

## SECTION 2 - LIMITATIONS

PA-30 \* 3600 LBS GROSS WEIGHT

1963 THROUGH 1969 (NORMALLY ASPIRATED MODEL ONLY)

APPLICABLE TO AIRPLANES WITH SERIAL NUMBERS:  
30-1 THROUGH 30-2000

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## LIMITATIONS

PA-30 \* 3600 LBS GROSS WEIGHT

### INTRODUCTION

The limitations included in this section are approved by the Federal Aviation Administration. The Twin Comanche is certified under FAA Type Certificate No. A1EA, approved February 05, 1963.

### AIRSPEED LIMITATIONS

#### $V_A$ - Design Maneuvering Speed / Turbulent Air Penetration Speed

At 3,600 lbs Gross Weight .....	CAS	162 mph	141 kt
	IAS	162 mph	141 kt
At 2,450 lbs Gross Weight .....	CAS	135 mph	117 kt
	IAS	134 mph	116 kt

**\*\* NOTE \*\*** Do not make full or abrupt control movements above  $V_A$ .

$V_{FE}$ - Flap Extension Speed .....	CAS	125 mph	108 kt
	IAS	124 mph	107 kt

**\*\* NOTE \*\*** Do not extend flaps or operate with flaps extended above  $V_{FE}$ .

$V_{LE}$ - Landing-Gear Extended Speed .....	CAS	150 mph	130 kt
	IAS	149 mph	129 kt

**\*\* NOTE \*\*** Do not exceed  $V_{LE}$  with the landing gear extended.

$V_{LO}$ - Landing-Gear Operation Speed .....	CAS	150 mph	130 kt
	IAS	149 mph	129 kt

**\*\* NOTE \*\*** Do not extend or retract the landing gear above  $V_{LO}$ .

$V_{MCA}$ - Single Engine Minimum Control Speed .....	CAS	90 mph	78 kt
	IAS	88 mph	76 kt

**\*\* NOTE \*\*** Minimum speed for directional controllability after sudden loss of an engine.

$V_{NE}$ - Never Exceed Speed .....	CAS	230 mph	200 kt
	IAS	234 mph	203 kt

**\*\* NOTE \*\*** Do not exceed  $V_{NE}$  in any operation.

$V_{NO}$ - Normal Operating Speed / Maximum Structural Cruising Speed ...	CAS	194 mph	169 kt
	IAS	197 mph	171 kt

**\*\* NOTE \*\*** Do not exceed  $V_{NO}$  except in smooth air and then only with caution.

$V_{S0}$ - Stall Speed (Power Off - Full Flaps and Gear Extended) .....	CAS	69 mph	60 kt
	IAS	69 mph	60 kt

$V_{S1}$ - Stall Speed (Power Off - Clean) .....	CAS	76 mph	66 kt
	IAS	74 mph	64 kt

## POWER PLANT INSTRUMENT MARKINGS

### 1.) Tachometer:

Green Arc (Normal Operating Range) ..... 500 to 2700 rpm  
Red Line (Maximum Continuous) ..... 2700 rpm

### 2.) Oil Temperature:

Green Arc (Normal Operating Range) ..... 120-245 Degrees Fahrenheit  
Yellow Arc (Caution Range) ..... 60-120 Degrees Fahrenheit  
Red Line (Maximum Temperature) ..... 245 Degrees Fahrenheit

### 3.) Oil Pressure:

Green Arc (Normal Operating Range) ..... 60-90 psi  
Yellow Arc (Caution Range) ..... 25-60 and 90-100 psi  
Red Line (Minimum psi) ..... 25 psi  
Red Line (Maximum psi) ..... 100 psi

### 4.) Fuel Flow:

Green Arc (Normal Operating Range) ..... Zero to 16.0 gph  
Red Line (Maximum Pressure at Sea Level) ..... 16.0 gph (7.0 psi)

### 5.) Cylinder Head Temperature:

Green Arc (Normal Operating Range) ..... 200-500 Degrees Fahrenheit  
Red Line (Minimum Temperature) ..... 200 Degrees Fahrenheit  
Red Line (Maximum Temperature) ..... 500 Degrees Fahrenheit

### 6.) Instrument Vacuum:

Green Arc (Normal Operating Range) ..... 4.8 to 5.1 in Hg  
Red Line (Minimum Suction) ..... 4.8 in Hg  
Red Line (Maximum Suction) ..... 5.1 in Hg

## AIRSPEED INDICATOR MARKINGS

**\*\* NOTE \*\*** The airspeed indicator color markings are in CAS values.

Red Line (Never Exceed Speed) ..... 230 mph 200 kt  
Yellow Arc (Caution Range) ..... 194-230 mph 169-200 kt  
Green Arc (Normal Operating Range) ..... 76-194 mph 66-169 kt  
White Arc (Flaps Down) ..... 69-125 mph 60-108 kt  
Red Radial Line ( $V_{MCA}$  - Single Engine) ..... 90 mph 78 kt  
Blue Radial Line ( $V_Y$  - Single Engine) ..... 105 mph 91 kt

**POWER PLANT LIMITATIONS**

**1.) Engine Operating Limits:**

Two Lycoming Model: IO-320-B1A

Takeoff Power and MCP ..... 2700 rpm/160 bhp

**2.) Propeller Limitations:**

Two Hartzell Hub Model: HC-E2YL-2

Blade Model: 7663-4

Diameter ..... Maximum 72 in \* Minimum 70 in

Pitch (30 in Station) ..... Low 12.0 Degrees \* Feathered 78.0 Degrees

**WEIGHT LIMITS**

Maximum Takeoff Weight ..... 3,600 lb

Maximum Landing Weight ..... 3,600 lb

Maximum Baggage Weight (SN 30-1 Through 30-901 Except 30-853) ..... 200 lb

Maximum Baggage Weight (SN 30-853 and 30-902 Through 30-2000) ..... 250 lb

**CENTER OF GRAVITY LIMITS**

Weight Pounds	Arm Forward Limit Inches Aft of Datum	Arm Rearward Limit Inches Aft of Datum
3,600	86.5	92.0
3,200	83.0	92.0
2,450 or Less	81.0	92.0

**\*\* NOTE \*\***

Straight line variation exists between the points given.

Datum is located 79 inches ahead of the wing leading edge. It is measured longitudinally from station 65.5 and laterally from spanwise station 97.0 (First leading skin lap outboard of engine nacelle).

**STRUCTURAL LOAD FACTORS**

Positive ..... Normal Category + 3.80 g

Negative ..... Normal Category - 1.52 g

**\*\* NOTE \*\*** No inverted maneuvers are approved

### OPERATIONAL LIMITS

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

- 1.) VFR day and night
- 2.) IFR day and night

**\*\* WARNING \*\***

Flight into known icing conditions is prohibited unless the following equipment is installed and working in accordance with applicable Piper drawings and FAA regulations

- 1.) Pneumatic Wing and Empennage Boots - STC No. SA233EA
- 2.) Alcohol Propeller Anti-Icing Kit - STC No. SA184EA
- 3.) Heated Windshield Panel - PAC Drawing 25221 or 26711
- 4.) Heated Pitot Head - PAC Drawing 21301 or 26732
- 5.) Piper Antennas - PAC Drawing 25043

### FUEL LIMITATIONS

Main (Inboard) Tanks:

Basic Fuel Capacity (Two Cells, 30 US gal ea.) ..... 60 US gal - 54 Usable

**\*\* NOTE \*\***

The unusable fuel in this aircraft has been determined to be 3 gallons in each inboard tank in critical flight attitudes.

Auxiliary (Outboard) Tanks:

Reserve Fuel Capacity (Two Cells, 15 US gal ea.) ..... 30 US gal - 30 Usable

Auxiliary (Tip) Tanks:

Reserve Fuel Capacity (Two Cells, 15 US gal ea.) ..... 30 US gal - 30 Usable

**\*\* NOTE \*\*** Minimum fuel grade is (blue) 91/96 octane (100 LL) aviation fuel.

### WING FLAP LIMITATIONS

Takeoff ..... Zero to 15 Degrees  
Landing ..... Zero to 27 Degrees

The flaps are electrically operated and the deflection is displayed on the flap position indicator. Takeoff range is indicated by the White Arc on the flap indicator.

### OTHER LIMITATIONS

- 1.) Loss of altitude in a power off stall with landing gear and wing flaps retracted is 280 ft.
- 2.) When performing power on stalls, do not exceed 2100 rpm.
- 3.) Landing Gear Down Light: The green gear down light on the instrument panel indicates the landing gear is down and locked. When the instrument panel lights are turned on the intensity if the gear indicator lights is reduced. The green light may be invisible with instrument lights on during daylight.
- 4.) Cowl flaps are provided to allow manual control of engine temperatures. The cowl flaps should be open during ground operations and during climbs. In no case should the cylinder head temperatures be allowed to exceed 500 Degrees Fahrenheit and/or the oil temperatures be allowed to exceed 245 Degrees Fahrenheit.

### PLACARDS

#### 1.) On Instrument Panel in Full View of the Pilot:

THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE AIRPLANE FLIGHT MANUAL. ACROBATIC MANEUVERS (INCLUDING SPINS) PROHIBITED.

MINIMUM SINGLE ENGINE CONTROL SPEED	90 MPH CAS
MANEUVERING SPEED	162 MPH CAS
MAXIMUM GEAR DOWN SPEED	150 MPH CAS

#### 2.) On Landing Gear Operating Motor Access Door:

EMERGENCY GEAR EXTENSION.  
REMOVE COVER.  
EXTENSION INSTRUCTIONS  
ON REVERSE SIDE.

#### 3.) On the Instrument Panel:

STALL WARNING  
The stall warning system is inoperative  
when the master switch is off.

WARNING - UNCOORDINATED MANEUVERS, INCLUDING SIDE SLIPS OF 30 SECONDS OR MORE, FOR ANY REASON, AND FAST TAXI TURNS JUST PRIOR TO TAKEOFF CAN CAUSE LOSS OF POWER IF FUEL TANKS IN USE ARE LESS THAN 1/4 FULL.

**PLACARDS (Cont.)**

**4.) On Circuit Breaker Access Door:**

CIRCUIT BREAKER ACCESS DOOR

**5.) On Baggage Compartment Door: (SN 30-1 Through 30-901 Except 30-853)**

MAXIMUM BAGGAGE 200 POUNDS

**6.) On Baggage Compartment Door: (SN 30-853 and 30-902 Through 30-2000)**

EMERGENCY EXIT  
HOLD KNOB UP  
TURN LATCH CLOCKWISE

**7.) On Right Rear Window Molding in Baggage Area: (SN 30-853 and 30-902 Through 30-2000)**

MAXIMUM BAGGAGE AND/OR PASSENGER WEIGHT  
250 LBS IN BAGGAGE AREA INCLUDING SEATS  
SEE WEIGHT AND BALANCE

**8.) At the Fuel Strainer Compartment:**

FUEL STRAINERS DRAIN ONLY TANK INDICATED BY  
FUEL SELECTOR. ALLOW SUFFICIENT DRAIN TIME.

## PROCEDURES

All of the following procedures were supplied by Piper Aircraft to comply with the requirements of Part 3 of the Civil Aviation Regulations effective May 15, 1956, as amended.

### A.) Fuel System:

#### 1.) Normal Operation

##### a.) Takeoff and Landing

- 1.) Fuel valves "ON" main tanks.
- 2.) Electric fuel pumps "ON".

##### b.) Cruising

- 1.) Fuel valves "ON" main or auxiliary tanks.
- 2.) Electric fuel pumps "OFF".

#### 2.) Emergency Operation -- Single Engine

A crossfeed is provided to increase the range during single engine emergency operating conditions. Fuel system operation is as follows:

##### a.) Cruising

- 1.) When using fuel from tanks from the same side as the operating engine the following will apply:
  - a.) Fuel valve "ON" (main or auxiliary) on Operating engine side.
  - b.) Fuel valve "OFF" on Inoperative engine side.
  - c.) Electric fuel pumps "OFF" (except in case of engine driven pump failure, electric fuel pump on operating engine side must be used).
- 2.) When using fuel from tanks on the opposite side of the operating engine the following will apply:
  - a.) Fuel valve "ON" (main or auxiliary) on Inoperative engine side.
  - b.) Electric fuel pumps "OFF" (except in case of engine driven pump failure, electric fuel pump on operating engine side must be used).
  - c.) "CROSSFEED ON" on Operating engine side.

Warning: DO NOT ATTEMPT TO PUT BOTH FUEL SELECTOR VALVES ON CROSSFEED.

##### b.) Landing

- 1.) Fuel valve "ON" main tank on Operating engine side.
- 2.) Fuel valve "OFF" on Inoperative engine side.
- 3.) Electric fuel pump "ON" on Operating engine side.



## PROCEDURES (Cont.)

### B.) Propeller Feathering Procedure:

- 1.) "Open Throttle" on Operating Engine to maintain altitude and airspeed above 97 MPH.
- 2.) "Close Throttle" on Inoperative Engine.
- 3.) Pull mixture control on Inoperative engine to "Idle Cut-Off".
- 4.) Pull prop control in Inoperative engine to "Feather" position.
- 5.) Ignition switches "OFF" on Inoperative engine.
- 6.) Electric fuel pumps "OFF".
- 7.) Main fuel valve on inoperative engine "OFF".  
See Fuel System Emergency Operation. (A.2.)  
See A.2. for fuel scheduling.

### C.) Propeller Unfeathering Procedure:

- 1.) Turn fuel valve "ON" on inoperative engine side.
- 2.) Turn electric fuel pump "OFF".
- 3.) "OPEN" throttle 1/4 inch.
- 4.) Advance propeller to "HIGH RPM".
- 5.) Advance mixture to "FULL RICH".
- 6.) Turn ignition switches "ON".
- 7.) Engage starter and hold until engine is started.
- 8.) Reduce propeller control to cruise RPM.
- 9.) Advance throttle to desired power.

### D.) Emergency Extension of Landing Gear:

- 1.) Reduce power -- airspeed not to exceed 100 MPH.
- 2.) Place Landing Gear Selector Switch in the center "OFF" position if equipped with a three position gear switch or the "GEAR DOWN LOCKED" position if equipped with a two position gear switch.
- 3.) Disengage motor. Raise motor release arm and push forward through full travel.
- 4.) Remove gear extension handle from stowage. If left socket is not in clear position, place handle in right socket. Engage slot and twist clockwise to secure handle. Extend handle and rotate forward until left socket is in clear position. Remove handle and place in left socket and secure. Extend handle. Rotate handle forward FULL forward to extend landing gear and to engage emergency safety lock.
- 5.) Handle locked in full forward position indicates landing gear is down and emergency safety lock engaged. Gear "DOWN LOCKED" indicator light should be "ON".

NOTE: Reducing power and rocking gear extension handle will aid in manually extending the landing gear. DO NOT RETRACT WITH HANDLE IN SOCKET. DO NOT RE-ENGAGE MOTOR IN FLIGHT.

## PROCEDURES (Cont.)

### E.) Circuit Breakers:

(SN 30-1 Through 30-1744 Except 30-1717) All circuit breakers are grouped in one panel in floor aft of the nose wheel well under a door marked "CIRCUIT BREAKER ACCESS DOOR".

(SN 30-1717 and 30-1745 Through 30-2000) All circuit breakers are grouped in the lower right corner of the instrument panel.

To reset the circuit breakers push in on the reset button.

### F.) Stopping Engines:

When operating under high ambient temperature conditions engine shutdown by mixture alone may not be positive.

Shutting down the engines under these conditions should be as follows:

- 1.) Pull the mixture controls to idle cut-off.
- 2.) Depress button on left side of quadrant.
- 3.) Pull back on throttles and hold until engines stop.

### G.) Warning:

#### 1.) Maneuvers:

This airplane is certified as a normal category airplane and must be operated in compliance with the Airplane Flight Manual. Acrobatic maneuvers (including spins) are prohibited. Stalls and slow flight should be performed only in accordance with the Airplane Flight Manual.

Avoid abrupt maneuvers. Maneuvers at speeds and weights in excess of the maneuvering speeds and loadings listed under Limitations Section of this Flight Manual may subject the airplane to load factors beyond which it is certificated.

Maintain at least 5,000 feet of terrain clearance when practicing stalls.

#### 2.) Spins:

All spins are prohibited, however, in the event an unintentional spin is encountered recovery can be accomplished by immediately using the following procedures:

- a.) Retard both throttles to the idle position.
- b.) Apply full rudder in the opposite direction to the spin.
- c.) Push control wheel full forward. While it is not necessary for recovery, the use of ailerons against the turn (i.e. right aileron if the spin is to the left) will expedite recovery.
- d.) Maintain controls in these positions until the spin stops. Then neutralize rudder and ailerons.
- e.) Recover from dive with smooth back pressure on the control wheel. No abrupt control movement should be used during recovery from the dive, as the maneuvering speed and positive limit maneuvering load factor may be exceeded.

## PROCEDURES (Cont.)

### H. Alternator System: (Non-Paralleling Type)

Press-to-test switches, in conjunction with the ammeter, are used to determine the output of each alternator. These switches are located directly below the ammeter. In the normal position the ammeter indicates battery charge or discharge current. Depressing the ammeter press-to-test switch causes the ammeter to indicate the output current for the corresponding alternator, viz. the left switch checks the left alternator.

A preflight check of the alternators should be made during engine run-up. With both engines operating at approximately 2000 RPM, depress the alternator press-to-test switches individually and check alternator outputs. These should be approximately equal.

In the event of failure of the voltage regulating system an auxiliary regulating system may be switched into the circuit. Abnormal operation may be indicated by zero output on both alternator test positions and a discharge indication for the battery. To energize the auxiliary regulating system the following procedure shall be followed:

- 1.) Reduce aircraft electrical load to minimum for continued safe flight.
- 2.) Switch "VOLTAGE REGULATOR SELECTOR" to "AUXILIARY" position.
- 3.) Reset tripped breakers but do not reset "MAIN" Voltage Regulator Breaker.
- 4.) Return to normal required electrical load.

If the electrical system still fails to maintain correct output while using the AUX VOLTAGE REGULATOR system, an alternator failure has probably occurred. To isolate the faulty component the following procedure should be followed:

- 1.) Reduce aircraft electrical load to minimum for continued safe flight.
- 2.) Turn aircraft MASTER SWITCH "OFF"
- 3.) Place both alternator output circuit breaker switches "OFF".
- 4.) Reset both MAIN and AUX Voltage Regulator Circuit Breakers, if tripped. Return Voltage Regulator Selector to "MAIN".
- 5.) Turn aircraft MASTER SWITCH "ON". Reset voltage regulator circuit breaker if tripped.
- 6.) Close one alternator output circuit breaker switch. Observe if electrical system is operating normally by checking for alternator output current on the ammeter. If not operating properly, open the alternator output circuit breaker; turn aircraft MASTER SWITCH "OFF" for approximately six seconds to reset the overvoltage relay.
- 7.) Turn aircraft MASTER SWITCH "ON". Close other alternator output circuit breaker switch and observe if electrical system is operating normally by checking ammeter indication as above.
- 8.) Check that aircraft electrical load does not exceed the output capability of the operating alternator causing the battery to discharge.

#### Caution:

Use of the voltage regulator selector switch and alternator circuit breakers should be limited to the above conditions.