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### GENERAL

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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 FAR 23. 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 and 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.

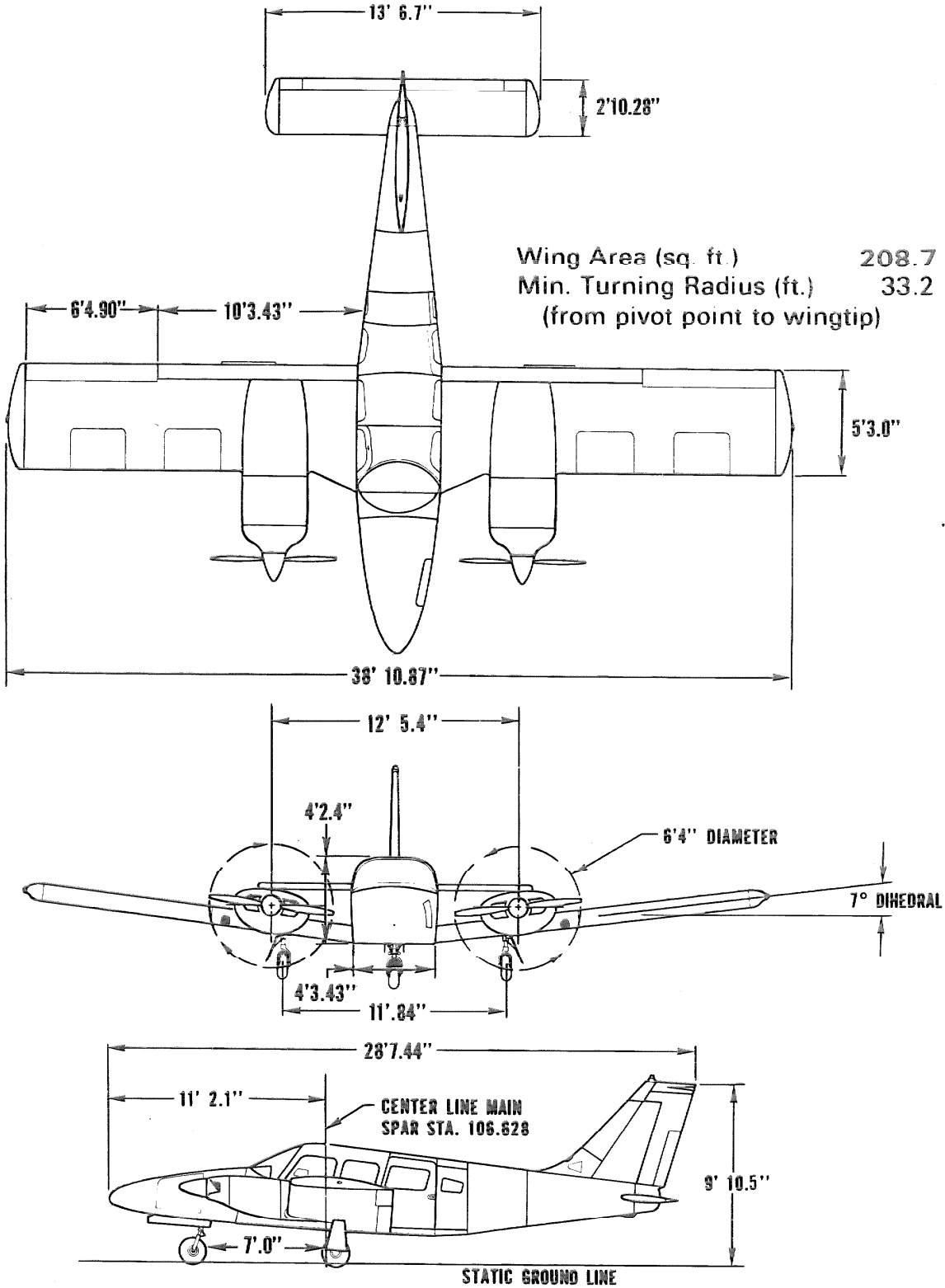
Assurance that the airplane is in an airworthy condition is the responsibility of the owner. The pilot in command is responsible for determining that the airplane is safe for flight. The pilot is also responsible for remaining within the operating limitations as outlined by instrument markings, placards,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

**SECTION I  
GENERAL**

**PIPER AIRCRAFT CORPORATION  
PA-34-220T, SENECA III**



**THREE VIEW**  
Figure I-1

1.3 ENGINE

(a) Number of Engines		2
(b) Engine Manufacturer		Continental
(c) Engine Model Number		
(1) Left		TSIO-360KB
(2) Right		LTSIO-360KB
	<u>T.O. Power</u>	<u>Max. Cont.</u>
	<u>5 Min. Limit</u>	<u>Power</u>
(d) Rated Horsepower	220 BHP	200 BHP
(e) Rated Speed (rpm)	2800	2600
(f) Bore (inches)		4.438
(g) Stroke (inches)		3.875
(h) Displacement (cubic inches)		360
(i) Compression Ratio		7.5:1
(j) Engine Type	Six Cylinder, Direct Drive, Horizontally Opposed, Air Cooled	

1.5 PROPELLER

STANDARD

(a) Number of Propellers		2
(b) Propeller Manufacturer		Hartzell
(c) Propeller Hub & Blade Models*		
(1) Left		BHC-C2YF-2CKUF/ FC8459-8R
(2) Right		BHC-C2YF-2CLKUF/ FJC8459-8R
(d) Number of Blades		2
(e) Propeller Diameter (in.)		
(1) Maximum		76
(2) Minimum		75
(f) Propeller Type	Constant Speed, Hydraulically Activated, Full Feathering	

\*The propellers have the same designation when deicing boots are installed.

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**OPTIONAL**

(a) Number of Propellers	2
(b) Propeller Manufacturer	McCaughey
(c) Propeller Hub & Blade Models*	
(1) Left	3AF32C508-( )/( )-82NFA-6
(2) Right	3AF32C509-( )/( )-L82NFA-6
(d) Number of Blades	3
(e) Propeller Diameter (in.)	
(1) Maximum	76
(2) Minimum	75
(f) Propeller Type	Constant Speed, Hydraulically Activated, Full Feathering

**1.7 FUEL**

**AVGAS ONLY**

(a) Fuel Capacity (U.S. gal.) (total)	
(1) Without optional tanks	98
(2) With optional tanks	128
(b) Usable Fuel (U.S. gal.) (total)	
(1) Without optional tanks	93
(2) With optional tanks	123
(c) Fuel	
(1) Minimum Grade	100 Green or 100LL Blue Aviation Grade
(2) Alternate Fuels	Refer to latest revision of Continental Service Bulletin "Fuel and Oil Grades."

**1.9 OIL**

(a) Oil Capacity (U.S. qts.) (per engine)	8
(b) Oil Specification	Refer to latest revision of Continental Service Bulletin "Fuel and Oil Grades."

\*The propellers have the same designation when deicing boots are installed.

(c) Oil Viscosity

	Aviation Grade	S.A.E. No.
(1) Below 40°F	1065	30
(2) Above 40°F	1100	50

When operating temperatures overlap indicated ranges, use the lighter grade of oil. Multi-viscosity oils meeting Teledyne Continental Motors' Specification MHS-24A are approved.

1.11 MAXIMUM WEIGHTS

(a) Max. Takeoff Weight	4407 LBS./1999 Kg.
(b) Max. Landing Weight	4407 LBS./1999 Kg.
(c) Max. Zero Fuel Weight	4407 LBS./1999 Kg.
(d) Max. Weights in Baggage Compartment	
(1) Forward	100 LBS./45 Kg.
(2) Aft	100 LBS./45 Kg.

1.13 STANDARD AIRPLANE WEIGHTS

Refer to Figure 6-5 for the Standard Empty Weight and the Useful Load.

1.15 BAGGAGE SPACE

	FORWARD	AFT
(a) Maximum Baggage	100 LBS./45 Kg.	100 LBS./45 Kg.
(b) Baggage Space (cu. ft.)	15.3	17.3
(c) Baggage Door Size (in.)	24 x 21	

1.17 SPECIFIC LOADINGS

(a) Wing Loading (lbs. per sq. ft.)	21.2
(b) Power Loading (lbs. per hp)	10.0

### **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**

<b>CAS</b>	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.
<b>KCAS</b>	Calibrated Airspeed expressed in "Knots."
<b>GS</b>	Ground Speed is the speed of an airplane relative to the ground.
<b>IAS</b>	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.
<b>KIAS</b>	Indicated Airspeed expressed in "Knots."
<b>M</b>	Mach Number is the ratio of true airspeed to the speed of sound.
<b>TAS</b>	True Airspeed is the airspeed of an airplane relative to undisturbed air which is the CAS corrected for altitude, temperature and compressibility.
<b>V<sub>A</sub></b>	Maneuvering Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane.
<b>V<sub>FE</sub></b>	Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.



<b>VLE</b>	<b>Maximum Landing Gear Extended Speed</b> is the maximum speed at which an aircraft can be safely flown with the landing gear extended.
<b>VLO</b>	<b>Maximum Landing Gear Operating Speed</b> is the maximum speed at which the landing gear can be safely extended or retracted.
<b>VMCA</b>	<b>Air Minimum Control Speed</b> is the minimum flight speed at which the airplane is directionally controllable as determined in accordance with Federal Aviation Regulations. Airplane certification conditions include one engine becoming inoperative and windmilling; not more than a 5° bank towards the operative engine; takeoff power on operative engine; landing gear up; flaps in takeoff position; and most rearward C.G.
<b>VNE/MNE</b>	<b>Never Exceed Speed or Mach Number</b> is the speed limit that may not be exceeded at any time.
<b>VNO</b>	<b>Maximum Structural Cruising Speed</b> is the speed that should not be exceeded except in smooth air and then only with caution.
<b>Vs</b>	<b>Stalling Speed</b> or the minimum steady flight speed at which the airplane is controllable.
<b>Vso</b>	<b>Stalling Speed</b> or the minimum steady flight speed at which the airplane is controllable in the landing configuration.
<b>VSSE</b>	<b>Intentional One Engine Inoperative Speed</b> is a minimum speed selected by the manufacturer for intentionally rendering one engine inoperative in flight for pilot training.

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**V<sub>x</sub>** Best Angle-of-Climb Speed is the airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance.

**V<sub>y</sub>** 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 (1013.2 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 (1013.2 millibars).

**Pressure Altitude** Altitude measured from standard sea-level pressure (29.92 in. Hg) by a pressure or barometric altimeter. It is the indicated pressure altitude corrected for position and instrument error. In this handbook, altimeter instrument errors are assumed to be zero.

**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 (DEMO. X-WIND)**

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.

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**Route Segment**            A part of a route. Each end of that part is identified by: (1) a geographical location; or (2) a point at which a definite radio fix can be established.

**(f) Weight and Balance Terminology**

**Reference Datum**        An imaginary vertical plane from which all horizontal distances are measured for balance purposes.

**Station**                    A location along the airplane fuselage usually given in terms of distance in inches from the reference datum.

**Arm**                        The horizontal distance from the reference datum to the center of gravity (C.G.) of an item.

**Moment**                    The product of the weight of an item multiplied by its arm. (Moment divided by a constant is used to simplify balance calculations by reducing the number of digits.)

**Center of Gravity (C.G.)**    The point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.

**C.G. Arm**                    The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.

**C.G. Limits**                The extreme center of gravity locations within which the airplane must be operated at a given weight.

**Usable Fuel**                Fuel available for flight planning.

Unusable Fuel	Fuel remaining after a runout test has been completed in accordance with governmental regulations.
Standard Empty Weight	Weight of a standard airplane including unusable fuel, full operating fluids and full oil.
Basic Empty Weight	Standard empty weight plus optional equipment.
Payload	Weight of occupants, cargo and baggage.
Useful Load	Difference between takeoff weight, or ramp weight if applicable, and basic empty weight.
Maximum 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.

