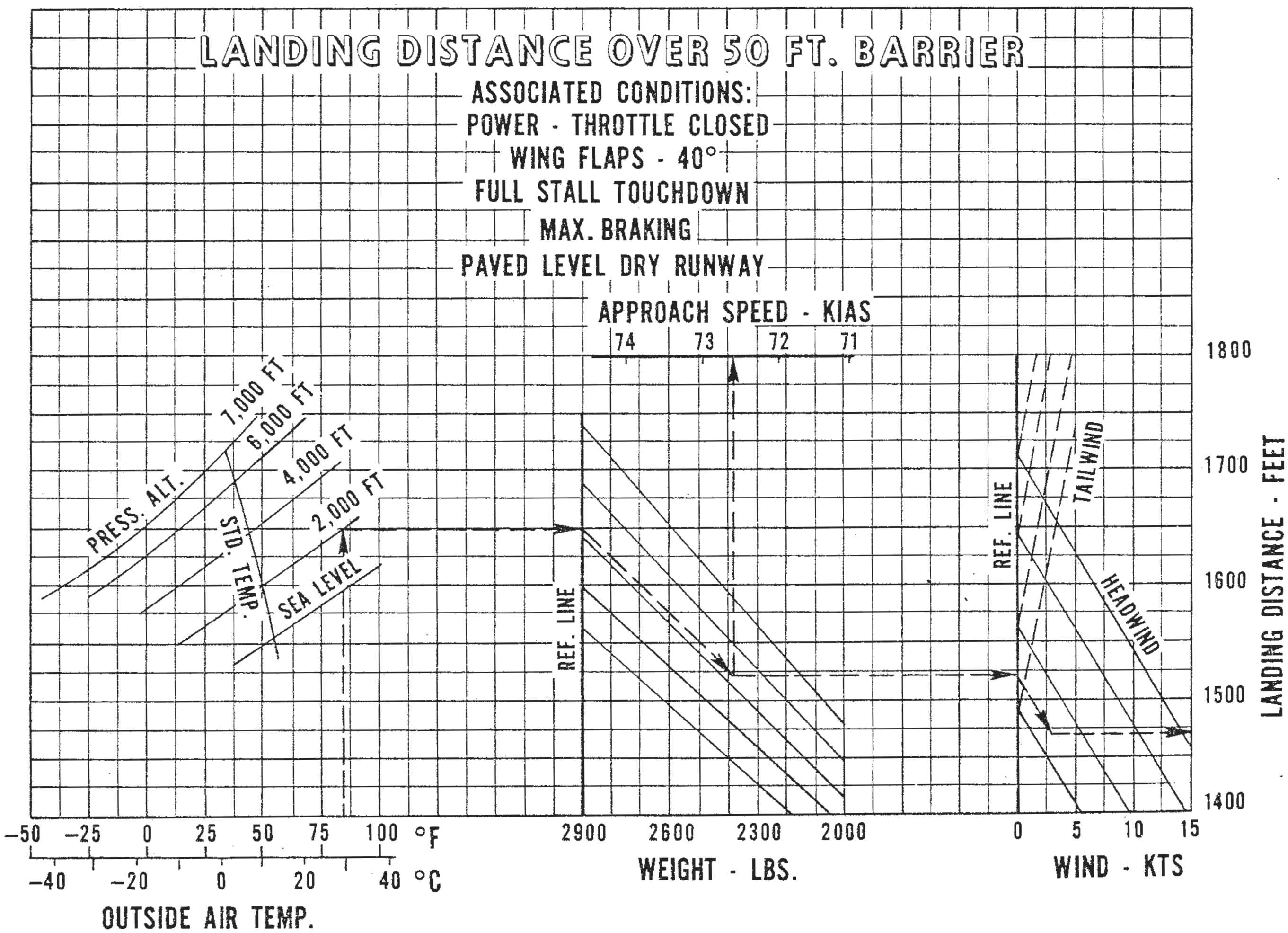


Example:
Cruise pressure altitude: 8500 ft.
Cruise OAT: 10°C
Terrain pressure altitude: 2000 ft.
Terrain OAT: 30°C
Glide time: (9 minus 4) = 5 min.
Glide distance: (16 minus 7) = 9 nautical miles

GLIDE TIME AND DISTANCE

Figure 5-33

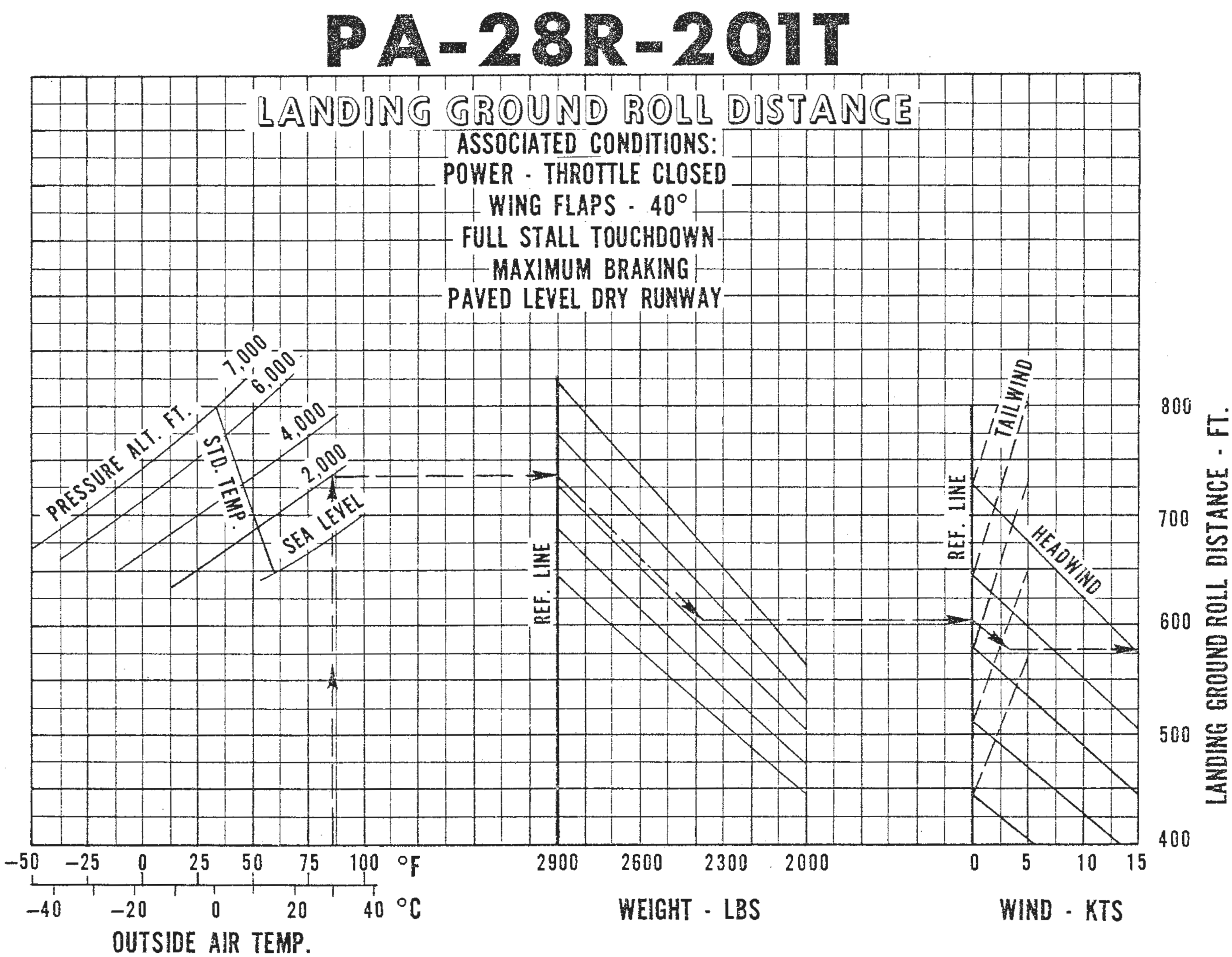
PA-28R-201T



Example:
Destination pressure altitude: 2000 ft.
Destination OAT: 30°C
Landing weight: 2378 lbs.; approach speed: 72.6 KIAS
Wind: 3 knots (headwind)
Landing distance: 1470 ft.

LANDING DISTANCE OVER 50 FT.

Figure 5-35



Example:
Destination pressure altitude: 2000 ft.
Destination OAT: 30° C
Landing weight: 2378 lbs.
Wind: 3 knots (headwind)
Landing ground roll: 580 ft.

LANDING GROUND ROLL DISTANCE
Figure 5-37

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TABLE OF CONTENTS

SECTION 6

WEIGHT AND BALANCE

SECTION 6

WEIGHT AND BALANCE

6.1 GENERAL

In order to achieve the performance and good 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 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 insure 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 licensed, 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 6-5) and the Weight and Balance Record (Figure 6-7). 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 overloading.

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.

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6.3 AIRPLANE WEIGHING PROCEDURE

At the time of licensing, 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 (5.0 gallons total, 2.5 gallons each wing).

CAUTION

Whenever the fuel system is completely drained and fuel is replenished it will be necessary to run the engine for a minimum of 3 minutes at 1000 RPM on each tank to insure no air exists in the fuel supply lines.

(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.

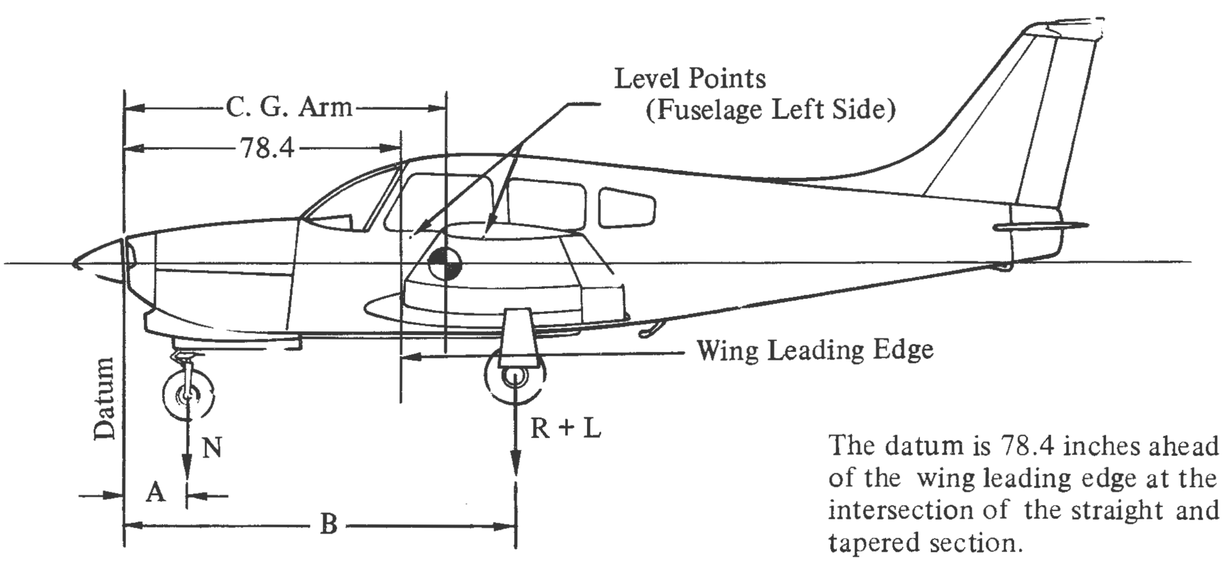
Scale Position and Symbol		Scale Reading	Tare	Net Weight
Nose Wheel	(N)			
Right Main Wheel	(R)			
Left Main Wheel	(L)			
Basic Empty Weight, as Weighed (T)		— —	— —	

WEIGHING FORM

Figure 6-1

(d) Basic Empty Weight Center of Gravity

(1) The following geometry applies to the PA-28R-201T airplane when it is level. Refer to Leveling paragraph 6.3 (b).



A = 15.6
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:

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

$$\text{Where:} \quad T = N + R + L$$

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 licensed at the factory. These figures apply only to the specific airplane serial number and registration number shown.

The basic empty weight of the airplane as licensed at 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.