NATIONWIDE AVIATION

PIPER APACHE (PA-23-160)

Engine

Lycoming O-320-B3B
160 HP at 2,700 RPM
Four Cylinder/Horizontally Opposed

Prop

Hartzell HC 82XG-2B
Constant Speed, Full-feathering
Takes approx. 3” to feather
No accumulators

Oil

Max 8
Minimum 2
Operating 6

Fuel System

36 (+18 aux tanks) Per Side
108 Total (XX Usable)
Engine Driven Fuel Pumps
Auxiliary Electric Fuel Pumps

Electrical System

12 Volt Battery, 33 Amps
Dual 12 V, 35 Amp Generators
2 Voltage regulators working in parallel

Flaps

Hydraulically operated from left engine
Simple Slotted/ 0°–50°
Manual hand pump in case of Hyd failure

Gear

Hydraulically operated from left engine
Manual hand pump in case of Hyd failure
C02 back up for fluid loss

Max Takeoff/Landing Weight: 3800 lbs.

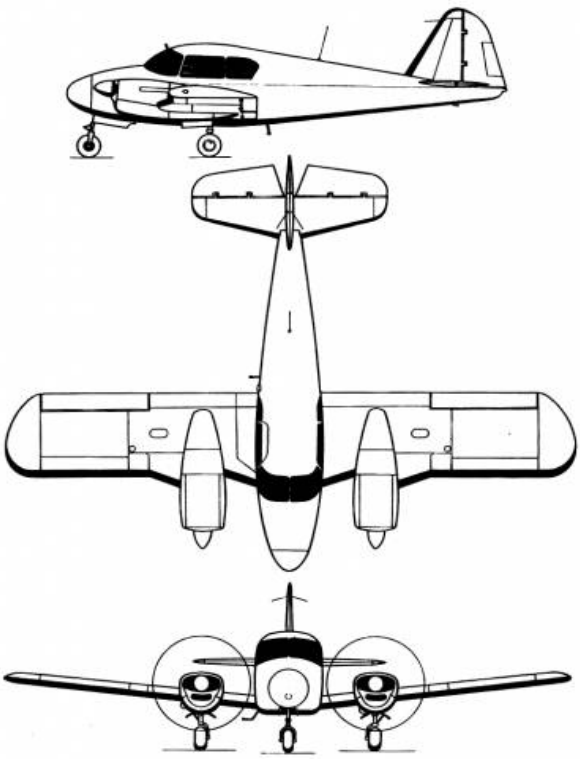
- **Wingspan:** 37’ 2”
- **Length:** 27’ 1”
- **Height:** 9’ 5”

Altitudes: Service ceiling 17,000 ft
Single engine Absolute ceiling 5,500 ft

Vmc: 72 mph

Nose Wheel: 30° Either Side of neutral

Brakes: Pilot (left) side ONLY



ORAL PREP & GENERAL KNOWLEDGE

A solid understanding of Vmc and defining a critical engine is vital to your Multi Engine training.

Vmc – Minimum controllable airspeed. It is defined in 14 CFR 23.2135(c) as the calibrated airspeed at which, following a sudden critical loss of thrust, it is possible to maintain control of the airplane. For multiengine airplanes, the applicant (A/C maker) must determine Vmc, if applicable, for the most critical configurations used in takeoff and landing configurations.

How is it determined?
C - Critical engine failed/ windmilling
O – Operating Engine at max T/O Power
M – Max Gross Weight (or most unfavorable)
B – Bank of no more than 5° into good engine
A – Aft CG
T – T/O config (Gear up, flaps in T/O posit)
S – Standard day (Temp and pressure)

In this config, the test pilot must be able to stop the turn that results when the critical engine is suddenly made inoperative within 20 degrees of the original heading using max rudder deflection and a max of 5 degrees of bank into the operative engine then maintain.

Things that increase Vmc airspeed (BAD)
Reduction in bank (due to side slipstream)
Lower altitude (better working eng perf)
Lower temps (better working eng perf)
High Press Altitude (better working eng perf)

Things that Lower Vmc (Good)
High Altitude (less working eng perf)
High Temperatures (less working eng perf)
Lower Press Altitude (less working eng perf)
Gear Down (Keel effect)
Reduced Drag (flaps up/Gear up)
Forward CG (Longer arm for rudder)
Reduced Power on good engine

Critical Engine – the engine whose failure would most adversely affect the airplanes performance or handling qualities.

Do all twin engine airplanes have a critical engine?

If not, then why?

Does the Apache have a critical Engine?

There are 4 major factors that determine a critical engine:
P – P Factor (Yaw)
A – Accelerated Slipstream (Roll)
S – Spiraling Slipstream (Yaw)
T – Torque (Roll)

New Airspeeds (V speeds)
Some new airspeeds will be introduced with multi-engine flying. Know and define these speeds for your airplane:

Vmc
Vxse
Vyse
Vsse

Understanding Multi-engine Performance is a must as well.

Does the loss of one engine mean you will have a 50% reduction in available power?

How high can you fly with 2 engines?

How high can you fly with 1 engine?

What's the difference in service ceiling and absolute service ceiling?

Be able to extrapolate from the POH:
Take off distance
Accelerate – stop distance
Accelerate - go distance
2 engine climb performance
1 engine climb performance
Landing distance