PILOT'S OPERATING HANDBOOK

PIPER CHEROKEE LANCE

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. 32R-7780005

AIRPLANE REGISTRATION NO. N5421F

PA-32R-300
REPORT: VB-840

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

DATE OF APPROVAL: AUGUST 20, 1976

HANDBOOK PART NO. 761 633

PIPER

FLIGHT MANUAL APPROVAL

Nationality and Registration Marks : VH- HMM

Aeroplane Serial Number : 32R-7780005

Manufacturer : Piper Aircraft Corporation

Designation of Aeroplane : Piper PA-32R-300

Certification Category or Categories : Normal

This Flight Manual has been approved by the Civil Aviation Authority and is the Flight Manual referred to in Certificate of Airworthiness Number

ML 185.....

Date 9/9/88 Delegate .....

Any person finding this Manual should return it to the nearest Regional Office of the Civil Aviation Authority.

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APPLICABILITY

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

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

REVISIONS

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

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

I. Revisions

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

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

II. Identification of Revised Material

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

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

ORIGINAL PAGES ISSUED

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

Title, ii through v, 1-1 through 1-14, 2-1 through 2-10, 3-1 through 3-14, 4-1 through 4-18, 5-1 through 5-32, 6-1 through 6-56, 7-1 through 7-28, 8-1 through 8-16, 9-1 through 9-20, 10-1 through 10-2.

PILOT'S OPERATING HANDBOOK LOG OF REVISIONS

Current Revisions to the PA-32R-300 Cherokee Lance Pilot's Operating Handbook, REPORT: VB-840 issued August 20, 1976.

Revision Number and Code	Revised Pages	Description of Revision	FAA Approval Signature and Date
Rev. 1 - 761 633 (PR760906)	4-1	Changed 4.3, item (f) from "KIAS to "KTS."	
	5-3	Revised weights in 5.5, item (a) (6).	
	5-4	Revised item (c), subsections (3) and (4).	
	5-5	Revised item (e), subsections (2), (6) and (7).	
	5-6	Revised item (f), subsection (1) and item (g) subsection (1).	
	5-20	Revised Fuel, Distance, and Time to Climb graph and example.	
	5-29, 5-30, 5-31, 5-32	Revised Gross Weight in example.	Ward Evans
	6-41	Revised item 171.	Ward Evans
	6-43	Revised items 185, 187 and 189.	Sept. 6, 1976

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SECTION 1

GENERAL

SECTION 1

GENERAL

1.1 INTRODUCTION

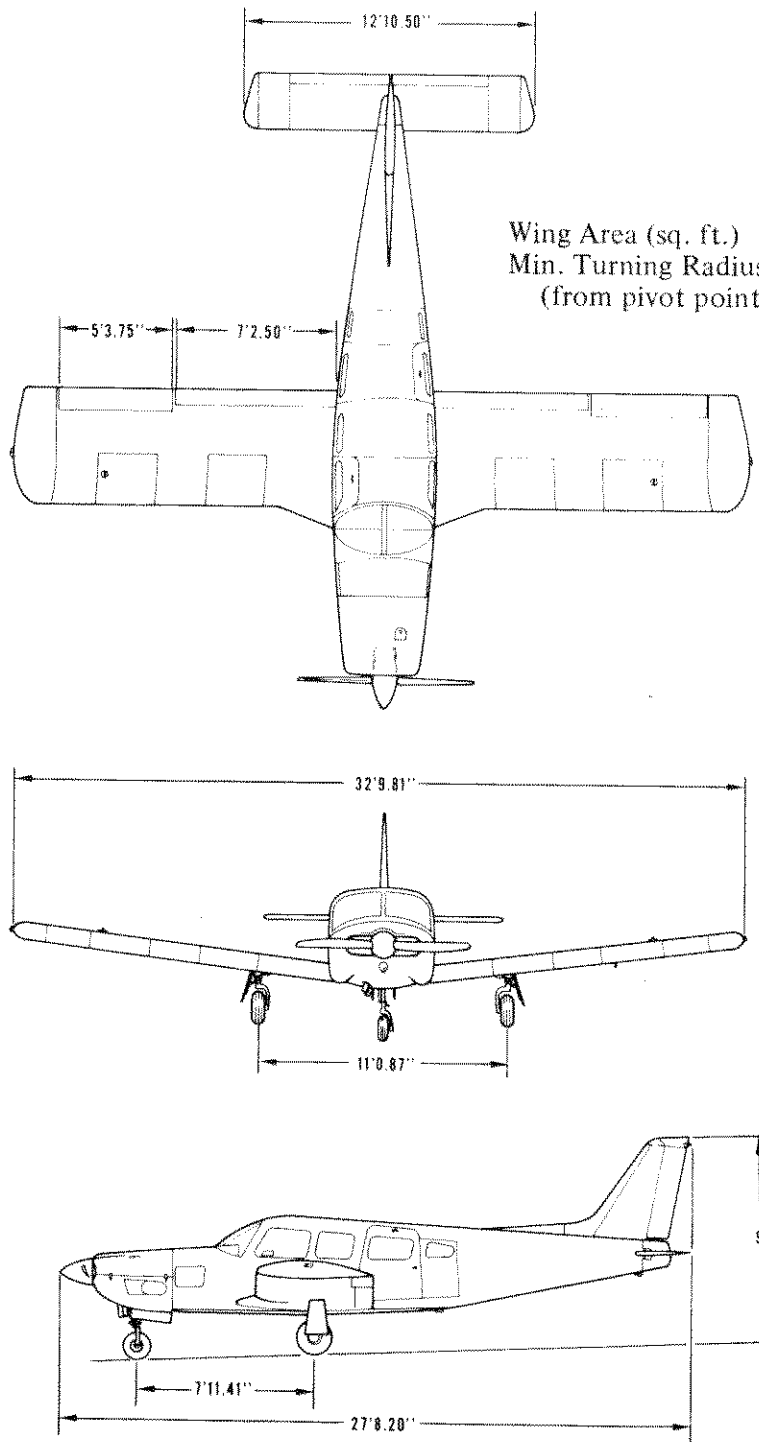
This Pilot's Operating Handbook is designed for maximum utilization as an operating guide for the pilot. It includes the material required to be furnished to the pilot by C.A.R. 3 and FAR Part 21 Subpart J. It also contains supplemental data supplied by the airplane manufacturer.

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.)	174.5
Min. Turning Radius (ft) (from pivot point to wingtip)	37.75

THREE VIEW

Figure 1-1

1.3 ENGINES

(a)	Number of Engines	1
(b)	Engine Manufacturer	Lycoming
(c)	Engine Model Number	IO-540-K1G5D
(d)	Rated Horsepower	300
(e)	Rated Speed (rpm)	2700
(f)	Bore (inches)	5.125
(g)	Stroke (inches)	4.375
(h)	Displacement (cubic inches)	541.5
(i)	Compression Ratio	8.7:1
(j)	Engine Type	Six Cylinder, Direct Drive, Horizontally Opposed, Air Cooled

1.5 PROPELLERS

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

1.7 FUEL

(a)	Fuel Capacity (U.S. gal) (total)	98
(b)	Usable Fuel (U.S. gal) (total)	94
(c)	Fuel Grade, Aviation	
	(1) Minimum Octane	100/130 - Green
	(2) Specified Octane	100/130 - Green
	(3) Alternate Fuels	Refer to latest revision of Lycoming Service Instruction 1070.

1.9 OIL

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

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

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

1.11 MAXIMUM WEIGHTS

(a) Maximum Takeoff Weight (lbs)		3600
(b) Maximum Landing Weight (lbs)		3600
	FORWARD	AFT
(c) Maximum Weights in Baggage Compartments	100	100

1.13 STANDARD AIRPLANE WEIGHTS

(a) Standard Empty Weight (lbs): Weight of a standard airplane including unusable fuel, full operating fluids and full oil.	1980
(b) Maximum Useful Load (lbs)*: The difference between the Maximum Takeoff Weight and the Standard Empty Weight.	1620

1.15 BAGGAGE SPACE

	FORWARD	AFT
(a) Compartment Volume (cubic feet)	7.0	20.0
(b) Entry Width (inches)	16.0	48.0
(c) Entry Height (inches)	22.0	26.0

1.17 SPECIFIC LOADINGS

(a) Wing Loading (lbs per sq ft)	20.6
(b) Power Loading (lbs per hp)	12.0

*This value is for a standard airplane without optional equipment. Refer to Figure 6-5 for the useful load value to be used for C.G. calculations for the airplane 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) Meterological Terminology

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

(c) Power Terminology

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

(d) Engine Instruments

EGT Gauge	Exhaust Gas Temperature Gauge

(e) Airplane Performance and Flight Planning Terminology

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

(f) Weight and Balance Terminology

Reference Datum	An imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	A location along the airplane fuselage usually given in terms of distance 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
atmospheres	76.00	cm Hg at 0°C
	29.92	in. Hg at 0°C
	14.696	lb/sq in.
	21,116	lb/sq ft
	1.033	kg/sq cm
centimeters	0.3937	in.
	3.281×10^{-2}	ft
cm Hg	1.934×10^{-1}	lb/sq in.
	27.85	lb/sq ft
	135.95	kg/sq m
cm/second	3.281×10^{-2}	ft/sec
	2.237×10^{-2}	mph
cu centimeters	10^{-3}	liters
	6.102×10^{-2}	cu in.
	2.642×10^{-4}	U.S. gal
cu ft	2.832×10^{4}	cu cm
	1,728	cu in.
	3.704×10^{-2}	cu yards
	7.481	U.S. gal
	28.32	liters
cu ft/min	4.719×10^{-1}	liters/sec
	2.832×10^{-2}	cu m/min
cu in.	16.39	cu cm
	1.639×10^{-2}	liters
	4.329×10^{-3}	U.S. gal
	1.732×10^{-2}	quarts
cu meters	61,023	cu in.
	1.308	cu yards
	35.31	cu ft
	264.2	U.S. gal
cu yards	27.0	cu ft
	7.646×10^{-1}	cu meters
	2.022×10^{2}	U.S. gal
deg (arc)	1.745×10^{-2}	radians

MULTIPLY	BY	TO OBTAIN
feet	3.048×10^{-1}	meters
	3.333×10^{-1}	yards
	1.894×10^{-4}	miles
	1.646×10^{-4}	nautical miles
ft/min.	1.136×10^{-2}	mph
	1.829×10^{-2}	km/hr
	5.080×10^{-1}	cm/sec
ft/sec	.6818	mph
	1.097	km/hr
	30.48	cm/sec
	.5925	knots
ft/lb	1.383×10^{-1}	m-kg
ft-lb/min	3.030×10^{-5}	hp
ft-lb/sec	1.818×10^{-3}	hp
fluid oz	8	dram
	29.6	cu cm
gal, Imperial	277.4	cu in.
	1.201	U.S. gal
	4.546	liters
gal, U.S. dry	268.8	cu in.
	1.556×10^{-1}	cu ft
	1.164	U.S. gal liquid
	4.405	liters
gal, U.S. liquid	231.0	cu in.
	1.337×10^{-1}	cu ft
	3.785	liters
	8.327×10^{-1}	Imperial gal
	1.280×10^{2}	fluid oz
grams/cm	0.1	kg/m
	6.721×10^{-2}	lb/ft
	5.601×10^{-3}	lb/in.
grams/cu cm	1,000	kg/cu m
	62.43	lb/cu ft

MULTIPLY	BY	TO OBTAIN
horsepower	33,000	ft-lb/min
	550	ft-lb/sec
	76.04	m-kg/sec
	1.014	metric hp
horsepower, metric	75.0	m-kg/sec
	9.863×10^{-1}	hp
inches	2.540	cm
	83.33×10^{-3}	ft
in. Hg at 0° C	3.342×10^{-2}	atmospheres
	4.912×10^{-1}	lb/sq in.
	70.73	lb/sq ft
	3.453×10^{2}	kg/sq m
kilograms	2.205	lb
	35.27	oz
	10^{3}	grams
kg-calories	3087	ft-lb
	4.269×10^{2}	m-kg
kg/cu m	62.43×10^{-3}	lb/cu ft
	10^{-3}	grams/cu m
kg/sq cm	14.22	lb/cu ft
	2.048×10^{3}	lb/sq ft
	28.96	in. Hg at 0° C
kilometers	3.281×10^{3}	ft
	6.214×10^{-1}	miles
	5.400×10^{-1}	nautical miles
	10^{5}	centimeters
km/hr	9.113×10^{-1}	ft/sec
	5.396×10^{-1}	knots
	6.214×10^{-1}	mph
	2.778×10^{-1}	m/sec
knots	1.0	nautical mph
	1.688	ft/sec
	1.151	mph
	1.853	km/hr
	5.148×10^{-1}	m/sec

MULTIPLY	BY	TO OBTAIN
liters	10^{3}	cu cm
	61.03	cu in.
	3.532×10^{-2}	cu ft
	2.642×10^{-1}	U.S. gal
	2.200×10^{-1}	Imperial gal
	1.057	quarts
meters	39.37	in.
	3.281	ft
	1.094	yards
	6.214×10^{-4}	miles
meter-kilogram	7.233	ft-lb
meter/sec	3.281	ft/sec
	2.237	miles/hr
	3.600	km/hr
microns	3.937×10^{-5}	in.
miles	5280	ft
	1.609	km
	8.690×10^{-1}	nautical miles
mph	1.467	ft/sec
	4.470×10^{-1}	m/sec
	1.609	km/hr
	8.690×10^{-1}	knots
miles/hr sq	2.151	ft/sec sq
milibars	2.953×10^{-2}	in. Hg at 0° C
nautical miles	6076.1	ft
	1.151	miles
	1852	m
ounces, fluid	29.57	cu cm
	1.805	cu in.
lb/cu ft	16.02	kg/cu m
lb/cu in.	1728	lb/cu ft
	27.68	grams/cu cm

MULTIPLY	BY	TO OBTAIN
lb/sq in.	2.036	in. Hg at 0°C
	6.805×10^{-2}	atmospheres
	7.031×10^{2}	kg/sq m
radians	57.30	deg (arc)
radians/sec	57.30	deg/sec
	15.92×10^{-2}	rev/sec
	9.549	rev/min
revolutions	6.283	radians
rev/min	1.047×10^{-1}	radians/sec
rod	16.5	ft
	5.5	yd
slug	32.174	lb
sq cm	1.550×10^{-1}	sq in.
	1.076×10^{-3}	sq ft
sq ft	929.0	sq cm
	144.0	sq in.
	1.111×10^{-1}	sq yards
	2.296×10^{-5}	acres
sq in.	6.452	sq cm
sq kilometers	3.861×10^{-1}	sq miles
sq meters	10.76	sq ft
	1.196	sq yards
sq miles	2.590	sq km
	640	acres
sq rods	30.25	sq yd
sq yards	8.361×10^{-1}	sq m
	9	sq ft
yards	9.144×10^{-1}	meters
	3.0	ft
	36.0	in.

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