

# CHEROKEE 180 F

PA-28-180

## Owner's Handbook



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

**WARNING**  
The rudder pedals are suspended from a torque tube which extends across the fuselage. The pilot should become familiar with the proper positioning of his feet on the torque tube when moving the rudder pedals or operating the toe brakes.

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## NOTICE

THIS HANDBOOK IS NOT DESIGNED, NOR CAN ANY HANDBOOK SERVE, AS A SUBSTITUTE FOR ADEQUATE AND COMPETENT FLIGHT INSTRUCTION, OR KNOWLEDGE OF THE CURRENT AIRWORTHINESS DIRECTIVES, THE APPLICABLE FEDERAL AIR REGULATIONS, AND ADVISORY CIRCULARS. IT IS NOT INTENDED TO BE A GUIDE OF BASIC FLIGHT INSTRUCTION, NOR A TRAINING MANUAL.

THE HANDBOOK IS DESIGNED:

1. TO HELP YOU OPERATE YOUR CHEROKEE WITH SAFETY AND CONFIDENCE.
2. TO MORE FULLY ACQUAINT YOU WITH THE BASIC PERFORMANCE AND HANDLING CHARACTERISTICS OF THE AIRPLANE.
3. TO MORE FULLY EXPLAIN YOUR CHEROKEE'S OPERATION THAN IS PERMISSIBLE TO SET FORTH IN THE AIRPLANE FLIGHT MANUAL.

IF THERE IS ANY INCONSISTENCY BETWEEN THIS HANDBOOK AND THE AIRPLANE FLIGHT MANUAL APPROVED BY THE F.A.A., THE FLIGHT MANUAL SHALL GOVERN.

Revised text and illustrations shall be indicated by a black vertical line in the margin opposite the change.

Additional copies of this manual, Part No. 761 460 may be obtained from your Piper Dealer.

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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)	720
Take-off Over 50-ft Barrier (maximum effort, 25° flap) (ft)	1625
Best Rate of Climb Speed (mph)	85
Rate of Climb (ft per min)	750
Service Ceiling (ft)	13,000
Absolute Ceiling (ft)	15,000
Top Speed (mph)	152 - 132
Optimum Cruising Speed (75% power, optimum altitude) (mph)	143 - 124
Cruising Range (75% power, optimum altitude) (mi)	725
Optimum Cruising Range (55% power, optimum altitude) (mi)	845
Stalling Speed (flaps down) (mph)	57 - 49
Stalling Speed (flaps up) (mph)	67 - 58
Landing Roll (flaps down) (ft)	600
Landing Roll Over 50-ft Barrier (ft)	1150

NADET

SECTION I

CHEROKEE "F"

SPECIFICATIONS (cont.)

DIMENSIONS

Wing Span (ft) 30  
 Wing Area (sq ft) 160  
 Wing Loading (lbs per sq ft) 15.0  
 Length (ft) 23.5  
 Height (ft) 7.3  
 Power Loading (lbs per hp) 13.3

LANDING GEAR

Wheel Base (ft) 6.2  
 Wheel Tread (ft) 10  
 Tire Pressure (psi) 24  
 Tire Size 24  
 Nose (4 ply rating) 6.00 x 6  
 Main (4 ply rating) 6.00 x 6

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SECTION I

CHEROKEE "F"

SPECIFICATIONS (cont.)

WEIGHTS

Gross Weight (lbs) 2400  
 Empty Weight (Standard) (lbs) 1328\*  
 USEFUL LOAD (Standard) (lbs) 1072\*

POWER PLANT

Engine (Lycoming) O-360-A4A  
 Rated Horsepower 180  
 Rated Speed (rpm) 2700  
 Bore (in.) 5.125  
 Stroke (in.) 4.375  
 Displacement (cu in.) 361.0  
 Compression Ratio 8.5:1  
 Dry Weight (lbs) 285  
 Propeller M76EMMS60

FUEL AND OIL

Fuel Capacity (U.S. gal) 50  
 Oil Capacity (qts) 8  
 Fuel, Aviation Grade (min octane) 91/96

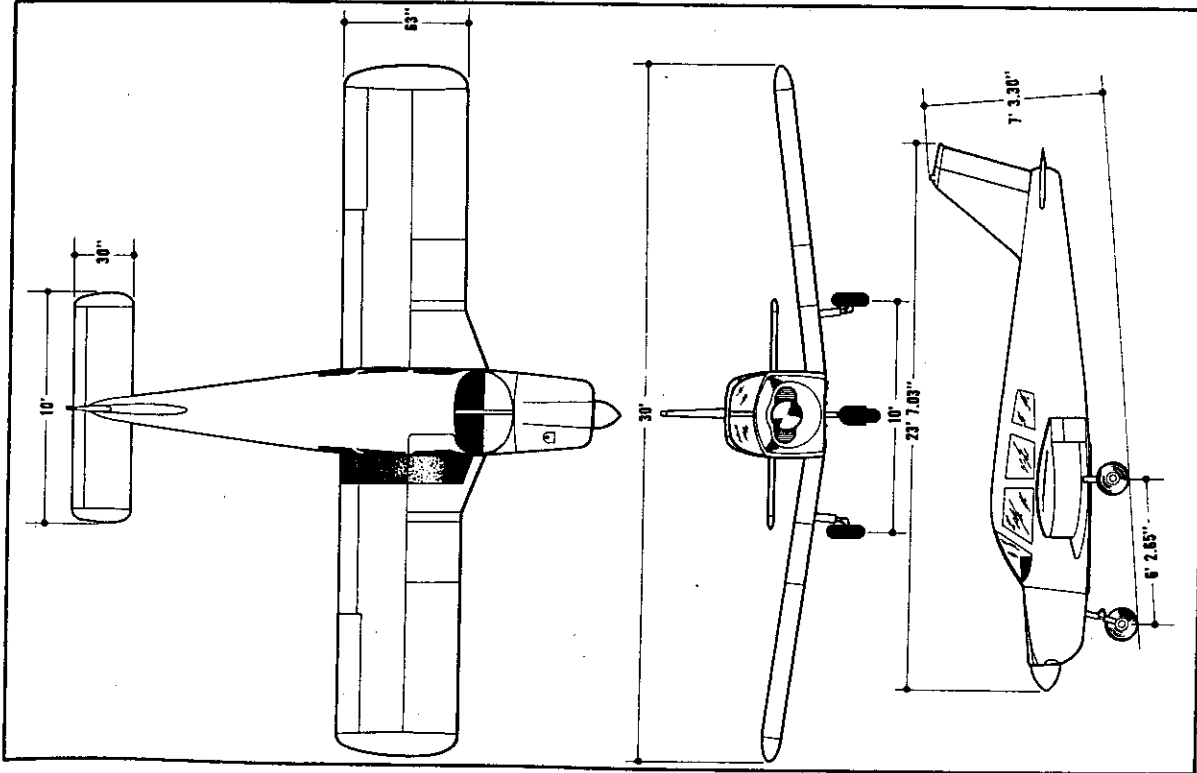
BAGGAGE

Maximum Baggage (lbs) 200  
 Baggage Space (cu ft) 24  
 Baggage Door Size (in.) 20 x 22

\* Weight varies with each aircraft

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SECTION II

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## SECTION II

## DESIGN INFORMATION

## ENGINE AND PROPELLER

The Cherokee "F" is powered by a Lycoming O-360-A4A four cylinder, direct drive, horizontally opposed engine rated at 180 HP at 2700 RPM. It is furnished with a starter, 60 ampere 12 volt alternator, shielded ignition, vacuum pump drive, fuel pump, and a dry, automotive type carburetor air filter.

The exhaust system is of the cross-over type to reduce back pressure and improve performance. It is made entirely from stainless steel and is equipped with dual mufflers. A heater shroud around the mufflers is provided to supply heat for the cabin and windshield defrosting.

The Sensenich 76EM855-0-60 fixed-pitch propeller is made from a one-piece alloy forging.

## STRUCTURES

All structures are of aluminum alloy construction and are designed to ultimate load factors well in excess of normal requirements. All exterior surfaces are primed with etching primer and painted with acrylic enamel.

The wings are attached to each side of the fuselage by inserting the butt ends of the respective main spars into a spar box carry-through which is an integral part of the fuselage structure, providing in effect a continuous main spar with splices at each side of the fuselage. There are also fore and aft attachments at the rear spar and at an auxiliary front spar.

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The wing airfoil section is a laminar flow type, NACA652-415 with the maximum thickness about 40% aft of the leading edge. This permits the main spar carry-through structure to be located under the rear seat providing unobstructed cabin floor space ahead of the rear seat.

#### LANDING GEAR

The three landing gears use a Cleveland 6.00 x 6 wheel, the main wheels being provided with Cleveland single disc hydraulic brake assemblies, No. 30-55. All wheels use 6.00 x 6 four ply tires with tubes.

The nose gear is steerable through a 44 degree arc by use of the rudder pedals. A spring device is incorporated in the rudder pedal torque tube assembly to aid in rudder centering and to provide rudder trim. The nose gear steering mechanism also incorporates a hydraulic shimmy dampener.

The three struts are of the air-oil type, with the normal extension being 3.25 inches for the nose gear and 4.50 inches for the main gear.

The standard brake system for the Cherokee consists of a hand lever and master cylinder which is located below and behind the left center of the instrument sub-panel. The brake fluid reservoir is installed on the top left front face of the firewall. The parking brake is incorporated in the master cylinder and is actuated by pulling back on the brake lever, depressing the knob attached to the handle and releasing the brake lever. To release the parking brake, pull back on the lever to disengage the catch mechanism and allow the handle to swing forward.

Optional toe brakes are available to supplement the standard hand lever and parking brake system.

#### CONTROL SYSTEMS

Dual controls are provided as standard equipment with a cable system used between the controls and the surfaces. The horizontal tail is of the Flying Tail type (stabilator), with a trim tab mounted on the trailing edge of the stabilator to reduce the control system forces. This tab is actuated by a control wheel on the floor between the front seats. The stabilator provides extra stability and controllability with less size, drag and weight than conventional tail surfaces. The ailerons are provided with a differential action which tends to reduce adverse yaw in turning maneuvers, and which also reduces the amount of coordination required in normal turns. A rudder trim adjustment is mounted on the right side of the pedestal below the throttle quadrant and permits directional trim as needed in flight.

The flaps are manually operated, balanced for light operating forces and spring-loaded to return to the up position. A past-center lock incorporated in the actuating linkage holds the flap when it is in the up position so that it may be used as a step on the right side. The flap will not support a step load except when in the full up position, so it must be completely retracted when used as a step. The flaps have three extended positions: 10, 25 and 40 degrees.

#### FUEL SYSTEM

Fuel is stored in two twenty-five gallon tanks which are secured to the leading edge structure of each wing by screws and nut plates. This allows easy removal for service or inspection.

The fuel selector control is located on the left side-panel, forward of the pilot's seat. If a modified selector valve cover has been installed, the button on the selector cover must be depressed and held while the handle is moved to the OFF position. The button releases automatically when the handle is moved into the ON position.

An auxiliary electric fuel pump is provided in case of failure of the engine driven pump. The electric pump should be on for all take-offs and landings, and when switching tanks. The pump switch is located in the switch panel above the throttle quadrant.





Standard accessories include a starter, electric fuel pump, stall warning indicator, cigar lighter, fuel gauge and ammeter. The navigation lights, anti-collision light, landing light, instrument lighting and cabin dome light are optional. Circuits will handle an entire complement of communications and navigational equipment.

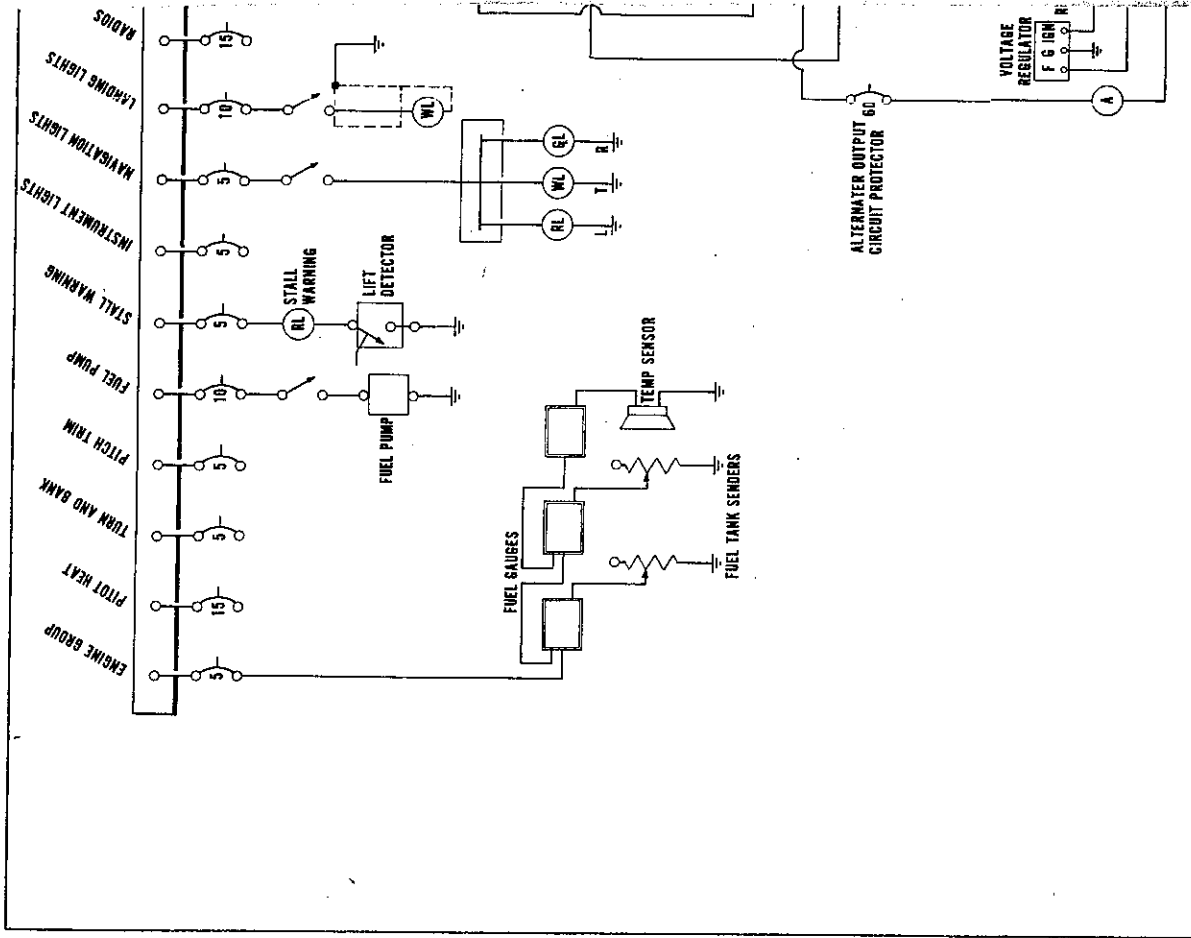
The alternator system offers many advantages over the generator system both in operation and maintenance. The main advantage is full electrical power output at lower engine RPM. This is a great improvement for radio and electrical equipment operation. Since the alternator output is available at all times, the battery will be charging for a greater percentage of use. This will make cold-morning starting easier.

The words "master switch" used hereafter in this manual indicate both sides of the switch, battery side "BAT" and alternator side "ALT" are to be depressed simultaneously to OFF or ON as directed.

Unlike previous generator systems, the ammeter does not indicate battery discharge; rather it displays in amperes the load placed on the alternator. With all electrical equipment off (except master switch) the ammeter will be indicating the amount of charging current demanded by the battery. As each item of electrical equipment is turned on, the current will increase to a total appearing on the ammeter. This total includes the battery. The maximum continuous load for night flight, with radios on, is about 30 amperes. This 30 ampere value, plus approximately two amperes for a fully charged battery, will appear continuously under these flight conditions. The amount of current shown on the ammeter will tell immediately if the alternator system is operating normally, as the amount of current shown should equal the total amperage drawn by the equipment which is operating.

If no output is indicated on the ammeter during flight, reduce the electrical load by turning off all unnecessary electrical equipment. Check both 5 ampere field breaker and 60 ampere output breaker and reset if open. If neither circuit breaker is open, turn off the "ALT" switch for 30 seconds to reset the overvoltage relay. If ammeter continues to indicate no output, maintain minimum electrical load and terminate flight as soon as practical.

Maintenance on the alternator should prove to be a minor factor. Should service be required, contact the local Piper Dealer.



## HEATING AND VENTILATING SYSTEM

Heat for the cabin interior and the defroster system is provided by a heater muff attached to the exhaust system. The amount of heat desired can be regulated with the controls located on the far right side of the instrument panel.

The air flow can be regulated between the front and rear seats by levers located on top of the heat ducts next to the console.

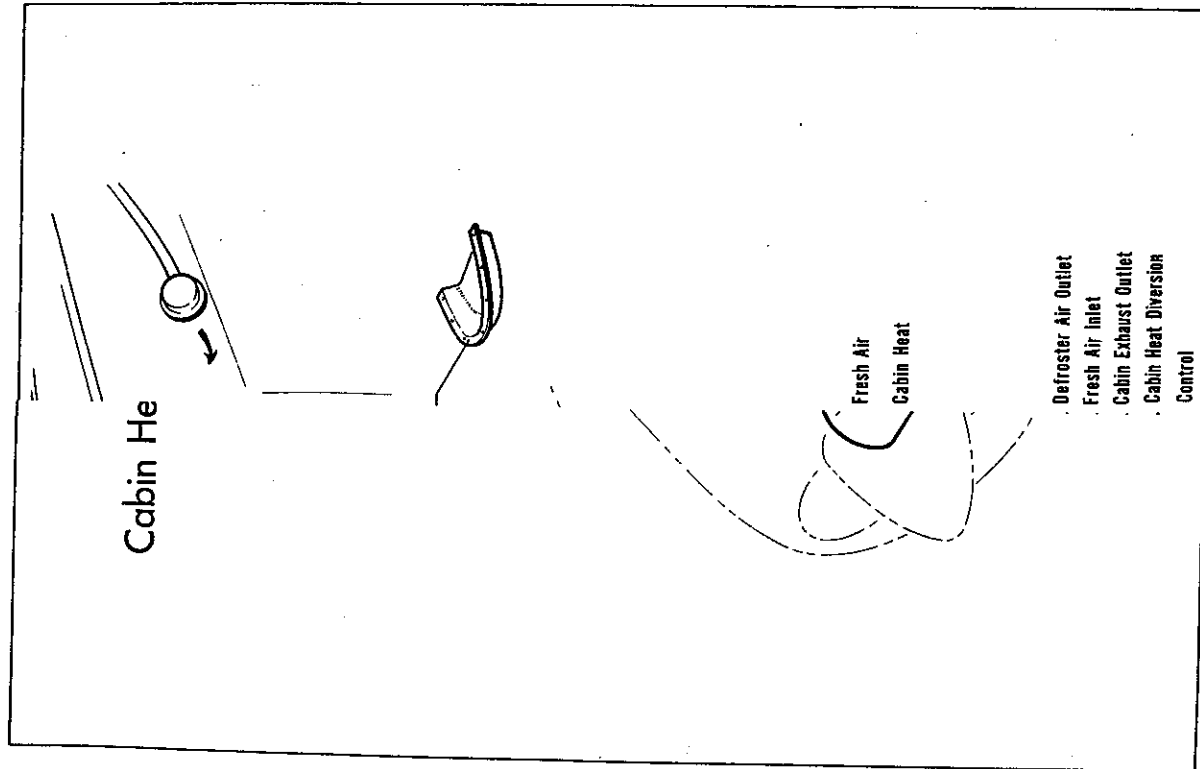
Fresh air inlets are located in the leading edge of the wing at the intersection of the tapered and straight sections. A large adjustable outlet is located on the side of the cabin near the floor at each seat location. Cabin air is exhausted through an outlet located below the rear seat.

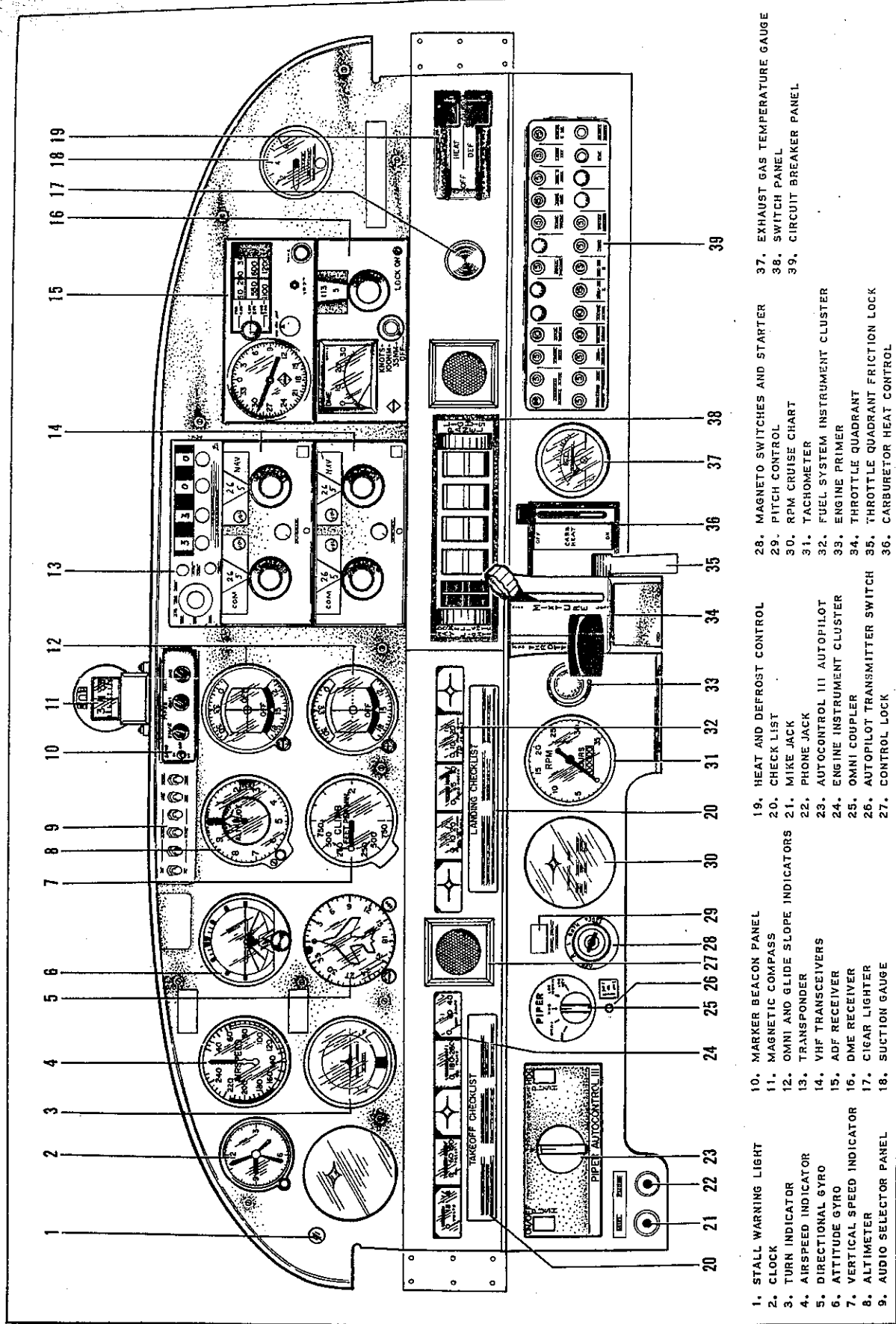
## CABIN FEATURES

The instrument panel of the Cherokee is designed to accommodate the customary advanced flight instruments and 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 mounted on the far right side of the instrument panel. A natural separation of the flight group and the power group is provided by placing the flight group in the upper instrument panel and the power group in the center and lower instrument panels.

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. Arm rests are also provided for the front seats.

The 24 cubic foot baggage area may be reached from the cabin or through a large 20 x 22 inch outside door.





- 1. STALL WARNING LIGHT
- 2. CLOCK
- 3. TURN INDICATOR
- 4. AIRSPEED INDICATOR
- 5. DIRECTIONAL GYRO
- 6. ATTITUDE GYRO
- 7. VERTICAL SPEED INDICATOR
- 8. ALTIMETER
- 9. AUDIO SELECTOR PANEL
- 10. MARKER BEACON PANEL
- 11. MAGNETIC COMPASS
- 12. OMNI AND GLIDE SLOPE INDICATORS
- 13. TRANSPONDER
- 14. VHF TRANSCEIVERS
- 15. ADF RECEIVER
- 16. DME RECEIVER
- 17. CIGAR LIGHTER
- 18. SUCTION GAUGE
- 19. HEAT AND DEFROST CONTROL
- 20. CHECK LIST
- 21. MIKE JACK
- 22. PHONE JACK
- 23. AUTOCENTROL III AUTOPILOT
- 24. ENGINE INSTRUMENT CLUSTER
- 25. OMNI COUPLER
- 26. AUTOPILOT TRANSMITTER SWITCH
- 27. CONTROL LOCK
- 28. MAGNETO SWITCHES AND STARTER
- 29. PITCH CONTROL
- 30. RPM CRUISE CHART
- 31. TACHOMETER
- 32. FUEL SYSTEM INSTRUMENT CLUSTER
- 33. ENGINE PRIMER
- 34. THROTTLE QUADRANT
- 35. THROTTLE QUADRANT FRICTION LOCK
- 36. CARBURETOR HEAT CONTROL
- 37. EXHAUST GAS TEMPERATURE GAUGE
- 38. SWITCH PANEL
- 39. CIRCUIT BREAKER PANEL

## SECTION III

### OPERATING INSTRUCTIONS

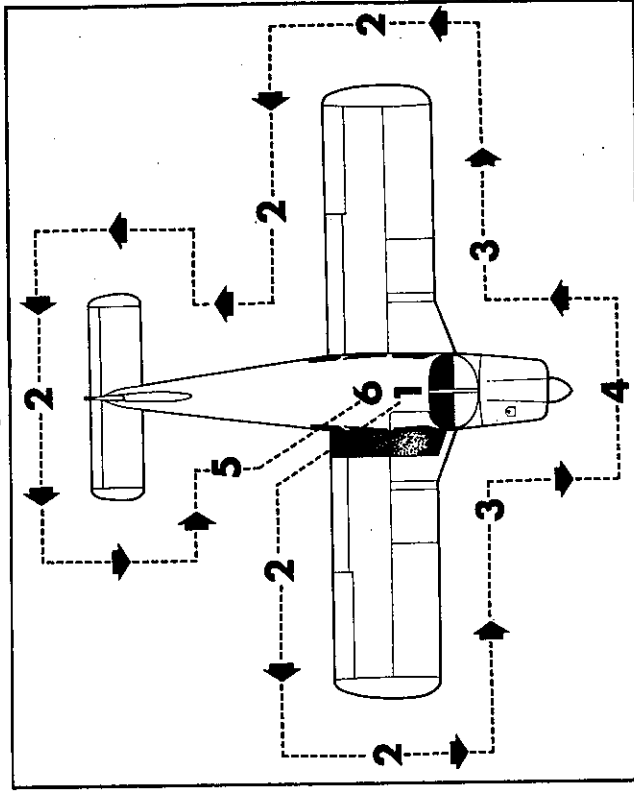
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SECTION III

OPERATING INSTRUCTIONS

PREFLIGHT

1. Master switch and ignition OFF.
2. a. Check for external damage and operational interference of control surfaces or hinges.  
b. Insure that wings and control surfaces are free of snow, ice or frost.
3. a. Visually check fuel supply and secure caps.  
b. Drain fuel tank sumps (two).



- c. Drain fuel system sump (left side of aircraft).
- d. Check that fuel system vents are open.
- e. Check main landing gear shock struts for proper inflation (approximately 4.50 inches showing).
- f. Check tires for cuts, wear and proper inflation.
4. a. Check windshield for cleanliness.
- b. Check propeller and spinner for defects or nicks.
- c. Check for obvious fuel or oil leaks.
- d. Check oil level (insure dipstick is properly seated).
- e. Check cowling and inspection covers for security.
- f. Check nose wheel tire for inflation and wear.
- g. Check nose gear shock strut for proper inflation (approximately 3.25 inches showing).
- h. Check for foreign matter in air inlet.
5. a. Stow tow bar and control locks if used.
- b. Check baggage for storage and security.
- c. Close and secure the baggage compartment door.
6. a. Upon entering airplane remove and stow control column lock pin in side pocket. Check that all primary flight controls operate properly.
- b. Close and secure cabin door.
- c. Check that required papers are in order and in the airplane.
- d. Fasten safety belts and shoulder harness. Check function of inertia reel.

**STARTING ENGINE**

1. Set parking brake ON.
2. Set the carburetor heat control in the full COLD position.
3. Select the desired tank with fuel selector valve.

**Starting Engine When Cold:**

1. Open throttle approximately 1/4 inch.
2. Turn the master switch ON.
3. Turn the electric fuel pump ON.
4. Move the mixture control to FULL RICH.
5. Engage the starter by rotating magneto switch clockwise and pressing in.

6. When the engine fires, advance throttle to desired setting. If the engine does not fire within five to ten seconds, disengage starter and prime with one to three strokes of the priming pump. Repeat the starting procedure.

**Starting Engine When Hot:**

1. Open the throttle approximately 1/2 inch.
2. Turn the master switch ON.
3. Turn the electric fuel pump ON.
4. Put mixture control in IDLE CUT-OFF.
5. Engage the starter by rotating magneto switch clockwise and pressing in. When the engine fires, advance the mixture control and move the throttle to desired setting.

**Starting Engine When Flooded:**

1. Open the throttle full.
2. Turn the master switch ON.
3. Turn the electric fuel pump OFF.
4. Put mixture control in IDLE CUT-OFF.
5. Engage the starter by rotating magneto switch clockwise and pressing in. When the engine fires, advance the mixture control and retard the throttle.

**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 800 to 1200 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 the engine be idled at 1200 RPM.

The magnetos should be checked at 2000 RPM and the drop off on either magneto should not exceed 175 RPM and should be within 50 RPM of the other. Prolonged operation on one magneto should be avoided.

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.

Check that the vacuum indicator reads 5" Hg.  $\pm$  .1" Hg. at 2000 RPM.

Carburetor heat should also be checked prior to take-off to be sure that the control is operating properly and to clear any ice which may have formed during taxiing. Avoid prolonged ground operation with carburetor heat ON as the air is unfiltered.

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.

#### TAKE-OFF

Just before take-off the following items should be checked:

1. Fuel - on proper tank
2. Electric fuel pump - ON
3. Engine gauges - checked
4. Carburetor heat - OFF
5. Mixture - set
6. Quadrant friction knob - set
7. Flaps - set
8. Trim tab - set
9. Controls - free
10. Door - latched
11. Safety belts/shoulder harness fastened

The take-off technique is conventional for the Cherokee. 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 50 to 60 MPH, then ease back on the wheel enough to let the airplane fly itself off the ground. Premature raising of the nose, or raising it to an excessive angle will result in a delayed take-off. After take-off let the aircraft accelerate to the desired climb speed by lowering the nose slightly.

Take-offs are normally made with flaps up. However, for short field take-offs, and for take-offs under difficult conditions such as deep grass or on a soft surface, distances can be reduced appreciably by lowering flaps to 25°.

#### CLIMB

The best rate of climb at gross weight will be obtained at 85 MPH. The best angle of climb may be obtained at 74 MPH. At lighter than gross weight these speeds are reduced somewhat. For climbing en route a speed of 100 MPH is recommended. This will produce better forward speed and increased visibility over the nose during the climb.



## STALLS

All controls are effective at speeds down through the stalling speed, and stalls are gentle and easily controlled.

Stall speeds shown on stall speed chart are at gross weight. Stall speeds at lower weights will be correspondingly less.

STALL SPEED TABLE		
Angle of Bank	Flaps 40°	Flaps Retracted
0°	57 MPH	67 MPH
20°	59 MPH	69 MPH
40°	65 MPH	77 MPH
60°	81 MPH	95 MPH

Power Off — Gross Weight 2400 lbs.

## CRUISING

The cruising speed 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.

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 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. 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 this procedure, refer to the AVCO Lycoming Operator's Manual.

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 first tank, which will have approximately one and one half hours of fuel remaining if the tanks were full at take-off. The second tank will contain approximately one half hour of fuel. Do not run tanks completely dry in flight.

## APPROACH AND LANDING

Before landing check list:

1. Fuel - on proper tank
2. Electric fuel pump - ON
3. Mixture - RICH
4. Flaps - set (115 MPH MAX)
5. Seat belts/shoulder harness - fastened

The airplane should be trimmed to an approach speed of about 85 MPH with flaps up. The flaps can be lowered at speeds up to 115 MPH, if desired, and the approach speed reduced 3 MPH for each additional notch of flaps. Carburetor heat should not be applied unless there is an indication of carburetor icing, since the use of carburetor heat causes a reduction in power which may be critical in case of a go-around. Full throttle operation with heat on is likely to cause detonation.

The amount of flap used during landings and 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 flap and enough power to maintain the desired airspeed and

approach flight path. Reduce the airspeed during flare out and contact the ground close to stalling speed. After ground contact hold the nose wheel off as long as possible. As the airplane slows down, drop the nose and apply brakes. 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. In high wind conditions, particularly in strong crosswinds, it may be desirable to approach the ground at higher than normal speeds with partial or no flaps.

#### 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 and the engine 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 magneto and master switches should be turned off and the parking brake set.

#### 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.

#### MOORING

The Cherokee 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 downs may be secured to rings provided

under each wing, and to the tail skid. The aileron and stabilator control wheel shaft are secured by looping the seat 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.

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. The best speed for take-off is about 60 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.
3. Flaps may be lowered at airspeeds up to 115 MPH. To reduce flap operating loads, it is desirable to have the airplane at a slower speed before extending the flaps.
4. Before attempting to reset any circuit breaker, allow a two to five minute cooling off period.
5. 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.

6. The overvoltage relay is provided to protect the electronics equipment from a momentary overvoltage condition (approximately 16.5 volts and up), or a 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 "ALT" switch to "OFF" for approximately 30 seconds and then returning the "ALT" switch to "ON."

7. 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 gauge registers lower than 5" Hg.  $\pm$  .10" Hg. 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.

#### NOTE

The pressure, even though set correctly, can read lower under two conditions:

1. Very high altitude, above 12,000 feet.
2. Low engine rpm usually on approach or during training maneuvers. This is normal and should not be considered a malfunction.

NOTES

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### EMERGENCY PROCEDURES

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## SECTION IV

## EMERGENCY PROCEDURES

## INTRODUCTION

This section contains procedures that are recommended if an emergency condition should occur during ground operation, take-off, or in flight. These procedures are suggested as the best course of action for coping with the particular condition described, but are not a substitute for sound judgement and common sense. Since emergencies rarely happen in modern aircraft, their occurrence is usually unexpected, and the best corrective action may not always be obvious. Pilots should familiarize themselves with the procedures given in this section and be prepared to take appropriate action should an emergency arise.

Most basic emergency procedures, such as power off landings, are a part of normal pilot training. Although these emergencies are discussed herein, this information is not intended to replace such training, but only to provide a source of reference and review, and to provide information on procedures which are not the same for all aircraft. It is suggested that the pilots review standard emergency procedures periodically to remain proficient in them.

In the procedures that follow, critical actions with respect to time are indicated by the use of bold print; these actions should be performed immediately if the emergency condition is not to be aggravated. The remaining procedures are non-critical in the sense that time is usually available for consulting the check list.

## GROUND OPERATIONS

## ENGINE FIRE DURING START

Engine fires during start are usually the result of over priming. The procedures below are designed to draw the excess fuel back into the induction system:

1. STARTER - CONTINUE TO CRANK ENGINE
2. THROTTLE - OPEN
3. MIXTURE - IDLE CUT-OFF
4. ELECTRIC FUEL PUMP - OFF
5. FUEL SELECTOR - OFF (if time allows)
6. ABANDON AIRCRAFT IF FIRE CONTINUES

#### TAKE-OFF

##### ENGINE POWER LOSS DURING TAKE-OFF

The proper action to be taken if loss of power occurs during take-off will depend on circumstances.

1. If sufficient runway remains for a normal landing, land straight ahead.
2. If insufficient runway remains, maintain a safe airspeed and make only a shallow turn to avoid obstructions. Use of flaps depends on circumstances. Normally, flaps should be fully extended for touchdown.
3. If you have gained sufficient altitude to attempt a restart, proceed as follows:
  - a. MAINTAIN SAFE AIRSPEED
  - b. FUEL SELECTOR - SWITCH TO ANOTHER TANK CONTAINING FUEL
  - c. ELECTRIC FUEL PUMP - CHECK ON
  - d. MIXTURE - CHECK RICH
  - e. CARBURETOR HEAT - ON

#### NOTE

If engine failure was caused by fuel exhaustion, power will not be regained after tanks are switched until empty fuel lines are filled, which may require up to ten seconds.

If power is not regained, proceed with the POWER OFF LANDING procedure.

#### IN FLIGHT

##### ENGINE POWER LOSS IN-FLIGHT

Complete engine power loss is usually caused by fuel flow interruption, and power will be restored shortly after fuel flow is restored. If power loss occurs at low altitude, the first step is to prepare for an emergency landing. (See POWER OFF LANDING.) Maintain an airspeed of at least 80 MPH IAS, and if altitude permits, proceed as follows:

1. Fuel Selector - switch to another tank containing fuel.
2. Electric Fuel Pump - On
3. Mixture - Rich
4. Carburetor Heat - On
5. Engine Gauges - check for an indication of the cause of Power Loss.
6. Primer - Check Locked
7. If no fuel pressure is indicated, check tank selector position to be sure it is on a tank containing fuel.

##### When Power is Restored:

8. Carburetor Heat - Off
9. Electric Fuel Pump - Off

If the above steps do not restore power, prepare for an emergency landing. If time permits:

1. Ignition Switch - "L" then "R" then back to "BOTH".
2. Throttle and Mixture - Different settings. (This may restore power if problem is too rich or too lean a mixture, or partial fuel system restriction).
3. Try another fuel tank - (Water in the fuel could take some time to be used up, and allowing the engine to windmill may restore power. If power loss is due to water, fuel pressure indications will be normal).

## NOTE

If engine failure was caused by fuel exhaustion, power will not be regained after tanks are switched until empty fuel lines are filled, which may require up to ten seconds.

If power is not restored, proceed with **POWER OFF LANDING** procedures.

**POWER OFF LANDING**

If loss of power occurs at altitude, trim the aircraft for best gliding angle (80 MPH IAS) and look for a suitable field. If measures taken to restore power are not effective, and if trim permits, check your charts for airports in the immediate vicinity; it may be possible to land at one if you have sufficient altitude. If possible, notify the FAA by radio of your difficulty and intentions. If another pilot or passenger is aboard, let them help.

When you have located a suitable field, establish a spiral pattern around this field. Try to be at 1000 feet above the field at the downwind position, to make a normal approach. Excess altitude may be lost by widening your pattern, using flaps or slipping, or a combination of these.

Touchdowns should normally be made at the lowest possible airspeed, with full flaps.

When committed to landing:

1. Ignition - Off
2. Master Switch - Off
3. Fuel Selector - Off
4. Mixture - Idle Cut-Off
5. Seat Belt (and harness if available) - Tight

## FIRE

There is no fire detection system on the aircraft. The presence of fire is noted through smoke, smell, and heat in the cabin. It is essential that the source of the fire be promptly identified through instrument readings, character of the smoke, or other indications, since the action to be taken differs somewhat in each case.

1. Source of fire - Check

Electrical Fire (smoke in cabin):

2. Master Switch - Off
3. Vents - Open
4. Cabin Heat - Off
5. Land as soon as practicable.

Engine Fire:

1. Mixture Control - Idle cut-off
2. Fuel Selector - Off
3. Electric Fuel Pump - Check Off
4. Master Switch - Off
5. Magneto Switch - Off
6. Throttle - Closed
7. Dive to blow out fire (if altitude permits).

Proceed with **POWER OFF LANDING** procedure.

**LOSS OF OIL PRESSURE**

Loss of oil pressure may be either partial or complete. A partial loss of oil pressure usually indicates a malfunction in the oil pressure regulating system, and a landing should be made as soon as possible to investigate the cause, and prevent engine damage.

A complete loss of oil pressure indication may signify oil exhaustion or may be the result of a faulty gauge. In either case, proceed toward the nearest airport, and be prepared for a forced landing. If the problem is not a pressure gauge malfunction, the engine

may stop suddenly. Maintain altitude until such time as a dead stick landing can be accomplished. Don't change power settings unnecessarily, as this may hasten complete power loss.

Depending on the circumstances, it may be advisable to make an off airport landing while power is still available, particularly if other indications of actual oil pressure loss, such as sudden increase in temperatures, or oil smoke, are apparent, and an airport is not close.

If engine stoppage occurs, proceed to **POWER OFF LANDING**.

#### LOSS OF FUEL PRESSURE

1. Electric boost pump - On
2. Fuel Selector - Check on Full Tank

If problem is not an empty fuel tank, land as soon as practicable, and have engine driven fuel pump checked.

#### HIGH OIL TEMPERATURE

An abnormally high oil temperature indication may be caused by a low oil level, an obstruction in the oil cooler, damaged or improper baffle seals, a defective gauge, or other causes. Land as soon as practicable at an appropriate airport and have the cause investigated.

A steady rapid rise in oil temperature is a sign of trouble. Land at the nearest airport and let a mechanic investigate the problem. Watch the oil pressure gauge for an accompanying loss of pressure.

#### ALTERNATOR FAILURE

Loss of alternator output is detected through a zero reading on the ammeter. Before executing the following procedure, insure that the reading is zero and not merely low by actuating an electrically powered device, such as the landing light. If no increase in the ammeter reading is noted, alternator failure can be assumed.

1. Reduce electrical load.
2. Alternator circuit breakers - Check
3. "Alt" switch - Off (for 30 seconds), Then On.

If the ammeter continues to indicate no output, or alternator will not stay reset, turn off "Alt" switch, maintain minimum electrical load and land as soon as practical. All electrical load is being supplied by the battery.

#### ENGINE ROUGHNESS

Engine roughness is usually due to carburetor icing, and may be accompanied by a slight loss of airspeed or altitude. If too much ice is allowed to accumulate, restoration of full power may not be possible; therefore, prompt action is required.

1. Carburetor heat-on (See Note). RPM will decrease slightly and roughness will increase. Wait for a decrease in engine roughness or an increase in RPM, indicating ice removal. If no change in approximately one minute, return carburetor heat to **COLD**. If the engine is still rough, try steps below.
  - a. Mixture - Adjust for maximum smoothness. Engine will run rough if too rich or too lean.
  - b. Electric Fuel Pump - On
  - c. Fuel Selector - Change to other tank to see if fuel contamination is the problem.
  - d. Engine Gauges - Check for abnormal readings. If any gauge readings are abnormal, proceed accordingly.
  - e. Magneto Switch - "L" then "R", then back to "BOTH".
    - If operation is satisfactory on either magneto, proceed on that magneto at reduced power, with mixture full rich, to a landing at the first available airport.

If roughness persists, prepare for a precautionary landing at pilot's discretion.



## NOTE

Partial carburetor heat may be worse than no heat at all, since it may partially melt ice, which will refreeze in the intake system. When using carburetor heat, therefore, always use full heat, and when ice is removed return the control to the full cold position.

## SPINS

Intentional spins are prohibited in the normal category airplane. For approved maneuvers as a utility category airplane, refer to the Flight Manual.

1. THROTTLE - IDLE
2. RUDDER - FULL OPPOSITE TO DIRECTION OF ROTATION
3. CONTROL WHEEL - FULL FORWARD
4. RUDDER - NEUTRAL (WHEN ROTATION STOPS).
5. CONTROL WHEEL - AS REQUIRED TO SMOOTHLY REGAIN LEVEL FLIGHT ATTITUDE.

## OPEN DOOR

The cabin door on the Cherokee is double latched, so the chances of it springing open in flight at both the top and bottom are remote. However, should you forget the upper latch, or not fully engage the lower latch, the door may spring partially open. This will usually happen at take-off or soon afterward. An open door will not affect normal flight characteristics, and a normal landing can be made with the door open.

If both upper and lower latches open, the door will trail slightly open, and airspeed will be reduced slightly.

To close the door in flight, proceed as follows:

1. Slow aircraft to 100 MPH IAS.
2. Cabin Vents - Close

3. Storm Window - Open

4. If upper latch is open - latch. If lower latch is open - open top latch, push door further open, and then close rapidly. Latch top latch.

A slip in the direction of the open door will assist in latching procedure.

**SECTION V**

**PERFORMANCE CHARTS**

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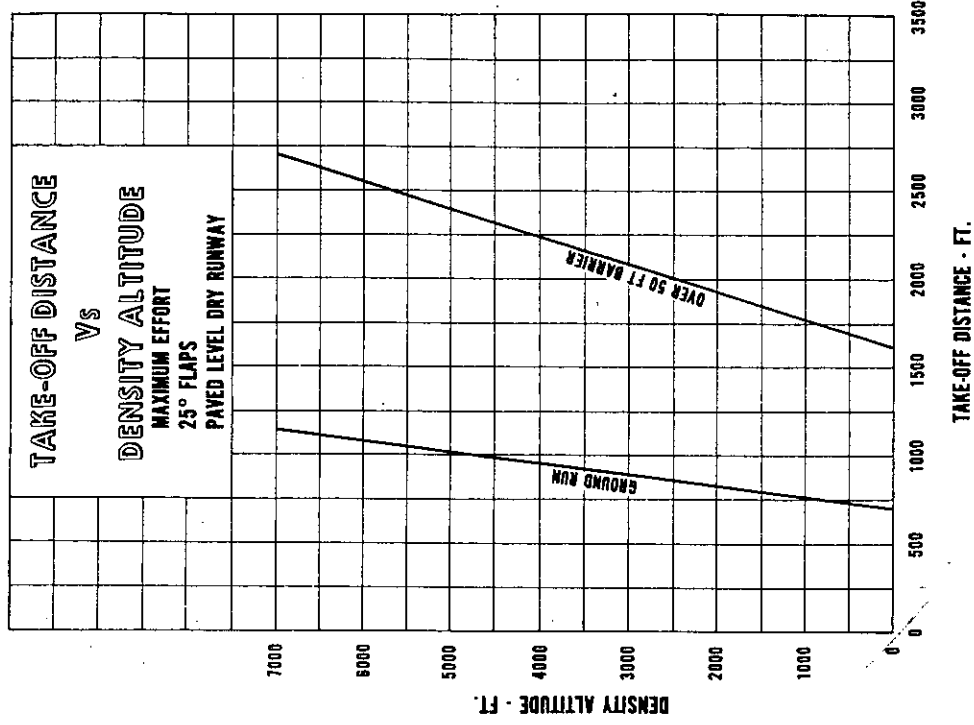
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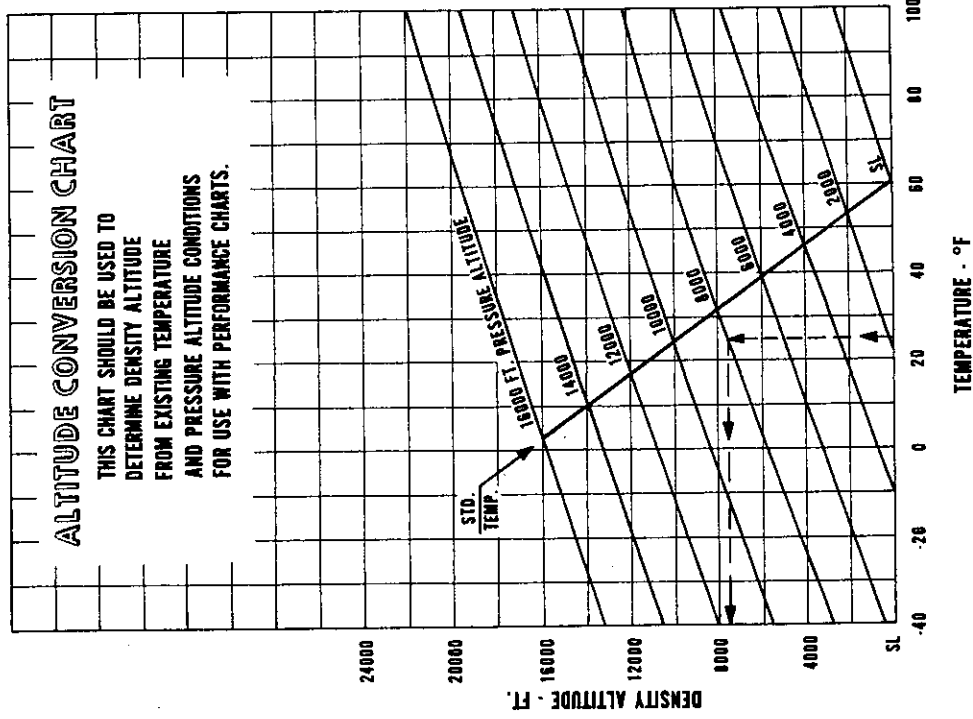
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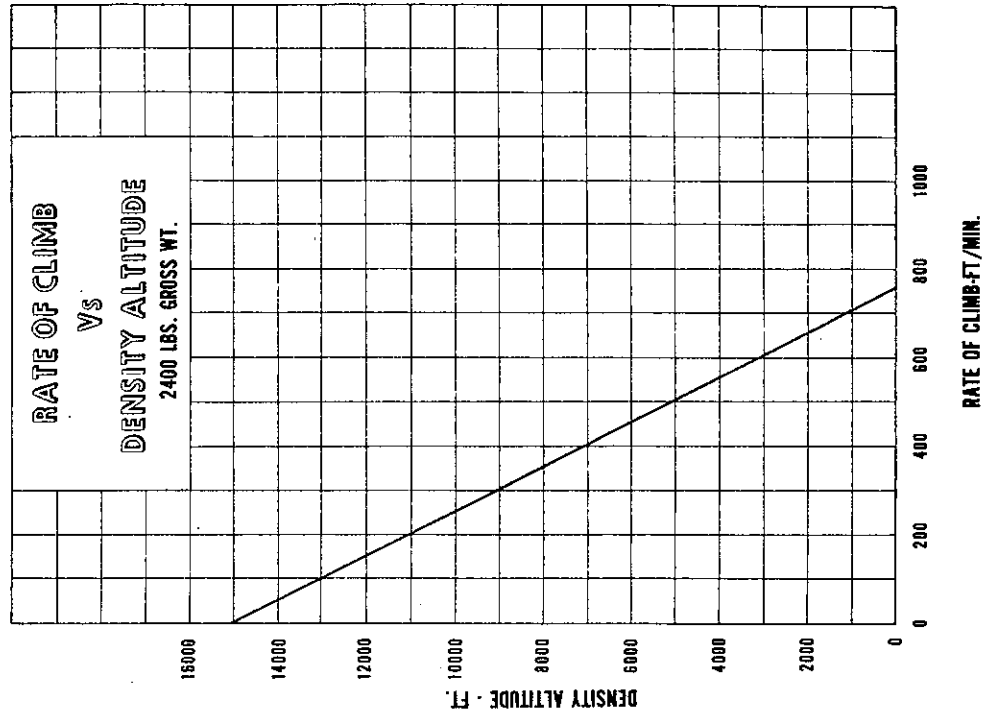
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## PIPER CHEROKEE

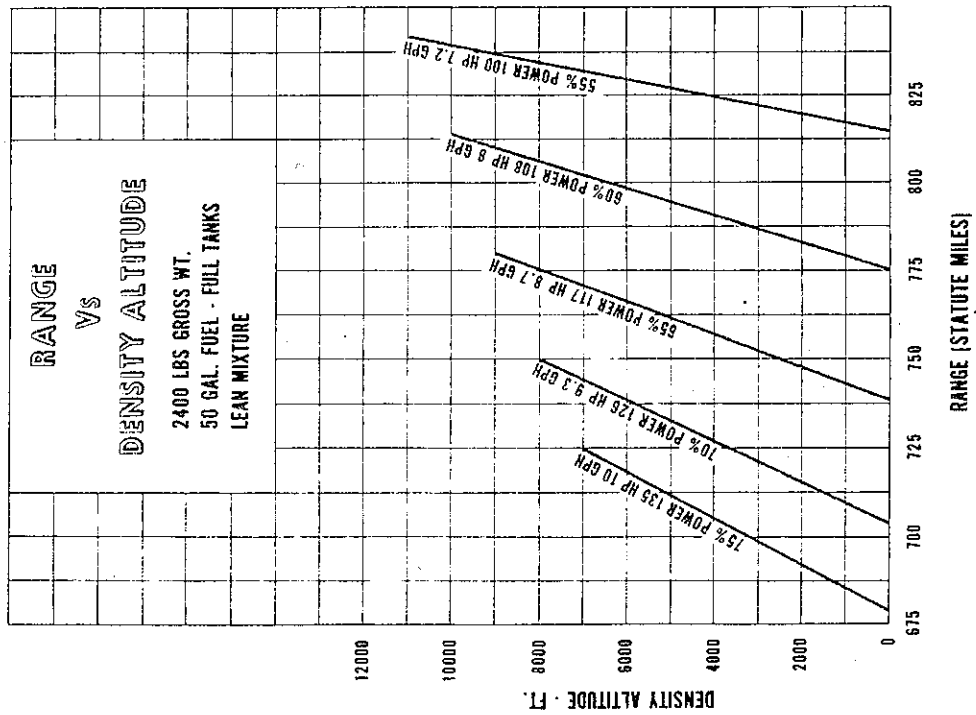


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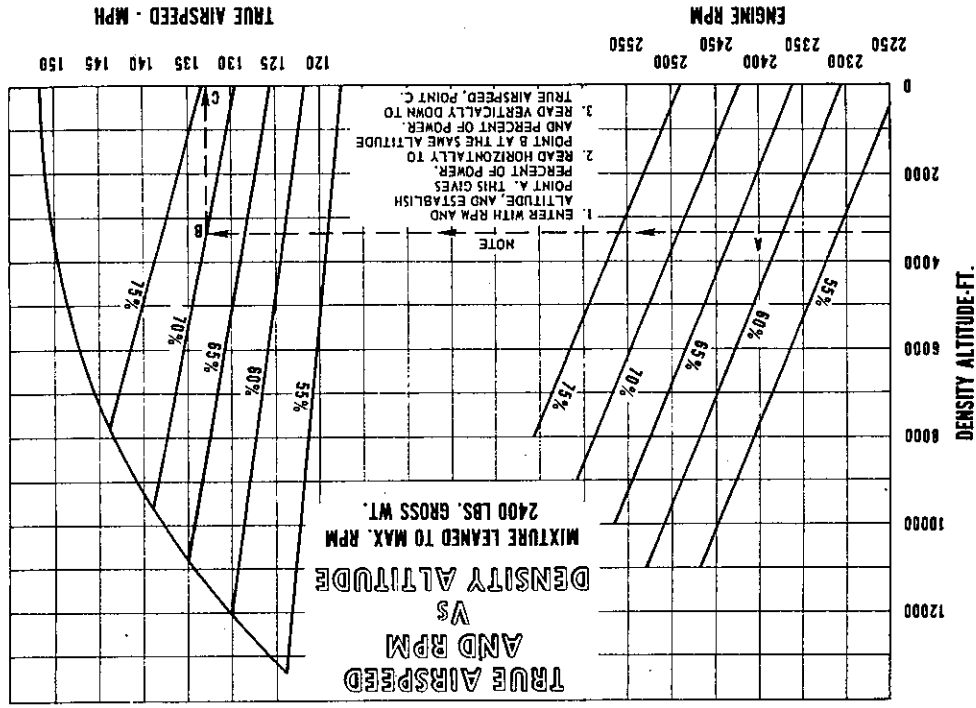
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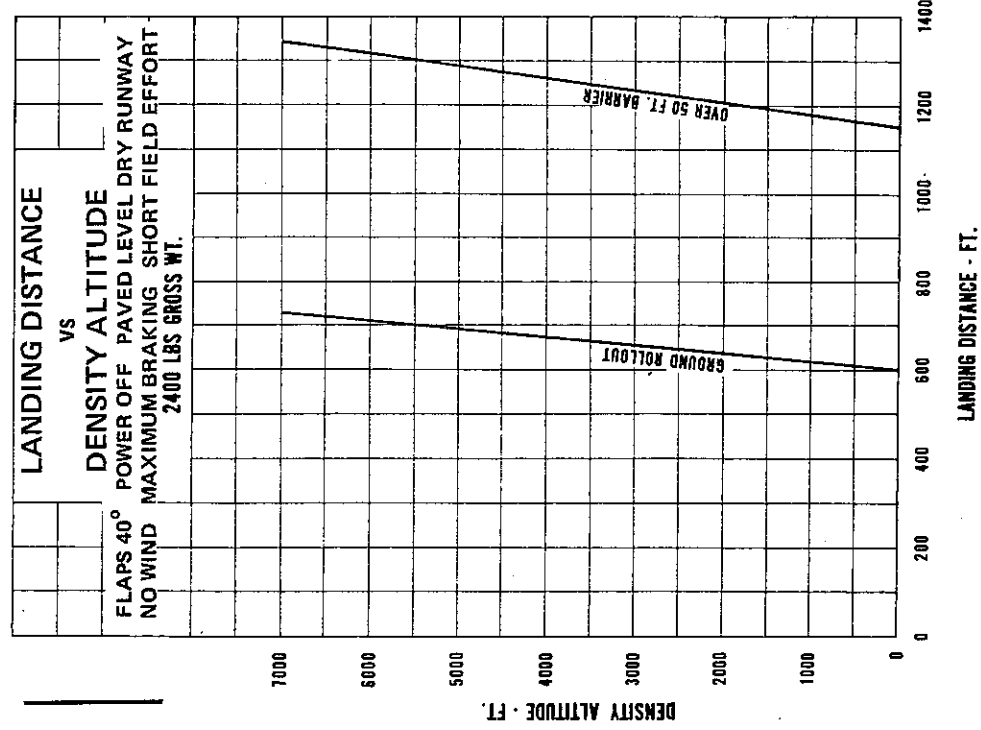


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## PIPER CHEROKEE



**Power Setting Table-Lycorning Model 0-360 Series, 180 HP Engine**

Alt	Std Alt	Temp ° F	108 HP 60% Power RPM	117 HP 65% Power RPM	126 HP 70% Power RPM	135 HP 75% Power RPM	Press. Alt
SL	59	2290	2370	2450	2520	2580	2500
1,000	55	2310	2390	2470	2540	2600	2520
2,000	52	2330	2410	2480	2540	2620	2540
3,000	48	2350	2430	2500	2560	2640	2560
4,000	45	2370	2450	2520	2580	2640	2580
5,000	41	2390	2470	2540	2600	2640	2600
6,000	38	2410	2490	2560	2620	2640	2620
7,000	34	2430	2510	2580	2640	2640	2640
8,000	31	2450	2530	2600	2660	2640	2660
9,000	27	2470	2550	2620	2680	2640	2680
10,000	23	2490	2570	2640	2700	2640	2700
11,000	19	2510	2590	2660	2720	2640	2720
12,000	16	2530	2610	2680	2740	2640	2740

## SECTION VI

### GENERAL MAINTENANCE

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## SECTION VI

## GENERAL MAINTENANCE

This section of the Cherokee "F" Handbook contains information which pertains to minor maintenance of the airplane. For further maintenance assistance refer to the Service Manual for this airplane. Any complex repairs or modification should be accomplished by a Piper Certified Service Center or equivalent.

## LANDING GEAR SERVICE

The main wheels are Cleveland Aircraft Products, Model # 40-86, with Cleveland single disk hydraulic brake assemblies, Model # 30-55. The nose wheel is a Cleveland Aircraft Products, Model # 38501. All wheels use a 6.00 x 6, four ply rating, type III tire with tube.

Main wheels are easily removed by taking off the hub cap, axle nut, and the two bolts holding the brake segment in place, after which the wheel slips easily from the axle.

Tires are demounted from the wheels by deflating the tire, removing the three through-bolts, and separating the wheel halves.

Landing gear oleo struts should be checked for proper strut exposures and fluid leaks. The required extensions for the strut when under normal static load (empty weight of airplane plus full fuel and oil) is 3.25 inches for the nose gear and 4.50 inches for the main gear. Should the strut exposure be below that required, it should be determined whether air or oil is required by first raising the airplane on jacks. Depress the valve core to allow air to escape from the strut housing chamber. Remove the filler plug and slowly raise the strut to full compression. If the strut has sufficient fluid it will be visible up to the bottom of the filler plug hole and will then only require proper inflation.