

CHEROKEE ARROW

PA-28R-200

**This handbook for airplanes with
serial nos. 28R-35001 through 28R-35392.**

Owner's Handbook



**Piper Aircraft Corporation, Vero Beach, Florida
U.S. A.**

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SECTION I

SPECIFICATIONS

PERFORMANCE

Performance figures are for airplanes equipped for cross country transportation and flown at gross weight under standard conditions at sea level or stated altitude. Any changes in equipment may result in changes in performance.

Take off Run (maximum effort 25 flap) (ft)	770
Take off over 50-ft barrier (maximum effort 25 flap) (ft)	1600
Best Rate of Climb Speed (mph)	95
Rate of Climb (ft per min)	910
Service Ceiling (ft)	16 000
Absolute Ceiling (ft)	18 000
Top Speed (mph)	176
Optimum Cruising Speed (75% power optimum altitude) (mph)	166
Cruising Range (75% power optimum altitude) (mi)	810
Optimum Cruising Range (55% power optimum altitude) (mi)	950
Stalling Speed (flaps down gear down) (mph)	64
Stalling Speed (flaps and gear up) (mph)	70
Landing Roll (flaps down) (ft)	780
Landing Roll over 50-ft barrier (ft)	1380

SECTION I**CHEROKEE ARROW****SPECIFICATIONS (cont)****WEIGHTS**

Gross Weight (lbs)	2600
Empty Weight (Standard) (lbs)	1450
USEFUL LOAD (Standard) (lbs)	1150

POWER PLANT

Engine (Lycoming)	IO 360-C1C
Rated Horsepower	200
Rated Speed (rpm)	2700
Bore (in)	5 125
Stroke (in)	4 375
Displacement (cu in)	361 0
Compression Ratio	8 7 1
Dry Weight (lbs)	326
Propeller	HC C2YK 1/7666A 2

FUEL AND OIL

Fuel Capacity (U S gal)	50
Oil Capacity (qts)	8
Fuel Aviation Grade (min octane)	100/130

BAGGAGE

Maximum Baggage (lbs)	200
Baggage Space (cu ft)	17
Baggage Door Size (in)	20 x 22

CHEROKEE ARROW**SECTION I****SPECIFICATIONS (cont)****DIMENSIONS**

Wing Span (ft)	30
Wing Area (sq ft)	160
Wing Loading (lbs per sq ft)	16 3
Length (ft)	24 2
Height (ft)	8 0
Power Loading (lbs per hp)	13 0

LANDING GEAR

Wheel Base (ft)	7 4
Wheel Tread (ft)	10 5
Tire Pressure (psi) Nose	30
Main	27
Tire Size	Nose (4 ply rating) 5 00 x 5
Main (4 ply rating)	6 00 x 6

SECTION II

CHEROKEE "ARROW"

accommodate the customary advanced flight instruments and all the normally required power plant instruments. The Artificial Horizon and Directional Gyro are vacuum operated through use of a vacuum pump installed on the engine, while the Turn and Bank instrument is electrically operated. A vacuum gauge is located in the right hand corner of the instrument panel. A natural separation of the flight group and the power group is provided by placing the flight instruments in the upper panel and the power group in the center and lower sub-panels. The radios and circuit breakers are on the right hand instrument panel, and extra circuits are provided for a complete line of optional radio equipment.

The cabin interior includes a pilot storm window, two sun visors, ash trays, two map pockets, and pockets on the backs of each front seat. The front seats are adjustable fore and aft for pilot-passenger comfort and ease of entry and exit. Recessed arm rests are also provided for the front seats.

The 17 cubic foot baggage area may be reached from the cabin or through a large 20 x 22 inch outside door.

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Starting With External Power Source

An optional feature known as Piper External Power (PEP) allows the operator to use an external battery to crank the engine without having to gain access to the aircraft battery

The procedure is as follows

- 1 Turn aircraft MASTER SWITCH to OFF
- 2 Connect RED lead of PEP kit jumper cable to POSITIVE (+) terminal of external 12 volt battery and BLACK lead to NEGATIVE (-) terminal
- 3 Insert plug of jumper cable into socket located on aircraft fuselage
- 4 Turn aircraft MASTER SWITCH to ON and proceed with NORMAL engine starting technique
- 5 After engine has been started turn MASTER SWITCH to OFF and remove jumper cable plug from aircraft
- 6 Turn aircraft MASTER SWITCH to ON and check alternator ammeter for indication of output DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT

When the engine is firing evenly advance the throttle to 800 RPM. If oil pressure is not indicated within thirty seconds stop the engine and determine the trouble. In cold weather it will take a few seconds longer to get an oil pressure indication. If the engine has failed to start refer to the Lycoming Operating Handbook Engine Troubles and Their Remedies

Starter manufacturers recommend that cranking periods be limited to thirty seconds with a two minute rest between cranking periods. Longer cranking periods will shorten the life of the starter

WARM UP AND GROUND CHECK

Warm up the engine at 1400 to 1500 RPM for not more than two minutes in warm weather four minutes in cold weather. Avoid prolonged idling at low RPM as this practice may result in fouled

spark plugs. If necessary to hold before take off it is recommended that engine be operated at 1400 1500 RPM

The magnetos should be checked at 2100 RPM with the propeller set at maximum RPM. Drop off on either magneto should not exceed 175 RPM and should have a differential of not more than 50 RPM. Prolonged operation on one magneto should be avoided

Check vacuum gauge indicator should read 5 Hg $\pm$ 1 Hg at 2000 RPM

Check both the oil temperature and pressure. The temperature may be low for some time if the engine is being run for the first time of the day but as long as the pressure is within limits the engine is ready for take off

The propeller control should be moved through its complete range to check for proper operation and then placed to increase RPM for take off. To obtain maximum RPM push the pedestal mounted control fully toward the instrument panel

In cold weather the propeller control should be cycled at least three times to ensure that warm engine oil has circulated through the system

The electric fuel pump should be turned off momentarily during ground check to make sure that the engine-driven pump is operating. The electric fuel pump should be on during take off to prevent loss of power should the engine-driven pump fail. The engine is warm enough for take off when the throttle can be opened without the engine faltering. Do not take off with a dead battery as some voltage is needed to excite the alternator

TAKE-OFF

Just before take-off the following items should be checked

- | | |
|------------------------------|----------------------------------|
| 1 Fuel on proper tank | 7 Flaps set |
| 2 Electric fuel pump ON | 8 Trim tab set |
| 3 Engine gauges checked | 9 Controls free |
| 4 Prop set | 10 Door latched |
| 5 Mixture set | 11 Seat backs erect |
| 6 Quadrant friction knob set | 12 Safety belts/harness fastened |

The takeoff technique is conventional for the Cherokee Arrow. The tab should be set slightly aft of neutral with the exact setting determined by the loading of the aircraft. Allow the airplane to accelerate to 60 to 70 mph then ease back on the wheel enough to let the airplane fly from the ground.

Short Field Obstacle Clearance

Lower flaps to 25 (second notch) accelerate aircraft to 60 to 65 mph and ease back on the wheel to rotate. After breaking ground accelerate to best angle of climb speed 80 mph select gear UP* and climb past obstacle. Continue climb and accelerate to best rate of climb speed 95 mph and slowly retract the flaps.

Short Field No Obstacles

Lower flaps to 25 (second notch) accelerate aircraft to 60 to 65 mph and ease back on the wheel to rotate. After breaking ground accelerate to 80 mph select gear UP* and continue climb while accelerating to best rate of climb speed 95 mph and slowly retract the flaps while climbing out.

Soft Field Obstacle Clearance

Lower flaps to 25 (second notch) accelerate aircraft pull nose gear off as soon as possible and lift off at lowest possible airspeed. Accelerate just above the ground to best angle of climb speed 80 mph select gear UP* and climb past obstacle clearance height continue climb while accelerating to best rate of climb speed 95 mph and slowly retract the flaps.

Soft Field No Obstacle

Proceed as above after gear retraction continue climb at best rate of climb speed 95 mph and slowly retract the flaps.

*During climb below speeds of 85 mph on aircraft equipped with the backup gear extender hold the emergency gear lever in the override up position until the system no longer commands the gear down. This will occur at approximate airspeeds of 85 mph IAS at sea level to 100 mph IAS at 10 000 feet with a straight line variation between

CLIMB

The best rate of climb with gear down at gross weight will be obtained at 85 MPH and 95 MPH with gear up. The best angle of climb with gear down may be obtained at 81 MPH and 91 MPH with gear up. For climbing en route a speed of 110 MPH is recommended. This will produce better forward speed and increase visibility over the nose during the climb.

STALLS

Angle of Bank	Flaps 40	Flaps Retracted
0	64 MPH	70 MPH
20	66 MPH	72 MPH
40	73 MPH	80 MPH
60	90 MPH	99 MPH

Power Off - Gear Down - Gross Weight 2600 lbs

CRUISING

The cruising speed of the Cherokee Arrow is determined by many factors including power setting altitude temperature loading and equipment installed on the airplane.

The normal cruising power is 75% of the rated horsepower of the engine. True airspeeds which may be obtained at various altitudes and power settings can be determined from the charts in Section IV of this handbook.

When selecting RPM below 2400 limiting manifold pressure for continuous operation as specified by the Lycoming Operator's Manual should be observed.

To INCREASE power first increase RPM then increase manifold pressure.

To DECREASE power first decrease manifold pressure then decrease RPM.

Use of the mixture control in cruising flight reduces fuel consumption significantly especially at higher altitudes. The mixture should be leaned during cruising operation above 5000 feet altitude and at the pilot's discretion at lower altitudes when 75% power or less is being used. If any doubt exists as to the amount of power being used, the mixture should be in the FULL RICH position for all operations under 5000 feet.

To lean the mixture, pull the mixture control until the engine becomes rough, indicating that the lean mixture limit has been reached in the leaner cylinders. Then enrich the mixture by pushing the control towards the instrument panel until engine operation becomes smooth. The fuel flow meter will give a close approximation of the fuel being consumed.

If the airplane is equipped with the optional exhaust gas temperature (EGT) gauge, a more accurate means of leaning is available to the pilot. For best power mixture, lean the mixture until the peak EGT is reached, then enrich the mixture until the temperature drops a minimum of 25 F. For best economy mixture, lean until the peak EGT is reached and continue to lean until the temperature drops a minimum of 25 F. Do not lean above 75% power.

In order to keep the airplane in best lateral trim during cruising flight, the fuel should be used alternately from each tank. It is recommended that one tank be used for one hour after take off, then the other tank be used for two hours, then return to the other tank for one hour. Each tank will then contain approximately 1/2 hour of fuel if tanks were full (25 gal. each tank) at take off. Do not run tanks completely dry in flight.

NOTE

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 and locked position. The pilot should be aware that the airplane's 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.

ROUGH 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 distractions caused by the conditions.

APPROACH AND LANDING

Before landing check list

- | | |
|-------------------------|---------------------------------------|
| 1 Fuel on proper tank | 5 Gear DOWN & LOCKED
(150 MPH MAX) |
| 2 Electric fuel pump ON | 6 Flaps set (125 MPH MAX) |
| 3 Mixture RICH | 7 Seat backs erect |
| 4 Prop set | 8 Seat belts/harness fastened |

The airplane should be trimmed to an approach speed of about 90 MPH with the flaps and gear extended. The flaps can be lowered at speeds up to 125 MPH and the gear can be extended at speeds up to 150 MPH if desired. The propeller should be set at approximately 2600 RPM to facilitate ample power for emergency go around and will prevent over-speeding of the engine if the throttle is advanced sharply. 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 minimum possible safe speed consistent with existing conditions.

Normally the best technique for short and slow landings is to use full flaps and enough power to maintain the desired approach flight path. The mixture should be full rich, fuel selector on the fullest tank and the electric fuel pump on. The airspeed should be reduced during flare out and contact with the ground should be made close to stalling speed. After ground contact the nose wheel should be held off. As the airplane slows down the nose should be eased down and the brakes applied. There will be less chance of skidding the tires if the flaps are retracted before applying the brakes. Braking is most effective when back pressure is applied to the control wheel putting most of the airplane weight on the main wheels without lifting the nose wheel. In high wind conditions it may be desirable to approach at higher than normal speeds; it is still desirable to make contact with the runway when the airplane is approximately at its minimum speed.

STOPPING ENGINE

At the pilot's discretion the flaps should be raised and the electric fuel pump turned off. After parking the radios should be turned off, the propeller set to increase RPM and the engine then stopped by pulling the mixture control to idle cut off. The throttle should be left full aft to avoid engine vibration while stopping. Then the ignition and master switches should be turned off and the parking brake set.

EMERGENCY GEAR PROCEDURES

Emergency Gear Extension

In the event that the gear selector switch is moved to the down position and the landing gear fails to lock down (gear is locked down when there are three green indicator lights) check the following items before initiating the emergency gear down procedure:

- 1 Master switch is on
- 2 Landing gear actuator control and indicator circuit breakers in
- 3 Panel lights are off (daytime) since gear indicator lights are dimmed with panel lights on
- 4 Bulbs in indicator lights have been changed

If gear down and locked indication is still not present initiate the following procedures:

- 1 Reduce airspeed below 100 mph
- 2 Landing gear selector is gear down position
- 3 If gear has failed to lock down on aircraft equipped with the backup gear extender raise emergency gear lever to override up position
- 4 Move emergency gear lever to the emergency down position while fishtailing the airplane
- 5 If gear still fails to lock down in aircraft equipped with the backup gear extender move emergency gear lever to the override up position and hold in this position while fishtailing the airplane until the gear is locked down as indicated by three green indicator lights

Gear Up Landing

During an emergency a gear up landing may be made:

- 1 When the surface is too soft or rough to permit a satisfactory gear down landing
- 2 When a field is too short for a gear down landing which might cause more damage through hitting obstructions than the gear up landing would cause
- 3 When a water landing is necessary

If a gear up landing is required on aircraft equipped with the backup gear extender make an initial approach at not less than 110 mph to prevent the gear from free falling:

- 1 Leave flaps up (to reduce wing and flap damage)

- 2 Close throttle and cut the master and ignition switch
- 3 Turn the fuel selector switch off
- 4 On aircraft equipped with the backup gear extender hold the emergency gear lever in the override up position while reducing speed and until the airplane is firmly on the ground. Contact the ground at minimum airspeed

NOTE

On aircraft equipped with the backup gear extender when the master switch is off the emergency gear lever must be continuously held in the override up position as airspeed is reduced or the gear will extend

ENGINE POWER LOSS

The most common cause of engine power loss is mismanagement of the fuel. Therefore the first step to take after engine power loss is to move the fuel selector valve to the tank not being used. This will often keep the engine running even if there is no apparent reason for the engine to stop on the tank being used.

If changing to another tank does not restore the engine

- 1 Check fuel pressure and turn on electric fuel pump if off
- 2 Push mixture control to full RICH
- 3 Check ignition switch. Turn to best operating magneto left right or both

MOORINGS

The Cherokee Arrow should be moved on the ground with the aid of the nose wheel tow bar provided with each plane and secured in the baggage compartment. Tie down ropes may be secured to rings provided under each wing and to the tail skid.

The aileron and stabilator controls should be secured by looping the safety belt through the control wheel and pulling it tight. The rudder is held in position by its connections to the nose wheel steering and normally does not have to be secured. The flaps are locked when in the full up position and should be left retracted.

WEIGHT AND BALANCE

It is the responsibility of the owner and pilot to determine that the airplane remains within the allowable weight vs. center of gravity envelope while in flight. For weight and balance data see the Airplane Flight Manual and Weight and Balance form supplied with each airplane.

OPERATING TIPS

The following Operating Tips are of particular value in the operation of the Cherokee Arrow.

1 Learn to trim for take off so that only a very light back pressure on the wheel is required to lift the airplane off the ground.

2 On take off do not retract the gear prematurely. The airplane may settle and make contact with the ground because of lack of flying speed, atmospheric conditions or rolling terrain.

3 The best speed for take off is about 65 MPH under normal conditions. Trying to pull the airplane off the ground at too low an airspeed decreases the controllability of the airplane in event of engine failure.

4 In high density areas where high traffic pattern speeds are necessary or when it is advantageous to extend the gear it is permissible to extend the landing gear at speeds up to 150 MPH.

5 Flaps may be lowered at airspeeds up to 125 MPH. To

reduce flap operating loads it is desirable to have the airplane at a slower speed before extending the flaps

- 6 Before attempting to reset any circuit breaker allow a two to five minute cooling off period
- 7 Always determine position of landing gear by checking the gear position lights
- 8 Remember that when the panel lights are on the gear position lights are very dim
- 9 Before starting the engine check that all radio switches light switches and the pitot heat switch are in the off position so as not to create an overloaded condition when the starter is engaged
- 10 A high fuel flow indication on the fuel flow indicator is a possible sign of restricted airbleed nozzles
- 11 The overvoltage relay is provided to protect the electronics equipment from a momentary overvoltage condition (approximately 16.5 volts and up) or catastrophic regulator failure. In the event of a momentary condition the relay will open and the ammeter will indicate 0 output from the alternator. The relay may be reset by switching the master switch to OFF for approximately one minute and then returning the master switch to ON. If after recycling the master switch the condition persists the flight may be continued on battery along by monitoring the voltmeter and reducing battery load to minimum
- 12 On aircraft equipped with the backup gear extender it should always be kept in mind that the system is intended to lower the gear during the approach should the pilot forget. However the pilot should always lower the gear during normal operations by using the gear selector switch on the instrument panel
- 13 The vacuum gauge is provided to monitor the pressure available to assure the correct operating speed of the vacuum driven gyroscopic flight instruments. It also monitors the condition of the common air filter by measuring the flow of air thru the filter. If the vacuum range does not register 5 Hg +/- 10 at 2000 rpm the following items should be checked before flight
 - a Common air filter could be dirty or restricted
 - b Vacuum lines could be collapsed or broken
 - c Vacuum pump worn

d Vacuum regulator not adjusted correctly. The pressure even though set correctly can read lower under two conditions (1) Very high altitude above 12000 feet (2) Low engine rpm usually on approach or during training maneuvers. This is normal and should not be considered a malfunction

14 The shape of the wing fuel tanks is such that in certain maneuvers the fuel may move away from the tank outlet. If the outlet is uncovered the fuel flow may be interrupted and a temporary loss of power may result. Pilots can prevent inadvertent uncovering of the outlet by avoiding maneuvers which could result in uncovering the outlet

Running turning takeoffs should be avoided as fuel flow interruption may occur if tank in use is not full

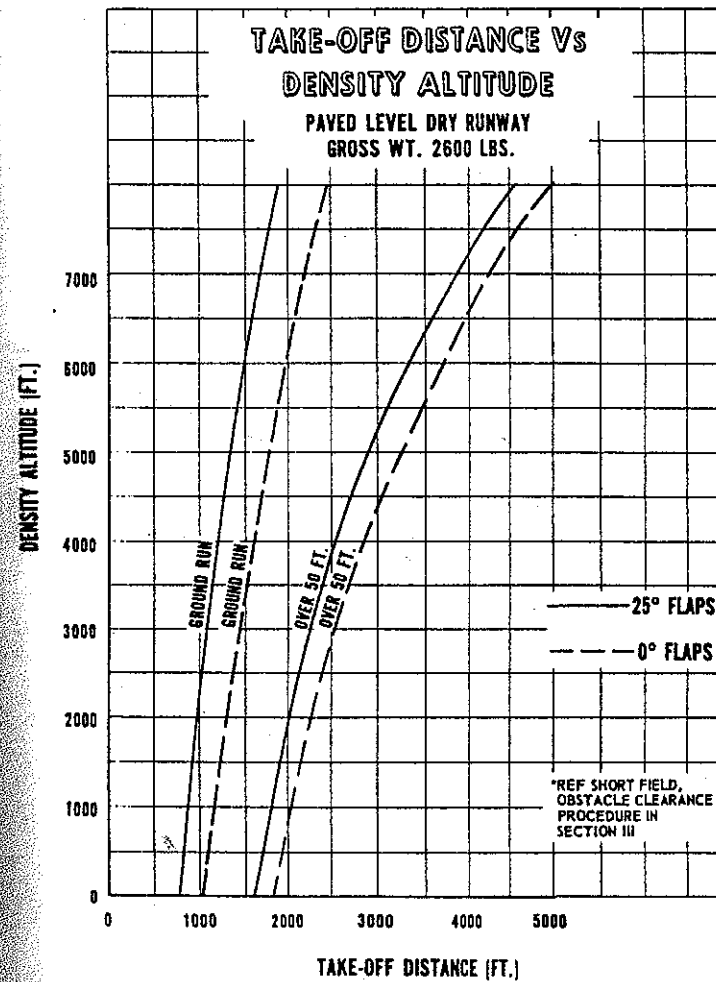
Prolonged slips or skids in any pitch attitude or other unusual or abrupt maneuvers which could cause uncovering of the fuel outlet must be avoided when tank being used is not full

SECTION IV

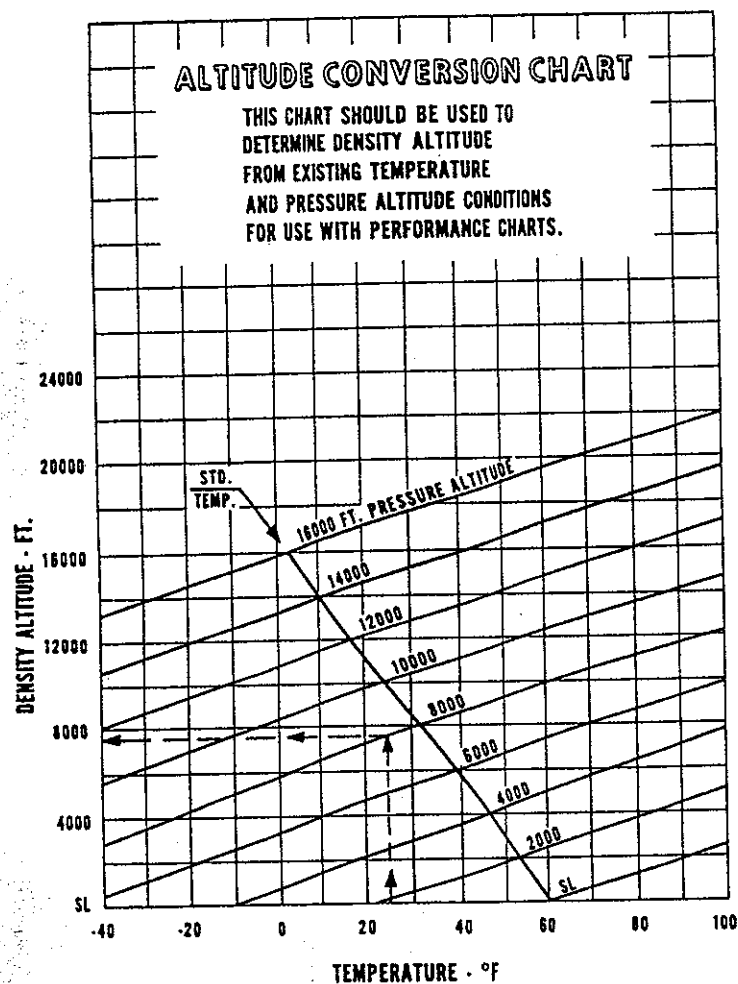
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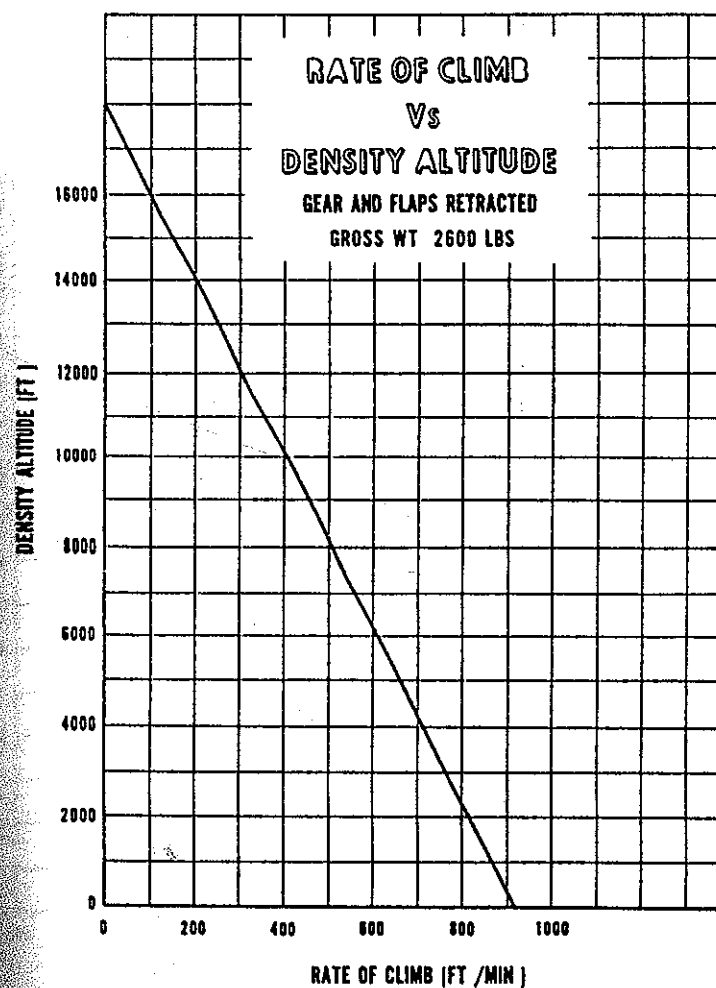
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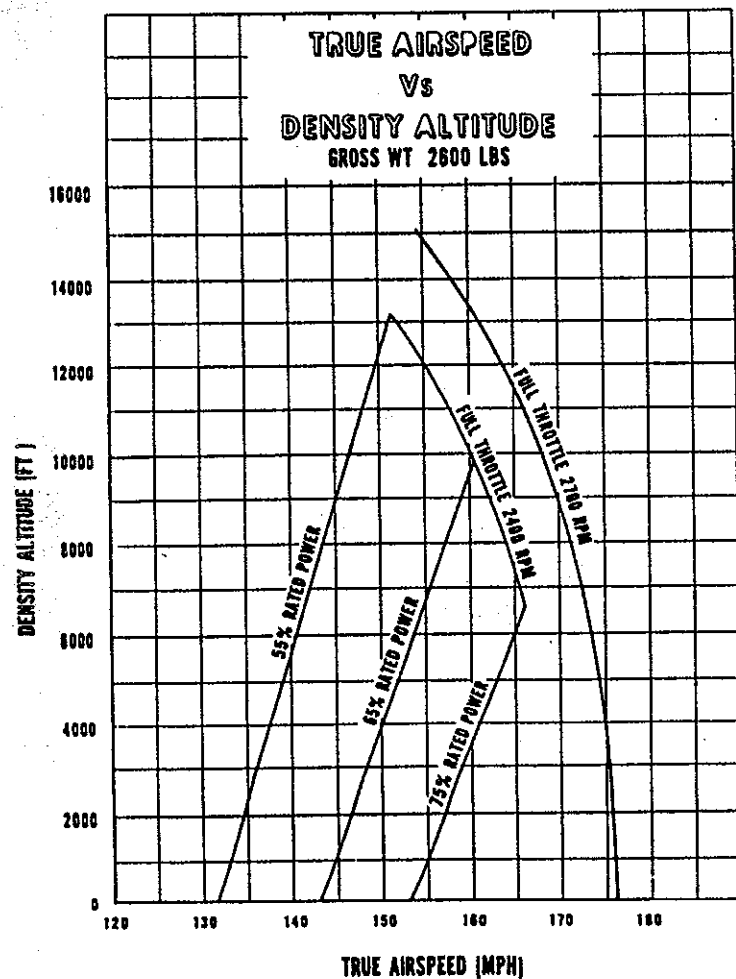
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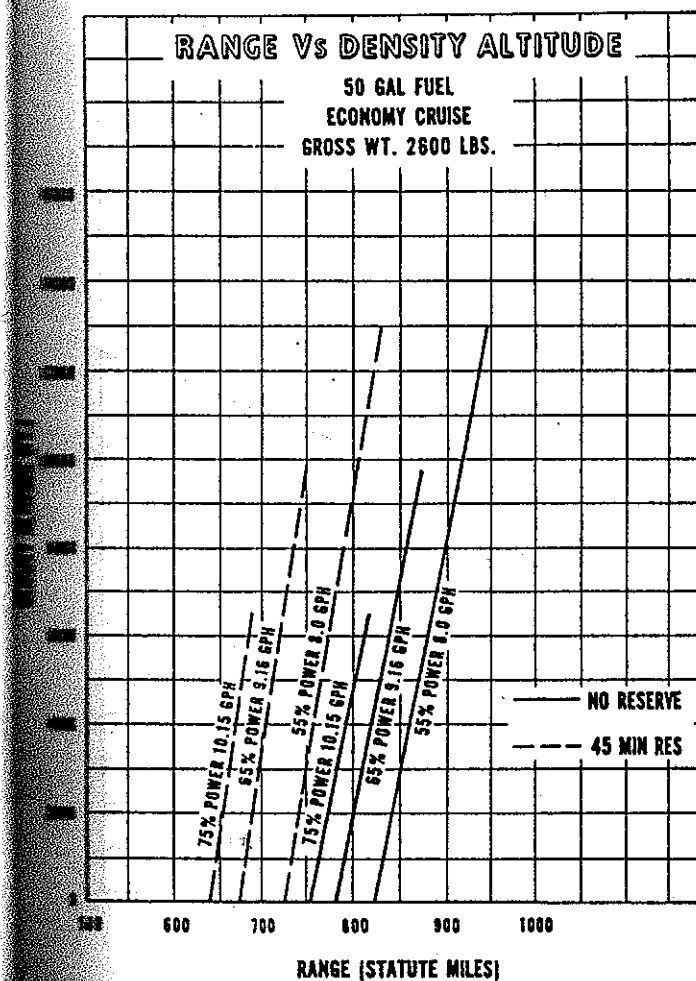
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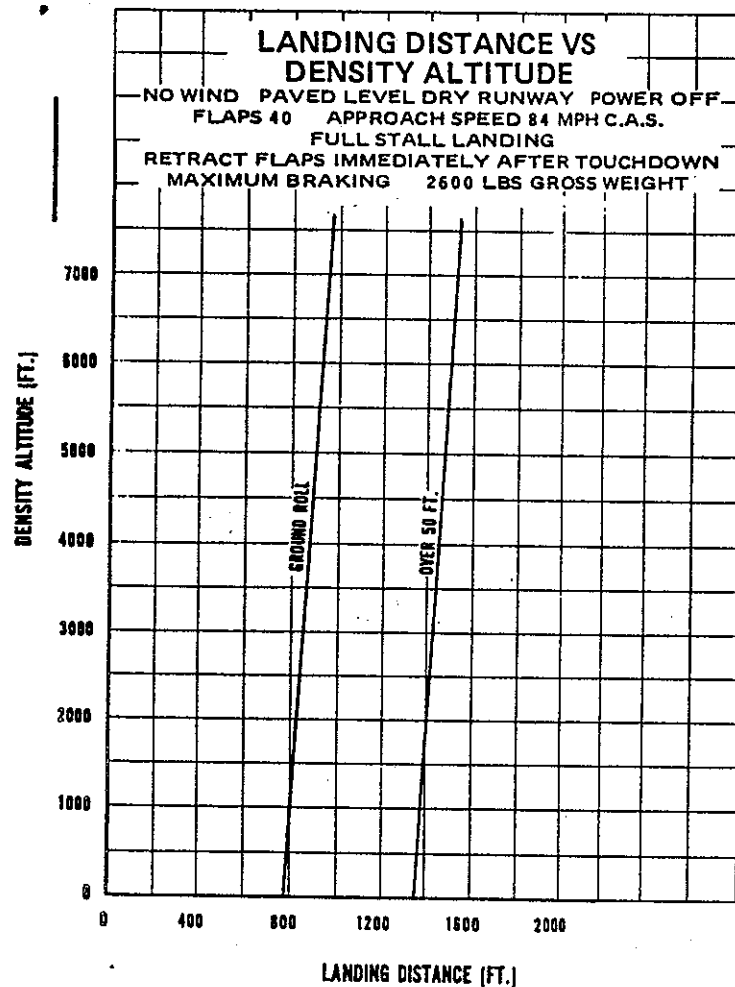
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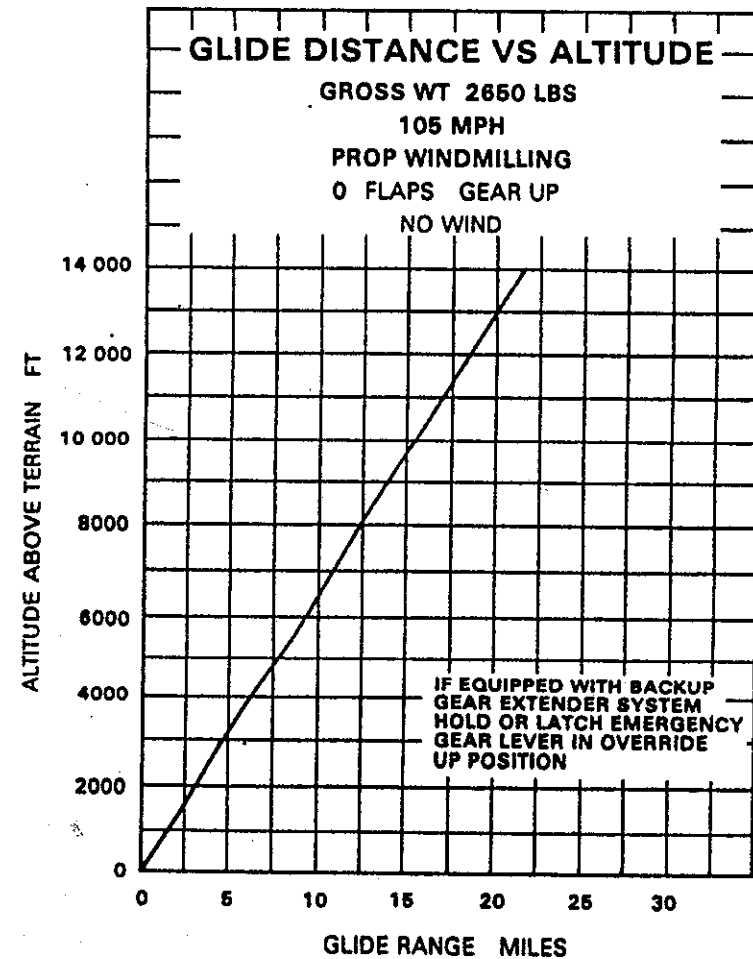
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PA-28R-200 PIPER CHEROKEE



Power Setting Table Lycoming Model 10 360 C Series 200 HP Engine

P Alt F t	Std Alt T mp F	110 HP - 55% R t d RPM AND MAN PRESS 2100 2400		130 HP - 65% Rat d RPM AND MAN PRESS 2100 2400		150 HP - 75% Rated RPM AND MAN PRESS 2400		P Alt F t
SL	59	22 9	20 4	25 9	22 9	25 5		SL
1 000	55	22 7	20 2	25 6	22 7	25 2		1 000
2 000	52	22 4	20 0	25 4	22 5	25 0		2 000
3 000	48	22 2	19 8	25 1	22 2	24 7		3 000
4 000	45	21 9	19 5	24 8	22 0	24 4		4 000
5 000	41	21 7	19 3	FT	21 7	FT		5 000
6 000	38	21 4	19 1	---	21 5	---		6 000
7 000	34	21 2	18 9	---	21 3	---		7 000
8 000	31	21 0	18 7	---	21 0			8 000
9 000	27	FT	18 5	---	FT			9 000
10 000	23	---	18 3					10 000
11 000	19	---	18 1					11 000
12 000	16	---	17 8					12 000
13 000	12	---	17 6					13 000
14 000	9	---	FT					14 000

To maintain constant power correct manifold pressure approximately 0.16 Hg for each 10 F variation in inlet air temperature from standard altitude temperature. Add manifold pressure for air temperatures above standard but act for temperatures below standard.

NOTES