PIPER

CHEROKEE 235 'B'

OWNER'S HANDBOOK

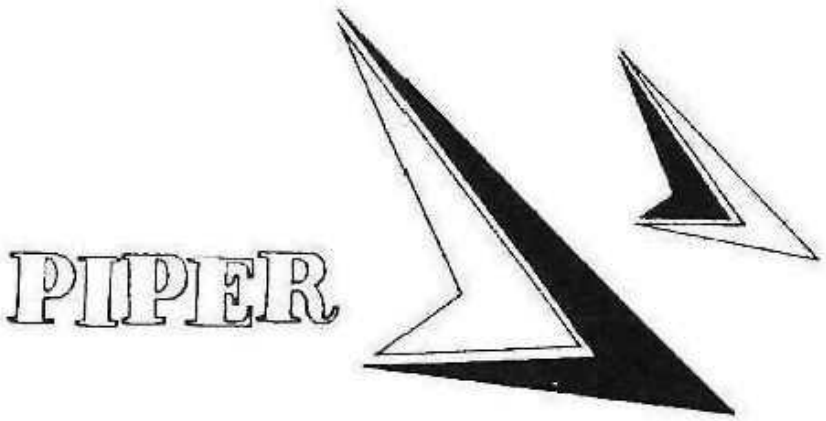
WARNING

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 rudder pedals so as to avoid interference with the torque tube when moving the rudder pedals or operating the toe brakes. 757 436

the

CHEROKEE 235 'B'

Owner's Handbook

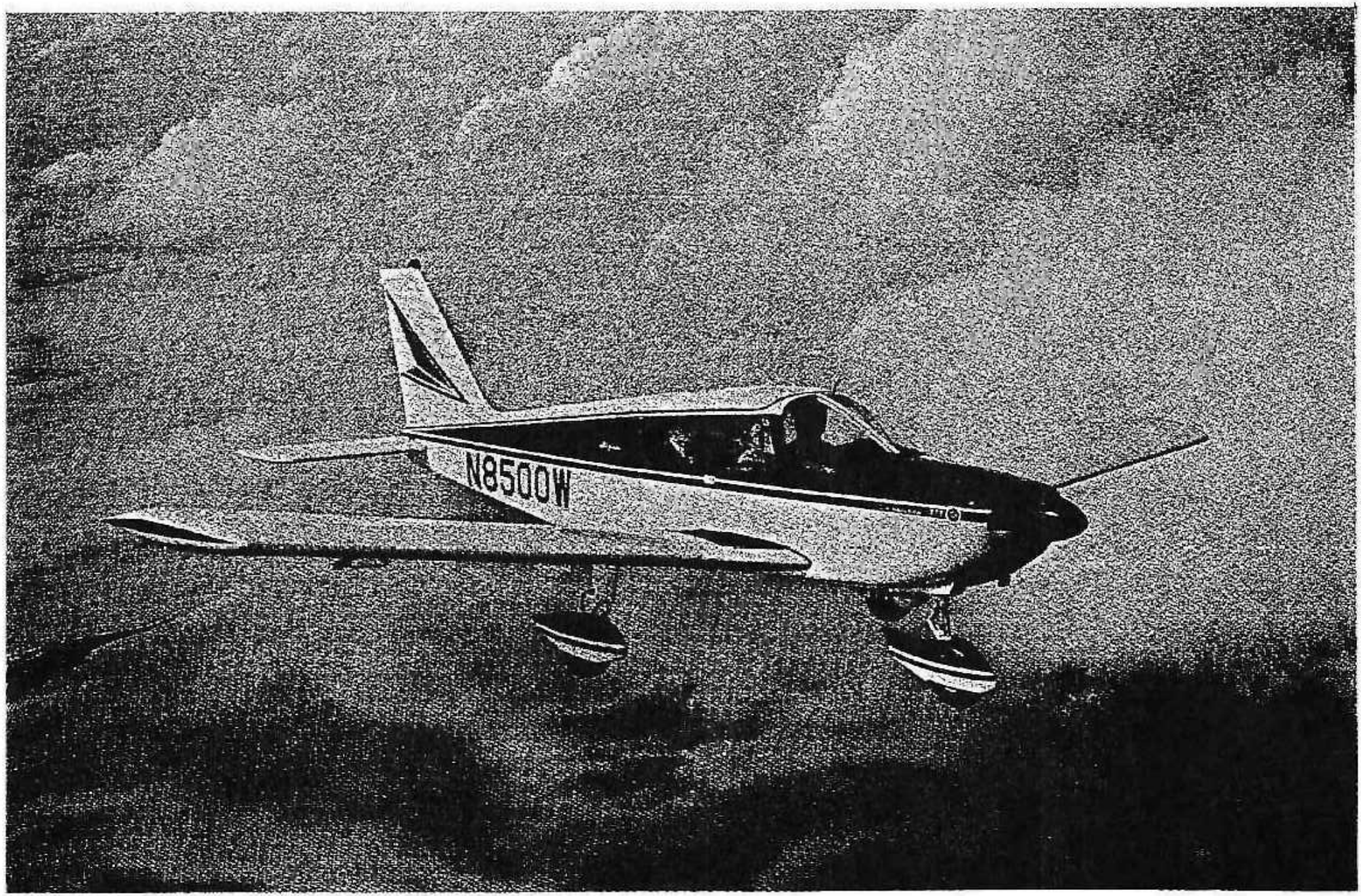


Piper Aircraft Corporation, Vero Beach, Florida
U.S.A.

If a non-conformity of information should exist between this manual and the FAA Approved Flight Manual, the Flight Manual shall be considered the authority.

Additional copies of this manual, Part No. 753 729, may be obtained from your Piper Dealer.

Published by
PUBLICATIONS DEPARTMENT
Piper Aircraft Corporation
753 729
Issued: July 1966
Revised: February 1968


N8500W

SECTION I

SPECIFICATIONS

SECTION I

SPECIFICATIONS

PERFORMANCE

Performance figures are for standard airplanes flown at gross weight under standard conditions at sea level, or stated altitude. Any deviation from standard equipment may result in changes in performance.

	PA-28-235 (Fixed Pitch)	PA-28-235 (Const. Speed)
Take-off Run (ft) (flaps up)	935	810
Take-off Distance Over 50-ft Obstacle (ft) (flaps up)	1510	1350
Take-off Run (ft) (flaps 25°)	800	750
Take-off Distance Over 50-ft Obstacle (ft) (flaps 25°)	1360	1220
Best Rate of Climb Speed (mph)	100	100
Rate of Climb (ft per min)	825	900
Service Ceiling (ft)	14,500	16,500
Absolute Ceiling	16,500	18,500
Top Speed (mph)	166	164
Cruising Speed (75% power, sea level mph)	146	145
Optimum Cruising Speed (75% power, 7000 ft, mph)	156	154
Fuel Consumption (gal per hr 75%)	14.0	14.0
Cruising Range (75% power, sea level, mi)	875	870

SPECIFICATIONS (cont):

PERFORMANCE	PA-28-235 (Fixed Pitch)	PA-28-235 (Const. Speed)
Cruising Range (75% power, 7000 ft) (mi)	935	923
Optimum Cruising Range (55% power, 10,000 ft)	1130	1105
Stalling Speed (flaps down, mph)	60	60
Stalling Speed (flaps up, mph)	70	70
Landing Roll (flaps down, ft)	680	680
Landing Distance Over 50-ft Obstacle (ft)	1300	1300

WEIGHTS		
Gross Weight (lbs)	2900	2900
Empty Weight (Standard) (lbs)	1435	1460
USEFUL LOAD (Standard)(lbs)	1465	1440

POWER PLANT		
Engine - Lycoming	O-540-B4B5	O-540-B4B5
Rated Horsepower	235	235
Rated Speed (rpm)	2575	2575
Bore (inches)	5.125	5.125
Stroke (inches)	4.375	4.375
Displacement (cubic inches)	541.5	541.5
Compression Ratio	7.2:1	7.2:1
Dry Weight (pounds)	395	395
Propeller	1P235PFA80	HC-C2YK-1

SPECIFICATIONS (cont):

FUEL AND OIL

Fuel Capacity (main tank) (U.S. gal)	50
Fuel Capacity (auxiliary tanks) (U.S. gal)	34
Oil Capacity (U.S. qts)	12
Fuel, Aviation Grade (min octane)	80/87

BAGGAGE

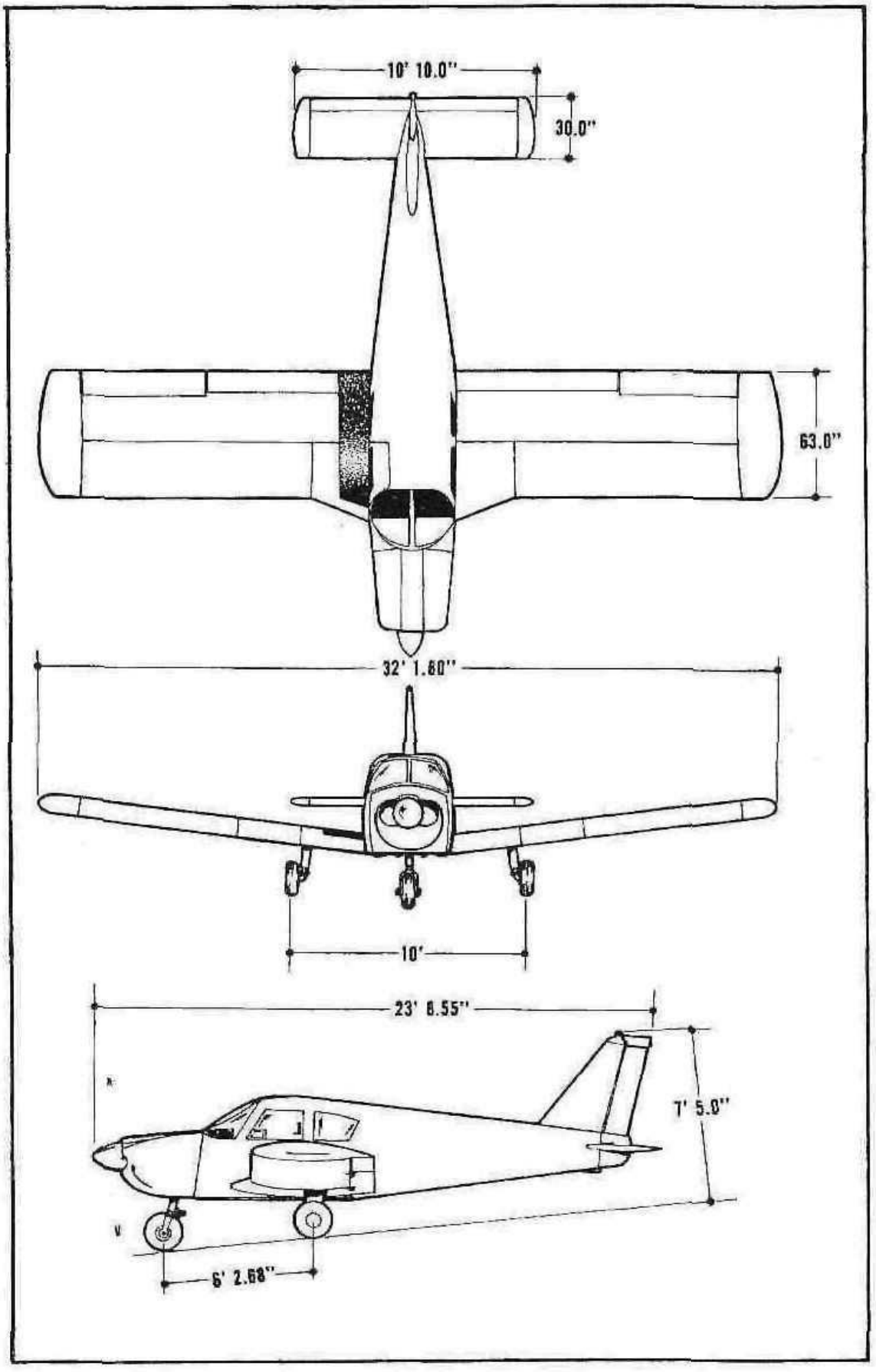
Maximum Baggage (lbs)	200
Baggage Space (cubic ft)	24
Baggage Door Size (in)	20 x 22

DIMENSIONS

Wing Span (ft)	32.0
Wing Area (sq ft)	170
Wing Loading (lbs per sq ft)	17.0
Length (ft)	23.7
Height (ft)	7.1
Power Loading (lbs per hp)	12.4

LANDING GEAR

Wheel Base (ft)		6.2
Wheel Tread (ft)		10.0
Tire Pressure (lbs)	Nose	28-30
	Main	35-40


10' 10.0"
30.0"
63.0"
32' 1.80"
10'
23' 8.55"
7' 5.0"
6' 2.68"

SECTION II

DESIGN INFORMATION

ENGINE AND PROPELLER

The Lycoming O-540-B engine installed in the Cherokee PA-28-235 is rated at 235 horsepower at 2575 rpm. This engine has a compression ratio of 7.2 to 1 and requires 80/87 minimum octane aviation fuel. The engine is equipped with a geared starter, a 60 ampere alternator, dual magnetos, shielded ignition system, vacuum pump drive, a diaphragm-type fuel pump and a float carburetor.

Exhaust gases are carried through a system constructed of heavy gauge stainless steel which incorporates two heater shrouds, one for cabin heat and the other for carburetor deicing.

The propeller used on the PA-28-235 is either the McCauley 1P235PFA80 fixed pitch aluminum alloy unit or the Hartzell HC-C2YK-1/8468A-4 constant speed propeller.

The McCauley propeller is 80 inches in diameter, with a standard pitch of 69 inches, although propellers with a pitch from 66 inches to 71 inches may be installed for special purposes. All performance figures are based on the standard 69 inch propeller.

The Hartzell propeller is 80 inches in diameter, and is controlled by a Hartzell F-4-3 governor mounted on a pad on the forward end of the crankcase. This governor supplies oil to the propeller through the engine shaft. The governor is controlled by a cable from the cockpit.

The two-piece cowling on the Cherokee is designed to cool the engine in all normal flight conditions, including protracted climb, without the use of cowl flaps or cooling flanges.

The throttle is of the push-pull type and is located in the

lower center of the instrument panel. A knurled friction lock is provided to prevent creeping of the throttle from any desired position. The mixture control, located in the lower right hand side of the instrument panel, is a push-pull control like the throttle. The full rich position is obtained when the control is full forward, while the full aft position provides an idle cut-off for stopping the engine. Intermediate positions are used for leaning the mixture at altitudes above sea-level. The carburetor heat control, located to the left of the throttle, provides maximum carburetor heat when pulled to its full aft position. With carburetor heat off, all engine air passes through a high-efficiency dry-type filter. Therefore, prolonged ground operation with carburetor heat "ON" should be avoided, particularly on unimproved fields as the air is not filtered.

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.

The wing airfoil section is a laminar flow type, NACA 65_2-415 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 landing gears use a Cleveland 600 x 6 wheel, the main wheels being provided with brake drums and single disc hydraulic brakes. The nose wheel carries a 600 x 6 four ply rating tire with tubes while the main gear uses 600 x 6 six ply rating tires.

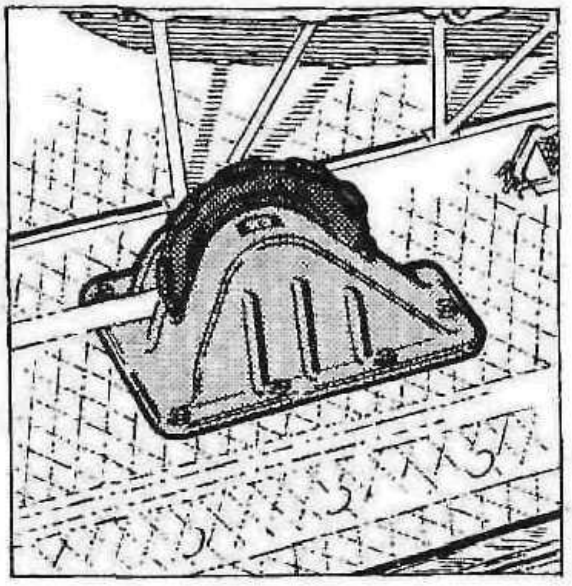
The nose gear is steerable through a 30 degree arc each side of neutral by use of the rudder pedals. A spring device is incorporated in the rudder pedal torque tube assembly to aid in rudder centering and to provide rudder trim. The nose gear steering mechanism also incorporates a hydraulic shimmy dampener.

The oleo struts are of the air-oil type, with normal extension being 3-1/4 inches for the nose gear and 4-1/2 inches for the main gear under normal static load (empty weight of airplane plus full fuel and oil).

The brakes are actuated by a hand lever and master cylinder located below and behind the left center of the instrument subpanel. 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 brake lever to disengage the catch mechanism and allow the handle to swing forward.

CONTROL SYSTEM

Dual controls are provided as standard equipment, with a cable system used between the controls and the surfaces. The horizontal tail is of the all movable slap type, with an anti-servo tab which also acts as a longitudinal trim tab, actuated by a control mounted on the control tunnel between



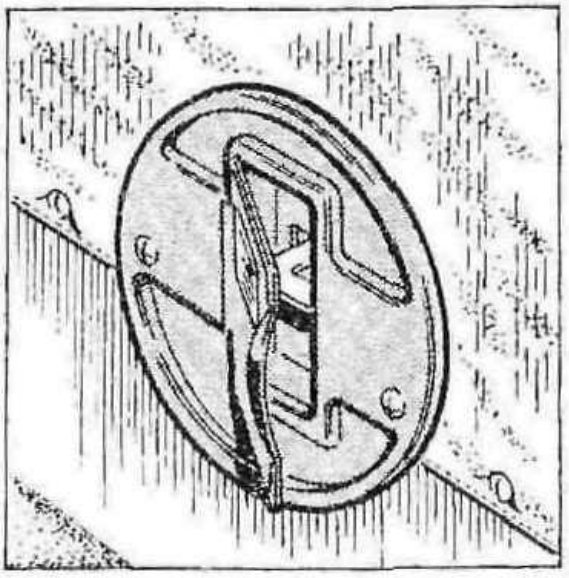
Stabilator Trim Control

the two 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 eliminate adverse yaw in turning maneuvers and to reduce the amount of coordination required in normal turns.

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

Standard fuel capacity of the Cherokee is 84 gallons, all of which is usable except for approximately one pint in each of the four tanks. The two main inboard tanks, which hold 25 gallons each, are attached to the wing structure with screws and nutplates and may be easily removed for service or inspection. The tip tanks are constructed of resin-impregnated fiberglas and hold 17 gallons each.



Fuel Drain Lever

The fuel selector control is located below the center of the instrument panel on the sloping face of the control tunnel. It has five positions corresponding to each of the four tanks plus an "OFF" position. When using less than the standard 84 gallon capacity of the tanks, fuel should be distributed equally between each side and may be placed in either the in-

board or tip tanks.

Each fuel tank is equipped with an individual quick drain located at the lower inboard rear corner of the tank. The fuel strainer and a system quick drain valve are located in the fuselage at the lowest point of the fuel system. This strainer should be drained regularly to avoid the accumulation of water or sediment. The drain valve is operated by pressing DOWN on the lever located on the right hand side of the cabin below the forward edge of the rear seat.

Fuel quantity gauges for each of the four tanks are located in the engine gauge cluster on the right side of the instrument panel. A fuel pressure indicator is also incorporated in the engine gauge cluster.

An electric fuel pump is provided for use in case of failure of the engine-driven pump. The electric pump operates from a switch and should be "ON" for all take-offs and landings.

ELECTRICAL SYSTEM

The Cherokee is equipped with a 12 volt, 60 ampere alternator which provides electrical power at all engine speeds and results in improved performance for radio and electrical equipment and longer battery life.

In addition to the alternator, the electrical system includes a 25 ampere-hour battery, a voltage regulator and a master switch relay. The battery and relay are mounted immediately aft of the baggage compartment. Access for service or inspection is obtained through a removable panel adjacent to the baggage door. The battery box is designed to accommodate a larger capacity battery for extreme cold weather operation.

Electrical switches, fuses and fuse spares are located on the lower left side of the instrument panel.

Standard electrical accessories, in addition to those already listed, include a starter, stall warning indicator, cigar lighter and ammeter. Navigation lights, anti-collision light, landing light, instrument lighting and a cabin dome light are offered as

optional accessories.

Circuit provisions are made to handle optional communications and navigational equipment. In the event either the 5 ampere or 60 ampere circuit breaker should open in flight, reduce the load on the alternator by turning off all unnecessary electrical equipment first, turn off the master switch, reset either or both circuit breakers, turn on master switch and observe ammeter for normal indication while turning on the required electrical equipment. In airplanes with serial numbers 28-10763 and up, an overvoltage relay protects electrical equipment from surges over 16.5 volts and from regulator failure. If overvoltage occurs, the relay will open and the ammeter will indicate "O" output from alternator. Reset the relay by turning the master switch to "OFF" for one minute, then turn the master switch to "ON". If overvoltage persists after recycling the master switch, continue flight by monitoring the voltmeter and reducing the battery load to a minimum.

In conventional generator systems, the ammeter indicates battery discharge. In the Cherokee electrical system, the ammeter displays the load in amperes placed on the system at any given time. With all electrical equipment except the master switch in the "OFF" position, the ammeter will indicate the amount of charging current demanded by the battery. This amount will vary and depends on the percentage of full charge on the battery at the time. When the battery becomes charged, the current displayed on the ammeter will reduce to a minimum value of about two amperes. As each unit of electrical equipment is switched on the amount of current it draws will be shown on the ammeter. The maximum continuous load for night flight with all equipment on is approximately thirty amperes. This thirty amperes plus approximately two amperes for the fully charged battery will appear continuously under these flight conditions.

Because of the mechanical simplicity of the alternator, maintenance should prove to be a minor factor as compared to previous systems. Should service be required, contact your 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 lower right side of the instrument panel.

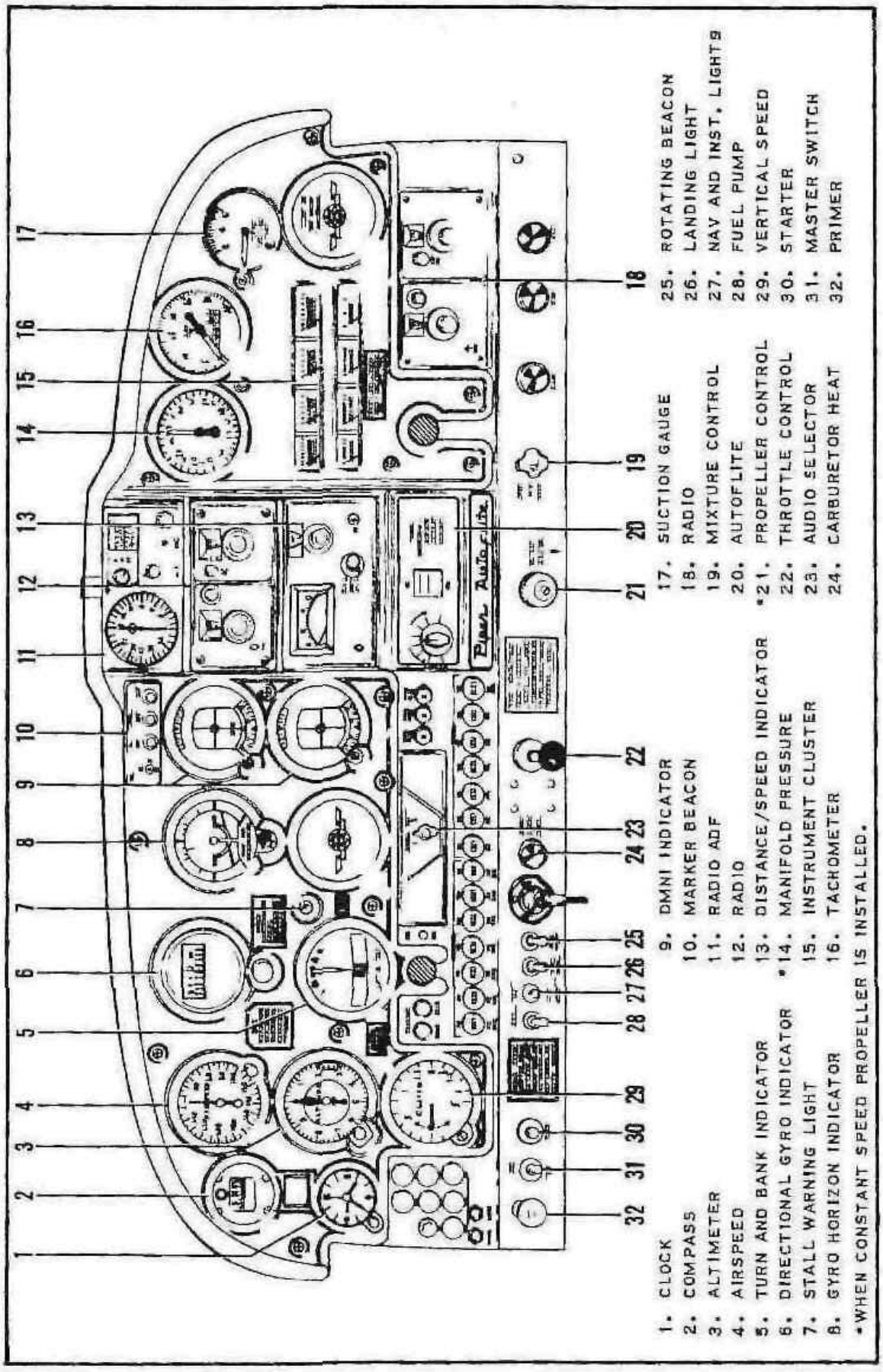
Fresh air inlets are located in the leading edge of the wing at the intersection of the tapered and straight sections. A large adjustable outlet is located on the side of the cabin near the floor at each seat location. Air is exhausted through an outlet under the rear seat.

CABIN FEATURES

The instrument panel of the Cherokee is designed to accommodate the customary advanced flight instruments and all the normally required power plant instruments. The Artificial Horizon, Directional Gyro and the Turn and Bank instruments are vacuum operated through use of a vacuum pump installed on the engine. A natural separation of the flight group and the power group is provided by placing the communications and radio navigational equipment in the center of the panel.

The cabin interior includes double side windows, two sun visors, cabin dome light, 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 24 cubic foot baggage area which includes a roomy hat shelf may be reached from the cabin or through a large 20 x 22 inch outside door.


1. CLOCK
2. COMPASS
3. ALTIMETER
4. AIRSPEED
5. TURN AND BANK INDICATOR
6. DIRECTIONAL GYRO INDICATOR
7. STALL WARNING LIGHT
8. GYRO HORIZON INDICATOR
9. OMNI INDICATOR
10. MARKER BEACON
11. RADIO ADF
12. RADIO
13. DISTANCE/SPEED INDICATOR
*14. MANIFOLD PRESSURE
15. INSTRUMENT CLUSTER
16. TACHOMETER
17. SUCTION GAUGE
18. RADIO
19. MIXTURE CONTROL
20. AUTOFLITE
*21. PROPELLER CONTROL
22. THROTTLE CONTROL
23. AUDIO SELECTOR
24. CARBURETOR HEAT
25. ROTATING BEACON
26. LANDING LIGHT
27. NAV AND INST. LIGHTS
28. FUEL PUMP
29. VERTICAL SPEED
30. STARTER
31. MASTER SWITCH
32. PRIMER
*WHEN CONSTANT SPEED PROPELLER IS INSTALLED.

CABIN FEATURES

The instrument panel of the Cherokee is designed to accommodate the customary advanced flight instruments and all the normally required power plant instruments. The Artificial Horizon, Directional Gyro and the Turn and Bank instruments are vacuum operated through use of a vacuum pump installed on the engine. A natural separation of the flight group and the power group is provided by placing the communications and radio navigational equipment in the center of the panel.

The cabin interior includes double side windows, two sun visors, cabin dome light, 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 24 cubic foot baggage area which includes a roomy hat shelf may be reached from the cabin or through a large 20 x 22 inch outside door.

SECTION III

OPERATING INSTRUCTIONS

SECTION III

OPERATING INSTRUCTIONS

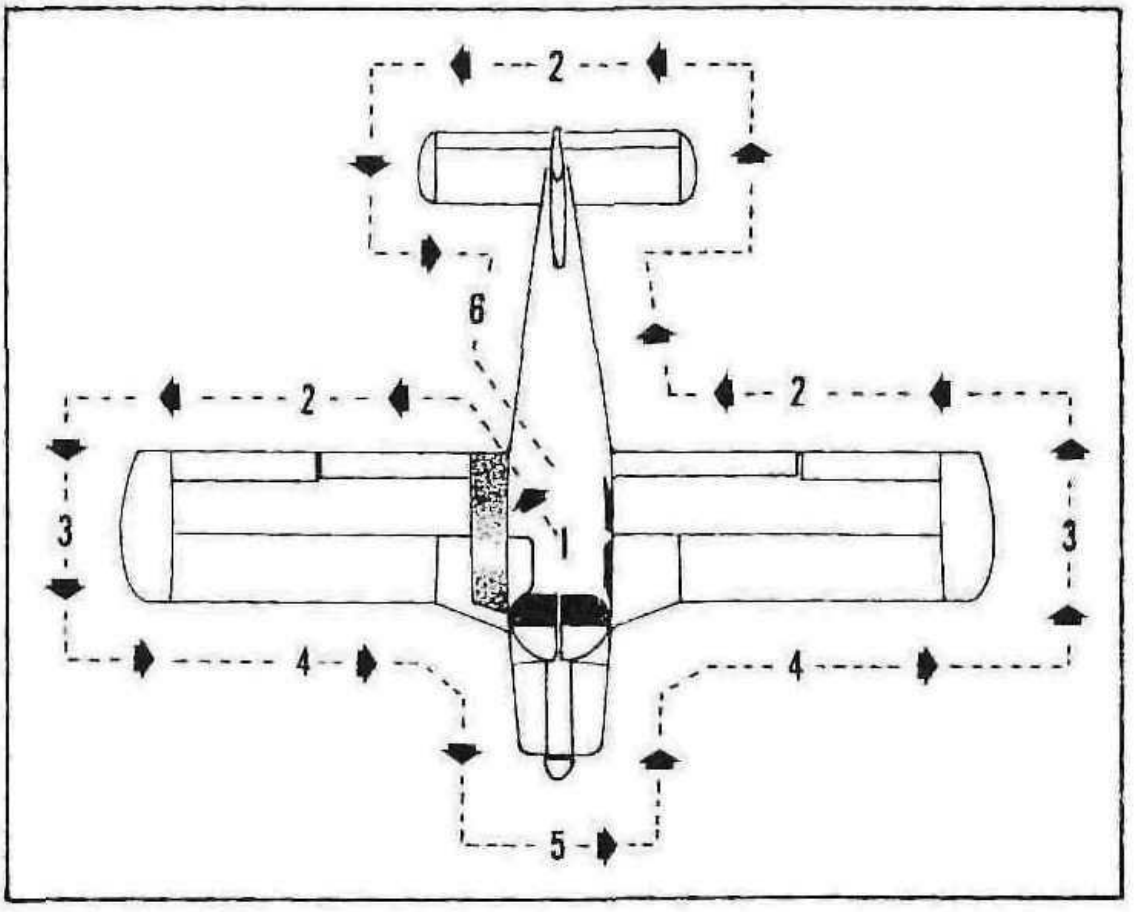
PREFLIGHT

The airplane should be given a thorough visual inspection prior to each flight. Particular attention should be given to the following items in the illustration below:

1. a. Master switch "ON".

b. Check fuel quantity indicators (four tanks).

c. Depress sump drain knob for four or five seconds to drain possible accumulation of water and sediment.



d. Master switch and ignition "OFF".

2. a. Check for external damage, 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, secure caps.

b. *Drain fuel tank sumps.*

c. Check navigation lights.

4. a. Visually check fuel supply, secure caps.

b. Drain fuel tank sumps.

c. Check that fuel system vents are open.

d. Check landing gear shock struts for proper inflation.

e. Check tires for cuts, wear and proper inflation.

5. a. Inspect windshield for cleanliness.

b. Check the propeller and spinner for defects or nicks.

c. Check for obvious fuel or oil leaks.

d. Check oil level, 8 quarts minimum. (Insure dipstick is properly seated.)

e. Inspect cowling and inspection covers for security.

f. Check nose wheel tire for inflation, wear.

g. Check nose wheel shock strut for proper inflation.

6. a. Stow tow bar and control locks, if used.

b. Check baggage for proper storage and security.

c. Close and secure the baggage compartment door.

7. a. Upon entering aircraft ascertain that all primary flight controls operate properly.

b. Close and secure the cabin door.

c. Check that required papers are in order and in the aircraft.

STARTING ENGINE

After completion of the preflight inspection:

1. Lock the wheel brakes.

2. Set the carburetor heat control in the full "COLD" position.

3. Set propeller control in full "increase RPM".
4. Select the desired tank with the fuel valve.
5. Move the mixture to the full "RICH" position.
6. Open the throttle 1/8 to 1/4 inch.
7. Turn the electric fuel pump "ON".

In cold weather (below 40 degrees F.) prime the engine with one to three full strokes of the priming pump. If extremely cold, starting will be aided by pulling the propeller through by hand (switch "OFF") four to five revolutions. If the temperature is above 40 degrees the engine may be primed by three or four short quick strokes of the throttle.

After priming, turn the electric master switch on, engage the starter and allow the engine to turn approximately one full revolution, then turn the ignition switch to the "Left" magneto position.

When the engine is firing evenly, turn the magneto switch to the "Both" position and advance the throttle to 800 RPM. Check the oil pressure gauge for a pressure indication. If oil pressure is not indicated within thirty seconds, stop the engine and determine the trouble.

If the engine fails to start at the first attempt, another attempt should be made without priming. If this fails, it is possible that the engine is overprimed. Turn the magneto switch off, open the throttle slowly, and rotate the engine approximately ten revolutions with the starter. Reprime the engine with one half the amount used in the initial attempt, turn the magneto switch to "Left", and repeat the starting procedure. If the engine again fails to start, refer to the "Lycoming Operating Handbook, Engine Troubles and Their Remedies".

WARM-UP

As soon as the engine starts, the oil pressure should be checked. If no pressure is 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. Warm-up the engine at 800 to 1200 RPM.

Take-off may be made as soon as ground check is completed, providing that the throttle may be opened fully without back firing or skipping, and without reduction in engine oil pressure.

GROUND CHECK

The magnetos should be checked at 1800 RPM on airplanes with a fixed pitch propeller or at 2150 RPM with propeller set at high RPM on airplanes with a constant speed propeller. Switch from both magnetos to only one and note the RPM loss; switch to the other magneto and again note the RPM loss. Drop off on either magneto should not exceed 125 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 in full "increase RPM" for take-off. To obtain maximum RPM with the vernier control, push the control forward while depressing the button, and then rotate the vernier control clockwise until it contacts the stop.

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

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.

TAKE-OFF

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

1. Controls free
2. Flaps "UP"
3. Tab set
4. Propeller set
5. Mixture "RICH"
6. Carburetor heat "OFF"
7. Fuel on proper tank
8. Electric fuel pump "ON"
9. Engine gauges normal
10. Door latched
11. Altimeter set

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 55 to 65 miles per hour, 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, to simplify operating procedure. However, for short field take-offs, and for take-offs under difficult conditions such as in deep grass or on a soft surface, distances can be reduced appreciably by lowering flaps to 25° (second notch).

CLIMB

The best rate of climb at gross weight will be obtained at 100 miles per hour. The best angle of climb may be obtained at 90 miles per hour. At lighter than gross weight these speeds are reduced somewhat. For climbing enroute a speed of 115 miles per hour is recommended. This will produce better forward speed and increased visibility over the nose during the climb.

STALLS

The stall characteristics of the Cherokee are conventional. Visual stall warning is provided by a red light located on the left side of the instrument panel which is turned on automatically between 5 and 10 miles per hour above the stall speed. The gross weight stalling speed of the Cherokee with power off and full flaps is 60 miles per hour. With the flaps up this speed is increased 10 miles per hour.

Intentional spins are prohibited in this airplane. In the event that an inadvertent spin occurs, standard recovery technique should be used immediately.

CRUISING

The cruising speed of the Cherokee 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 high altitudes. The mixture should always be leaned during cruising operations at 75% power or less, but during the climb only at altitudes above 5000 feet.

When selecting cruising RPM below 2300, limiting manifold pressure for continuous operation, as specified by the Lycoming Operators Manual, should be observed.

The continuous use of carburetor heat during cruising flight decreases engine efficiency. Unless icing conditions in the carburetor are severe, do not cruise with the heat on. Apply full carburetor heat slowly and only for a few seconds at intervals determined by icing severity.

In order to keep the airplane in best lateral trim during

cruising flight, the fuel should be used alternately from each main tank, and when they are exhausted, from each tip tank. It is recommended that one main tank be used for one hour after take-off; the other main tank used until nearly exhausted, then return to the first main tank. When nearly exhausted, turn to one tip tank and alternate at one-half hour intervals to maintain lateral trim.

APPROACH AND LANDING

Before landing check list:

1. Mixture "RICH"
2. Propeller set
3. Carburetor heat "OFF" (unless icing conditions exist)
4. Electric fuel pump "ON"
5. Fuel selector on proper tank
6. Flaps as desired (under 115 M.P.H.)

The airplane should be trimmed to an approach speed of about 90 miles per hour and flaps extended. The flaps can be lowered at speeds up to 115 miles per hour, if desired. The propeller should be set at full RPM or at a high cruising RPM to facilitate an emergency go-around if needed. 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 the speed of the aircraft at contact with the runway should be varied according to the landing surface and existing conditions, both windwise and loadwise. It is generally good practice to contact the ground at the 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. Mixture should be full rich, fuel on the fullest tank, carburetor heat off, and electric fuel pump on.

Reduce the speed during the flareout and contact the ground close to the stalling speed (55 to 65 MPH). After ground contact hold the nose wheel off as long as possible. As the airplane slows down, drop the nose and apply the 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 aircraft 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.

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 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.

FUEL SYSTEM OPERATING PROCEDURES

1. Fuel quantity should be visually checked in all fuel tanks before entering the aircraft.

2. After using the under-seat quick drain, it should be checked from outside the aircraft to make sure it has closed completely, and is not leaking.

3. Take-off should be made on the fullest main tank to assure best fuel flow, and this tank selected before or immediately after starting in order to allow fuel flow to be adequately established before take-off. The main or tip tank with the highest quantity of fuel should be selected for landing.

4. Fuel tank selection at low altitude is not recommended, since little recovery time is available in the event of an error in tank selection. When switching tanks, make sure that the selector drops into a detent, and is lined up with the desired tank.

5. The electric fuel pump should be turned on before switching tanks, and should be left on for a short period thereafter.

6. To preclude making a hasty selection, and to provide continuity of flow, it is desired that the selector be changed to another tank before fuel is exhausted from the tank in use.

7. Operation of the engine driven fuel pump should be checked while taxiing or during pre-take-off engine run-up by switching off the electric fuel pump and observing fuel pressure.

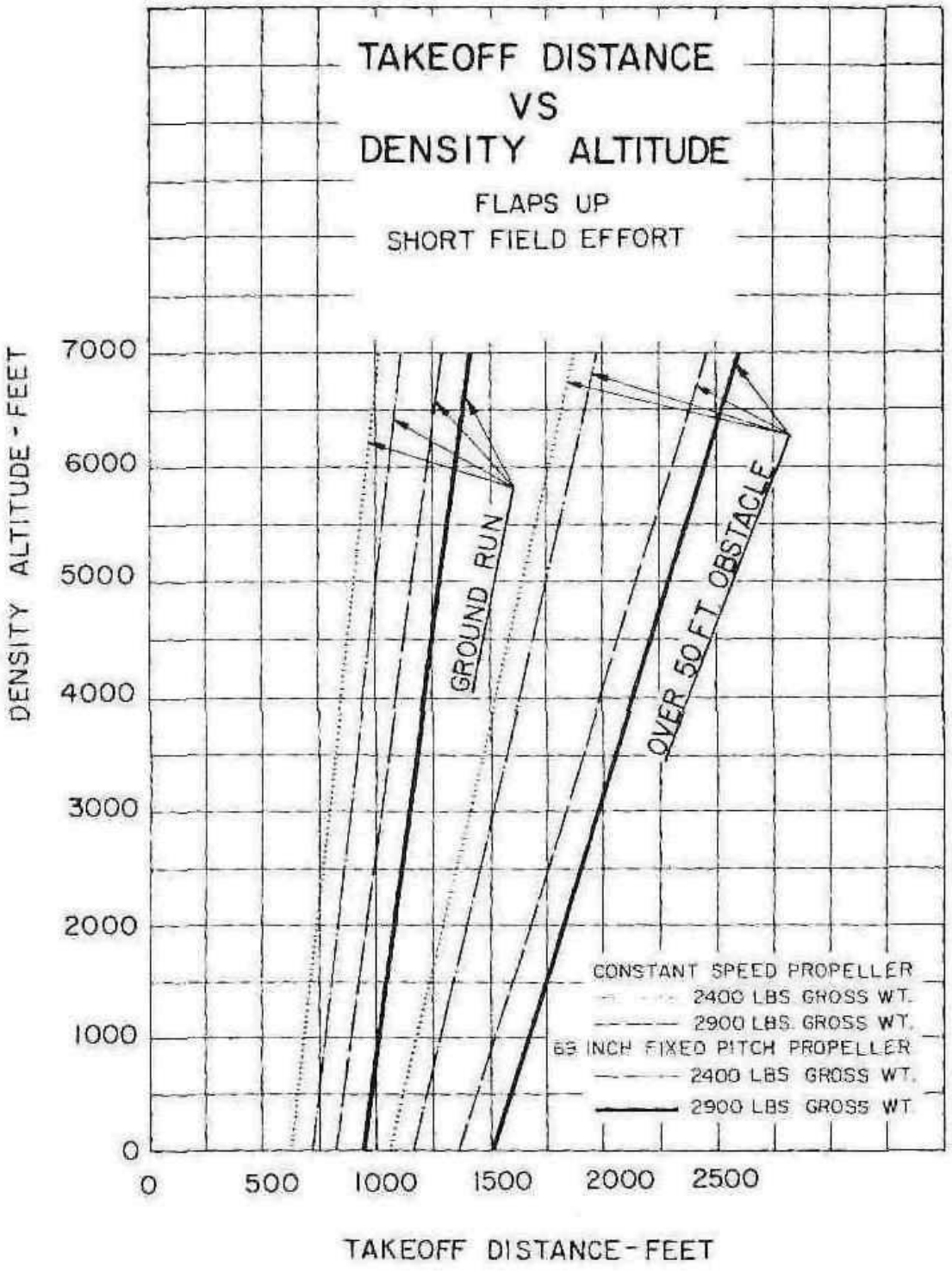
8. During cruise, the electric fuel pump should be in the off position so that any malfunction of the engine driven fuel pump is immediately apparent.

9. If signs of fuel starvation should occur at any time during flight, fuel exhaustion should be suspected, at which time the fuel selector should be immediately positioned to a full tank and the electric fuel pump switched to the on position.

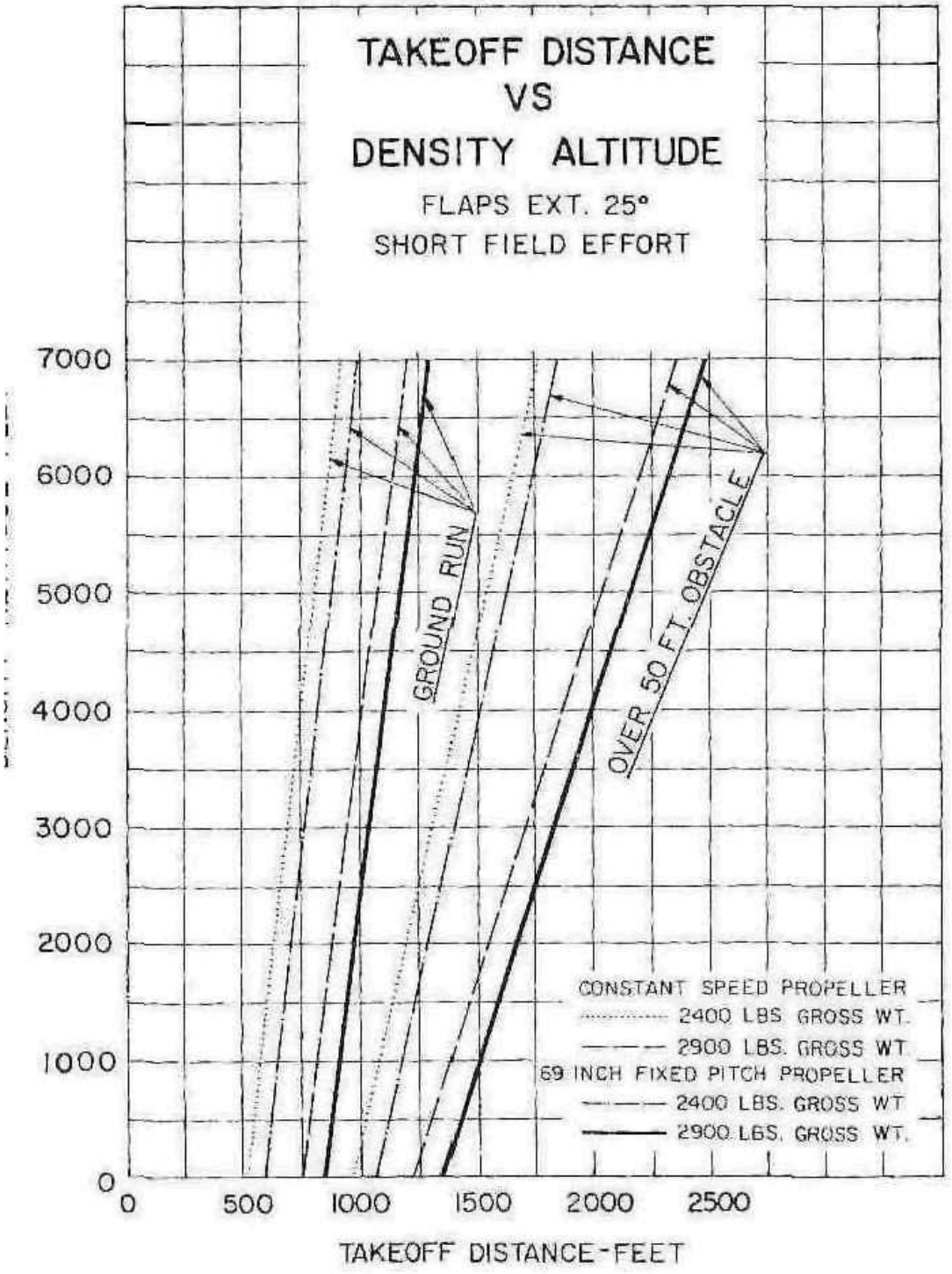
SECTION IV

PERFORMANCE CHARTS

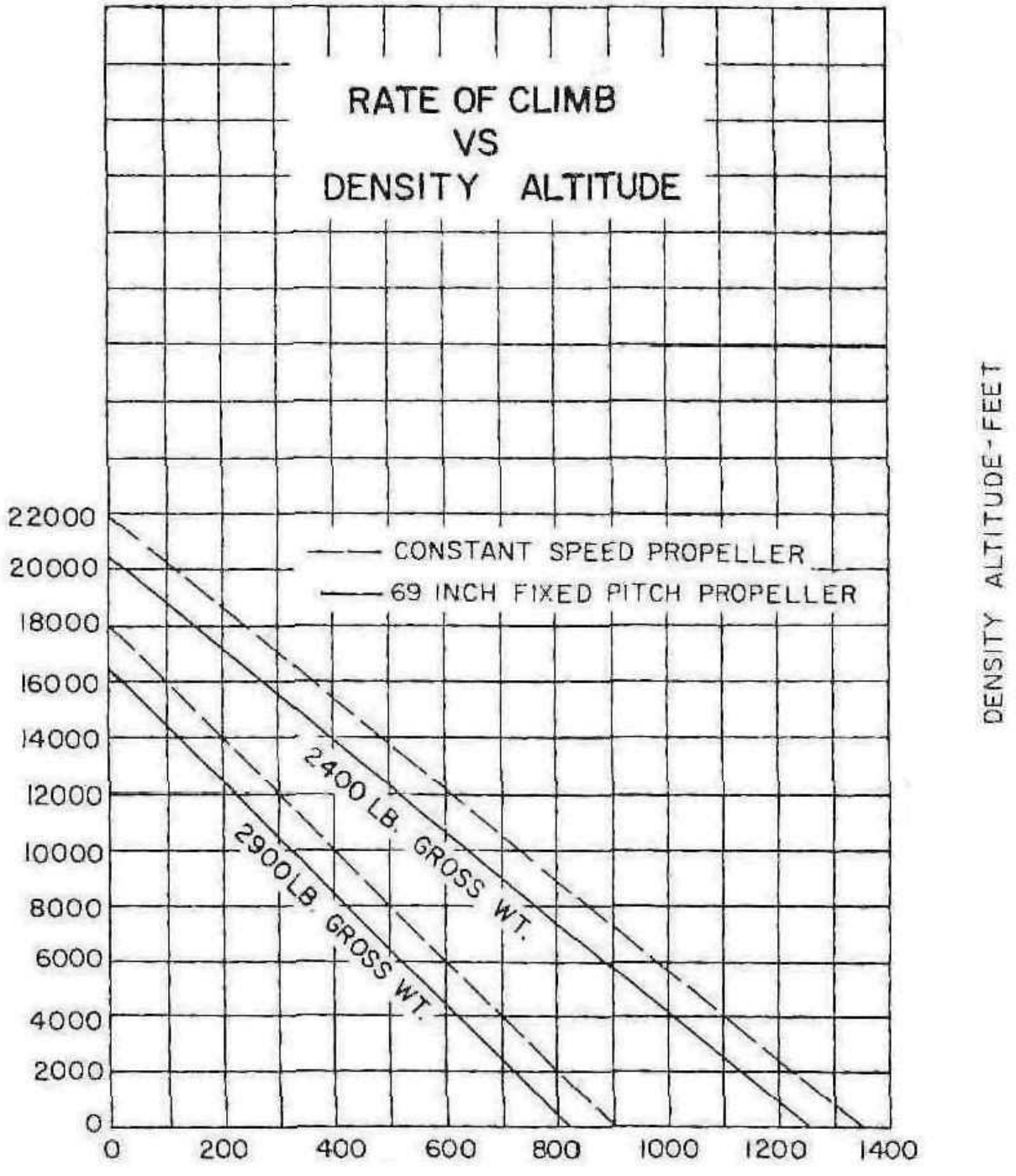
PIPER CHEROKEE
PA-28-235



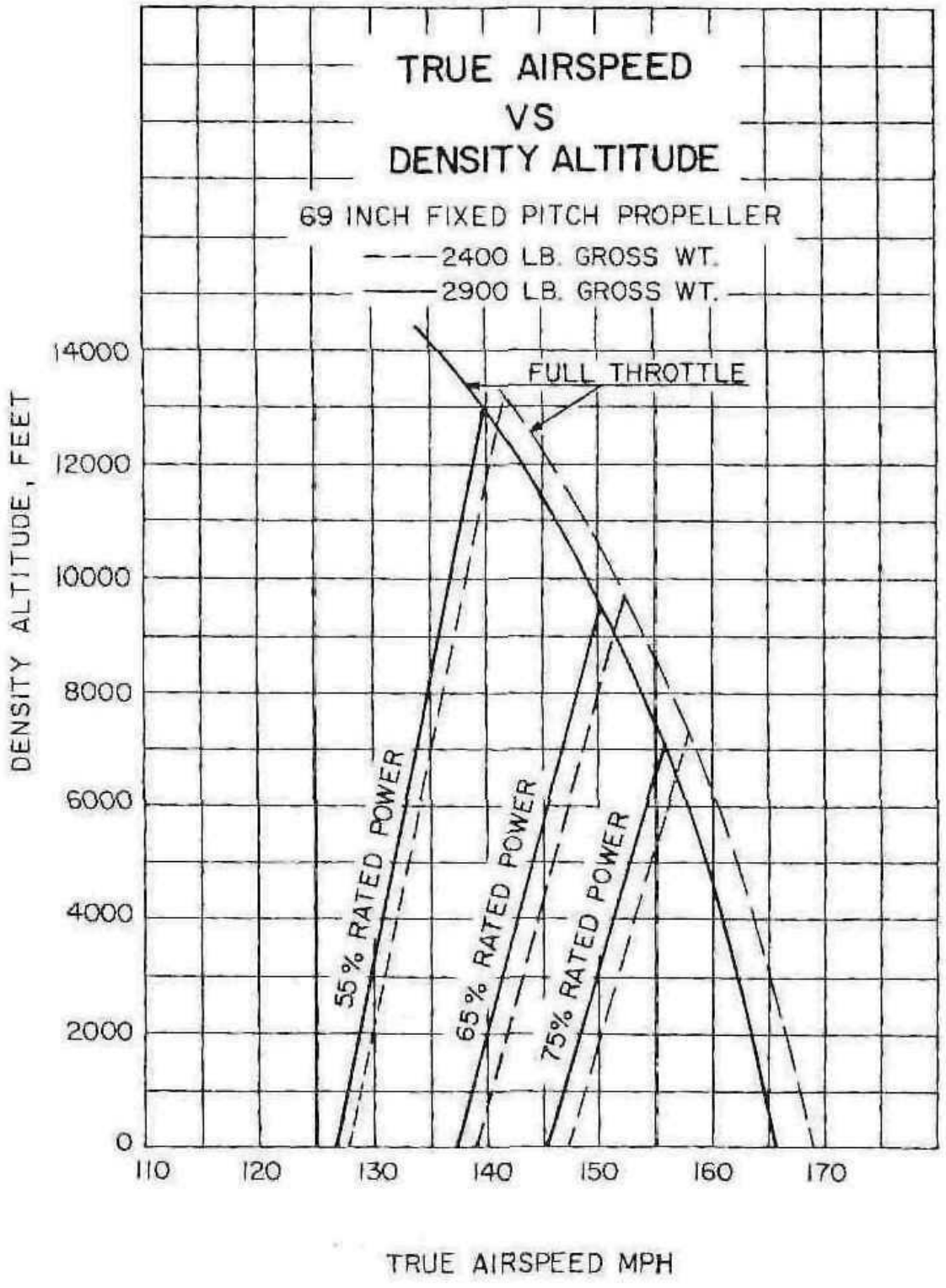
PIPER CHEROKEE
PA-28-235



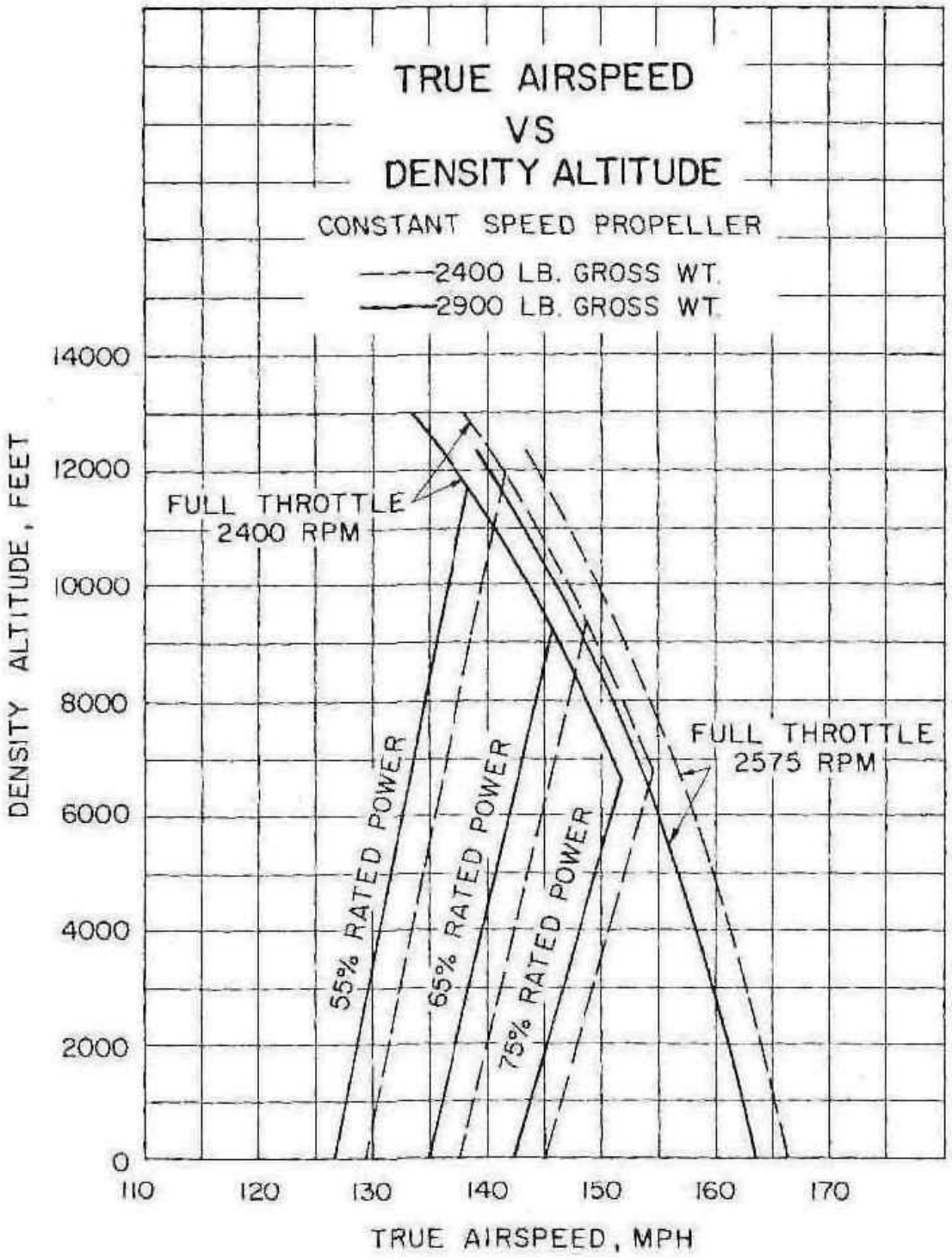
PIPER CHEROKEE
PA-28-235



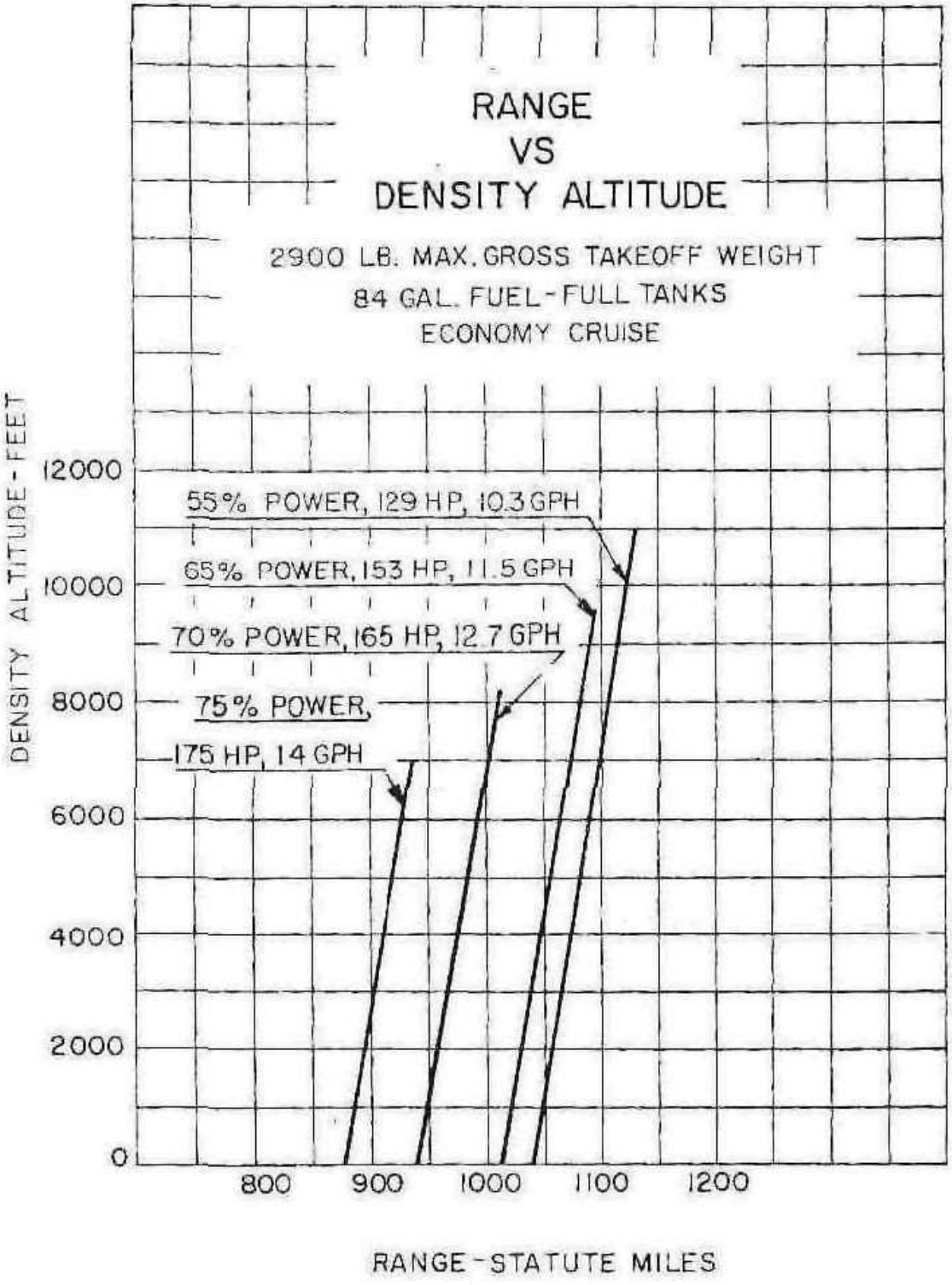
PIPER CHEROKEE
PA-28-235



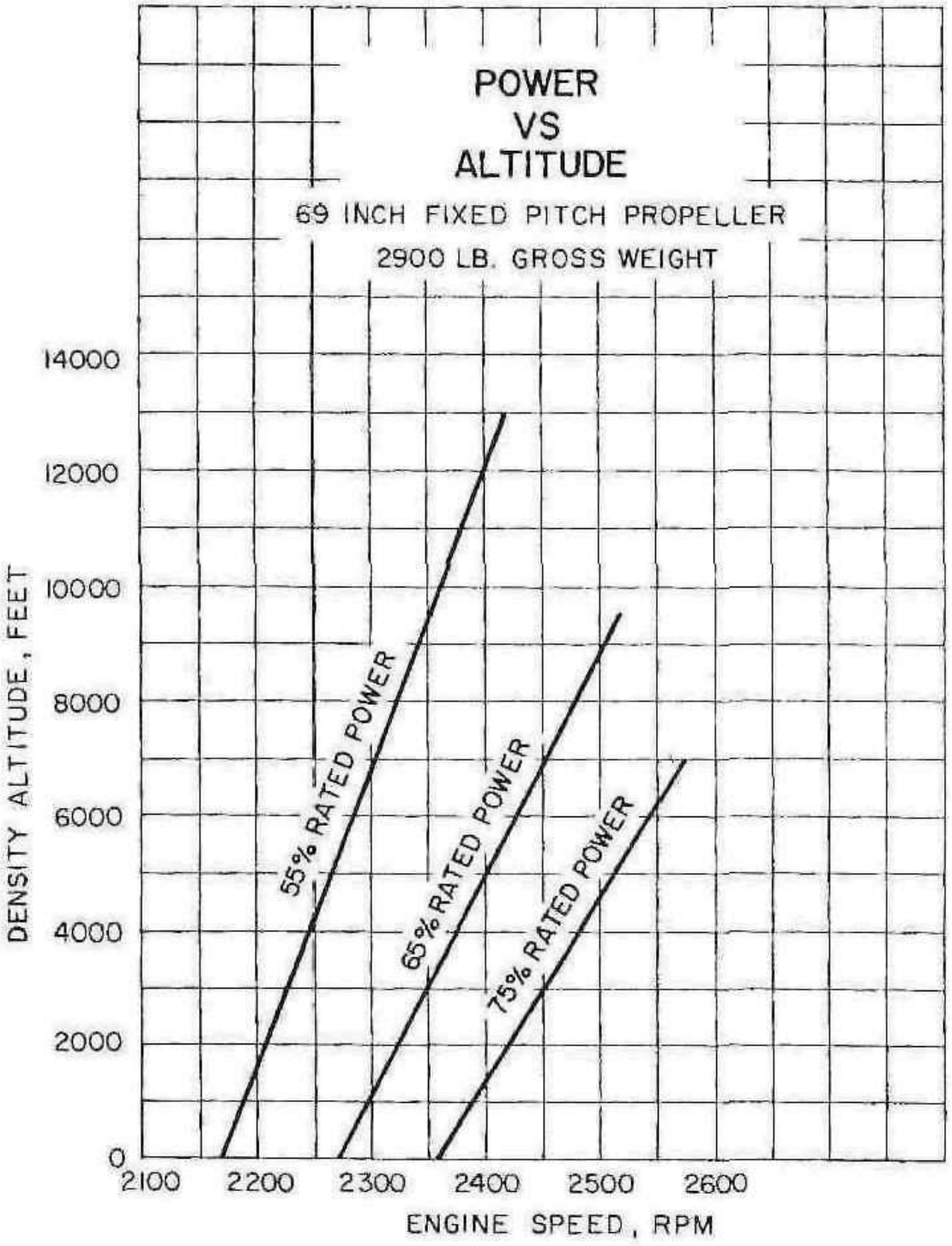
PIPER CHEROKEE
PA-28-235



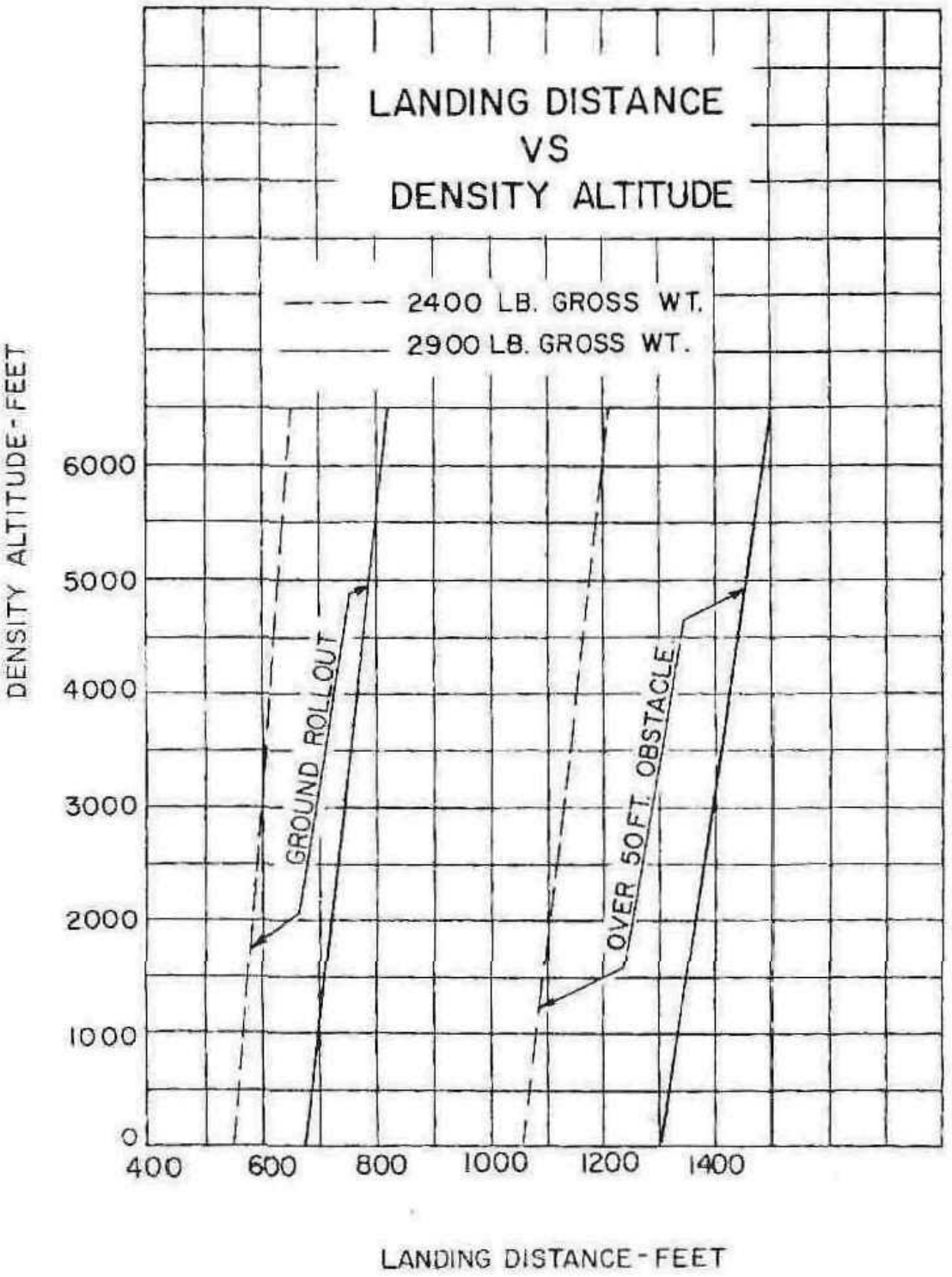
PIPER CHEROKEE
PA-28-235



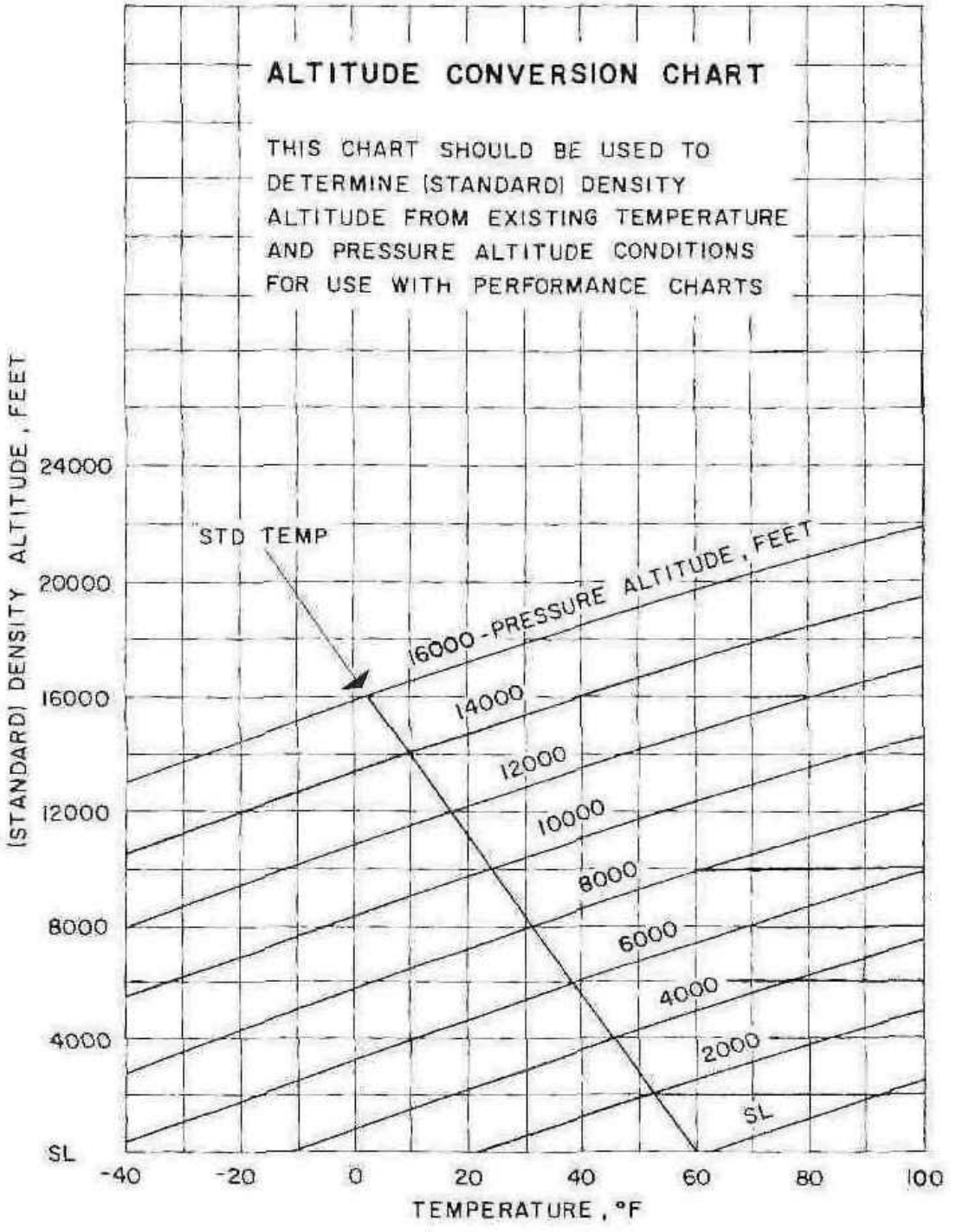
PIPER CHEROKEE
PA-28-235



PIPER CHEROKEE
PA-28-235



PIPER CHEROKEE
PA-28-235



Power Setting Table - Lycoming O-540-B Engine - Constant Speed Propeller

Press. Alt 1000 Feet	Std Alt Temp °F	129 HP – 55% Rated RPM AND MAN. PRESS. 2100	2200	2300	2400	153 HP – 65% Rated RPM AND MAN. PRESS. 2100	2200	2300	2400	176 HP – 75% Rated RPM AND MAN. PRESS. 2100	2200	2300	2400	Press. Alt 1000 Feet
SL	59	20.6	20.1	19.6	19.2	23.2	22.6	22.0	21.5	25.7	25.0	24.4	23.7	SL
1	55	20.3	19.8	19.3	18.9	22.9	22.3	21.7	21.2	25.4	24.7	24.1	23.4	1
2	52	20.1	19.6	19.1	18.7	22.7	22.1	21.5	21.0	25.2	24.5	23.8	23.1	2
3	48	19.8	19.3	18.8	18.4	22.4	21.8	21.2	20.7	24.9	24.2	23.5	22.8	3
4	45	19.6	19.1	18.6	18.2	22.2	21.6	21.0	20.5	24.7	24.0	23.3	22.5	4
5	41	19.3	18.8	18.3	17.9	21.9	21.3	20.7	20.2	–	23.7	23.0	22.3	5
6	38	19.1	18.6	18.1	17.7	21.7	21.1	20.5	19.9	–	–	22.7	22.0	6
7	34	18.8	18.3	17.8	17.4	21.4	20.8	20.2	19.7	–	–	–	21.6	7
8	31	18.6	18.1	17.6	17.2	21.2	20.6	20.0	19.4					8
9	27	18.4	17.9	17.4	17.0	–	20.4	19.8	19.2					9
10	23	18.2	17.7	17.2	16.8	–	–	19.6	19.0					10
11	19	18.0	17.5	17.0	16.6									11
12	16	17.8	17.3	16.8	16.4									12
13	12	–	17.1	16.6	16.2									13
14	9	–	–	16.4	16.1									14
15	5	–	–	–	15.9									15

To maintain constant power, correct manifold pressure approximately 0.18" Hg for each 10° F variation in carburetor air temperature from standard altitude temperature. Add manifold pressure for air temperatures above standard; subtract for temperatures below standard.

230 026

Power Setting Table - Lycoming O-540-B Engine --Fixed Pitch Propeller

Press. Alt	Std Alt Temp °F	129 HP 55% Power RPM	153 HP 65% Power RPM	176 HP 75% Power RPM	Press. Alt
SL	59	2170	2270	2360	SL
1,000	55	2190	2295	2390	1,000
2,000	52	2210	2320	2420	2,000
3,000	48	2230	2350	2450	3,000
4,000	45	2250	2375	2480	4,000
5,000	41	2270	2400	2510	5,000
6,000	38	2285	2425	2540	6,000
7,000	34	2305	2450	2570	7,000
8,000	31	2320	2475	–	8,000
9,000	27	2340	2500	–	9,000
10,000	23	2360	–	–	10,000
11,000	19	2380	–	–	11,000
12,000	16	2400	–	–	12,000
13,000	12	2420	–	–	13,000

SECTION V

GENERAL MAINTENANCE

SECTION V

GENERAL MAINTENANCE

LANDING GEAR SERVICE

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 removed from the wheels by first deflating the tire, removing the 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 3-1/4 inches for the nose gear and 4-1/2 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.

Should fluid be below the bottom of the filler plug hole, oil should be added. Replace the plug with valve core removed, attach a clear plastic hose to the valve stem of the filler plug and submerge the other end in a container of hydraulic fluid (MIL-H-5606). Fully compress and extend the strut several times thus drawing fluid from the container and expelling air from the strut chamber. To allow fluid to enter the bottom chamber of the main gear strut housing, the torque link assembly must be disconnected to let the strut be extended a minimum of 10 inches. (The nose gear torque links need not be disconnected.) Do not allow the strut to extend more than 12 inches. When air bubbles

cease to flow through the hose, compress the strut fully and again check fluid level. Reinstall the valve core and filler plug, and the main gear torque links, if disconnected.

With fluid in the strut housing at the correct level, attach a strut pump to the air valve and with the airplane on the ground, inflate the oleo strut to the correct height.

In jacking the Cherokee for landing gear service, a jack kit (available through the Piper Dealers and Distributors) should be used. This kit consists of two hydraulic jacks and a tail stand. At least 350 pounds of ballast should be placed on the tail stand before jacking the aircraft. The jacks should be placed under the jack points on the wing and the airplane jacked up until the tail skid is at the right height to attach the tail stand. After attaching the tail stand and adding ballast, jacking may be continued until the aircraft is at the height desired.

BRAKE SERVICE

The brake system is filled with MIL-H-5606 (petroleum base) hydraulic brake fluid. This should be checked at every 100 hour inspection and replenished when necessary by filling the brake reservoir on the firewall to the indicated level. If the system as a whole has to be refilled, it should be done by filling with fluid under pressure from the brake end of the system. This will eliminate air from the system.

No adjustment of brake clearances is necessary on the Cherokee. If after extended service the brake blocks become worn excessively, they are easily replaced with new segments.

TIRE INFLATION

For maximum service from the Cherokee tires, keep the tires inflated to a pressure of 35 to 40 pounds for the main gear and 28 to 30 pounds for the nose gear. If necessary, interchange the tires on the main wheels to produce even wear. All wheels and

tires are balanced before original installation, and the relationship of the tire, tube and wheel should be maintained if possible. Out of balance wheels can cause extreme vibration on take-off. In the installation of new components, it may be necessary to rebalance the wheel with the tires mounted.

CARE OF WINDSHIELD AND WINDOWS

A certain amount of care is needed to keep the plexiglas windows clean and unmarred. The following procedure is recommended:

1. Flush with clean water and dislodge excess dirt, mud, etc., with your hand.
2. Wash with mild soap and water. Use a soft cloth or sponge, do not rub.
3. Remove oil, grease or sealing compounds with a soft cloth and kerosene.
4. After cleaning, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth.
5. A severe scratch or mar may be removed by using jeweler's rouge to rub out the scratch, smoothing, and then applying wax.
6. If it is found that fog, stains, etc., appears on the inner surfaces of the double window assemblies, refer to the Cherokee Service Manual for cleaning instructions.

BATTERY SERVICE

Access to the 12 volt battery is through the right rear baggage compartment panel. The stainless steel box has a plastic drain tube which is normally closed off with a clamp and which should be opened occasionally to drain off any accumulation of liquid. The battery should be checked for proper fluid level but must not be filled above the baffle plates. A hydrometer check should be performed to determine the percent of charge present

in the battery.

If the battery is not up to charge, recharge starting at a 4 amp rate and finishing with a 2 amp rate. Quick charges are not recommended.

FUEL AND OIL REQUIREMENTS

Aviation grade 80/87 Octane (minimum) fuel must be used in the Cherokee. The use of lower grades can cause serious engine damage in a very short period of time, and is considered of such importance that the engine warranty is invalidated by such use.

The oil capacity of the Lycoming O-540 series engines is 12 quarts and the minimum safe quantity is 2-3/4 quarts. It is recommended that engine oil and oil filter element be changed every 50 hours or sooner under unfavorable conditions. The following grades are recommended for the specified temperatures:

Temperatures above 60° F S.A.E. 50
Temperatures between 30° F and 90° F S.A.E. 40
Temperatures between 0° F and 70° F S.A.E. 30
Temperatures below 10° F S.A.E. 20

CARE OF AIR FILTER

The carburetor air filter must be cleaned at least once every fifty hours. Under extremely adverse conditions of operation it may be necessary to clean the filter daily. Extra filters are inexpensive and a spare should be kept on hand and used as a rapid replacement.

The filter manufacturer recommends that the filter be tapped gently to remove dirt particles. Do not blow out with compressed air.

LEVELING AND RIGGING

Leveling the Cherokee for purposes of weighing or rigging is accomplished as follows:

1. Partially withdraw two machine screws located immediately below the left front side window. These screws are leveling points and the airplane is longitudinally level when a level placed on the heads of these screws indicates level.

2. To put the airplane in a longitudinally level position on scales, first block the main gear oleos in the fully extended position, then deflate the nose wheel tire until the proper attitude is obtained. For rigging only, the airplane may be placed on jacks for leveling.

3. To level the airplane laterally, place a level across the baggage compartment floor along the rear bulkhead.

Rigging: Although the fixed flight surfaces on the Cherokee cannot be adjusted for rigging purposes, it may be necessary upon occasion to check the position of these surfaces. The movable surfaces all have adjustable stops, as well as adjustable turnbuckles on the cables or push-pull tubes, so that their range of travel can be altered. The positions and angular travels of the various surfaces are as follows:

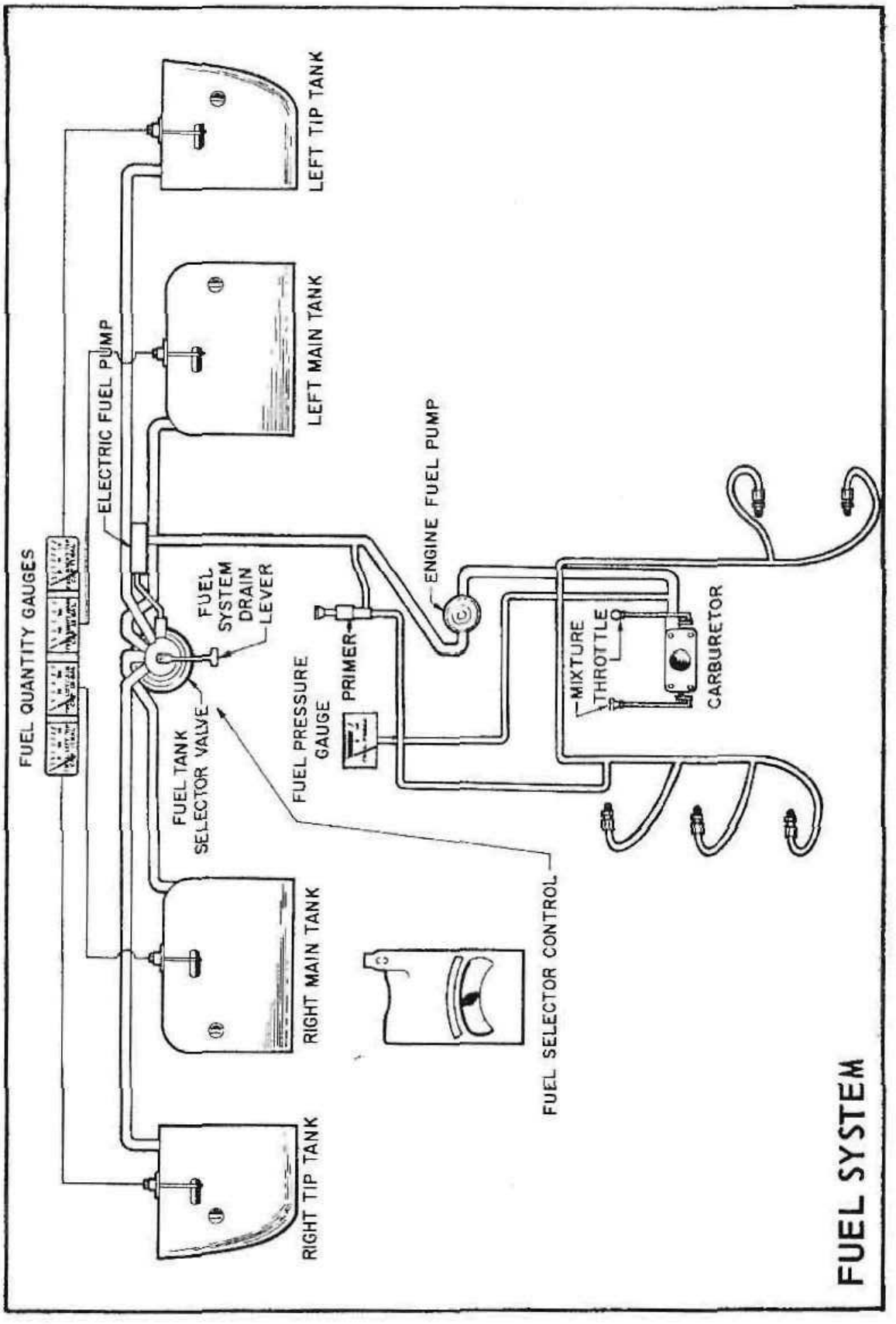
1. Wings: 7° dihedral, 2° washout.
2. Stabilator Travel: 18° up, 2° down, tolerance +/-1°.
3. Fin should be vertical, and in line with center of fuselage.
4. Ailerons Travel: 30° up, 15° down, tolerance +/-2°.
5. Flaps Travel: 10°, 25°, 40°, tolerance +/-2°.
6. Rudder Travel: 27° right and left, tolerance +/-2°.
7. Stabilator Tab Travel: 3° up, 12° down, tolerance +/-1°.

Cable tensions for the various controls are as follows:

Rudder: 40+/-5#	Stabilator: 40+/-5#
Ailerons: 40+/-5#	Stabilator Trim: 5+/-1#

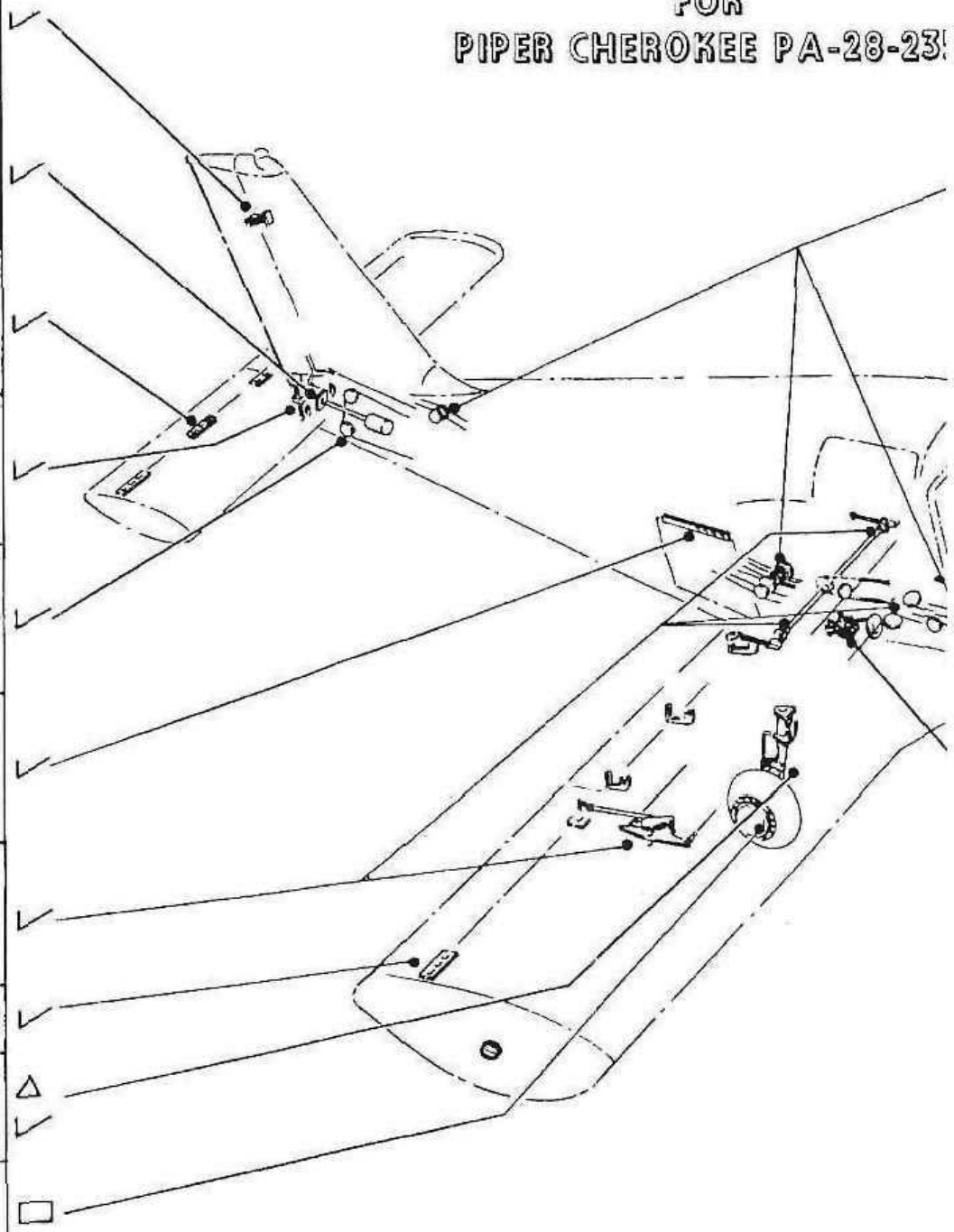
SERIAL NUMBER PLATE

The serial number plate is located near the stabilator on the left side of the airplane. Refer to this number for service or warranty matters.


FUEL QUANTITY GAUGES
ELECTRIC FUEL PUMP
LEFT TIP TANK
LEFT MAIN TANK
FUEL SYSTEM DRAIN LEVER
ENGINE FUEL PUMP
PRIMER
FUEL PRESSURE GAUGE
MIXTURE
THROTTLE
CARBURETOR
FUEL TANK SELECTOR VALVE
FUEL SELECTOR CONTROL
RIGHT MAIN TANK
RIGHT TIP TANK
FUEL SYSTEM

LUBRICATION CHART FOR PIPER CHEROKEE PA-28-23

	HOURS	LUBRICANT
RUDDER HINGES AND HORN	100	
STABILATOR HINGES	100	
STABILATOR TRIM TAB	100	
STABILATOR ADJUSTMENT MECHANISM	100	
STABILATOR CONTROL PULLEYS	100	
BAGGAGE DOOR AND MAIN DOOR HINGES	100	
AILERON AND FLAP TORQUE TUBE, PULLEYS, BELLCRANK, LEFT AND RIGHT	100	
AILERON HINGES	50	
MAIN LANDING GEAR TORQUE LINKS	50	
MAIN WHEEL BEARINGS LEFT AND RIGHT	100	



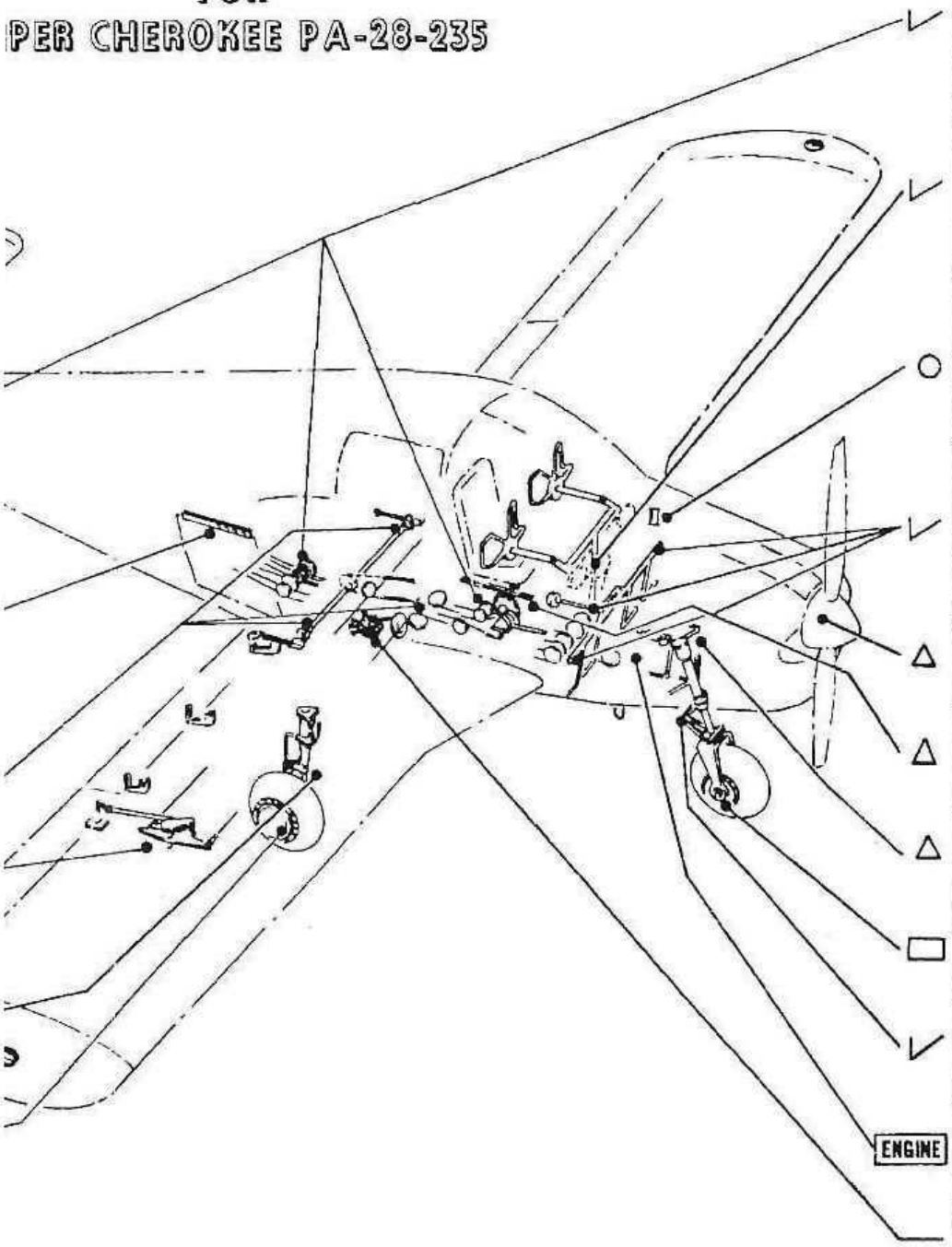
NOTES

1. OLEO STRUTS AND BRAKE RESERVOIR – FILL PER INSTRUCTIONS ON UNIT OR CONTAINER, OR REFER TO SERVICE MANUAL, SECTION II.
2. INTERVALS BETWEEN OIL CHANGES CAN BE INCREASED AS MUCH AS 100% ON ENGINES EQUIPPED WITH FULL FLOW (CARTRIDGE TYPE) OIL FILTERS – PROVIDED THE ELEMENT IS REPLACED EACH 50 HOURS OF OPERATION.
3. PROPELLER – REMOVE ONE OF THE TWO GREASE FITTINGS FOR EACH BLADE. APPLY GREASE THROUGH FITTING UNTIL FRESH GREASE APPEARS AT HOLE OF REMOVED FITTING.
4. INDUCTION FILTER – CLEAN PAPER AIR FILTER BY TAPPING THE UNIT LIGHTLY AGAINST A HARD SURFACE. DO NOT USE SOLVENT OR COMPRESSED AIR. REPLACE WHEN NECESSARY.
5. FUEL SELECTOR VALVE – LUBRICATE AREA WHERE DETENT BALL MOVES ACROSS COVER PLATE WITH DUPONT ALL PURPOSE SLIP SPRAY #6611 OR EQUIVALENT.

LEGEND

✓	MIL-L-7870 OIL - GENERAL PURPOSE LOW TEMP. LUBRICATION.
△	MIL-G-23827 GREASE - LUBRICATION GENERAL PURPOSE AIRCRAFT.
▭	MIL-L-3545 GREASE - LUBRICATION HIGH TEMP.
○	MIL-H-5606 HYDRAULIC FLUID (RED).
ENGINE	SAE 50 ABOVE 60°F AIR TEMP. *
	SAE 40 30°F TO 90°F AIR TEMP. *
	SAE 30 0°F TO 70°F AIR TEMP. *
	SAE 20 BELOW 10°F AIR TEMP. *

LUBRICATION CHART FOR PER CHEROKEE PA-28-235



LUBRICANT	HOURS	
✓	250	STABILATOR TRIM PULLEYS (SEE CAUTION 4)
✓	100	CONTROL COLUMN
○	50	BRAKE RESERVOIR MAINTAIN FLUID LEVEL INDICATED ON THE SIDE OF RESERVOIR
✓	100	RUDDER ADJUSTMENT MECHANISM AND RUDDER ASSEMBLY
△	100	PROPELLER GREASE FITTINGS (CONSTANT SPEED)
△	100	FRONT SEAT ADJUSTMENT
△	100	NOSE WHEEL STEERING
□	100	NOSE WHEEL BEARINGS
✓	50	NOSE LANDING GEAR TORQUE LINKS
ENGINE	50	ENGINE OIL DRAIN AND REFILL 12 U.S. QTS.
✓	100	FUEL SELECTOR VALVE SEE NOTE 5

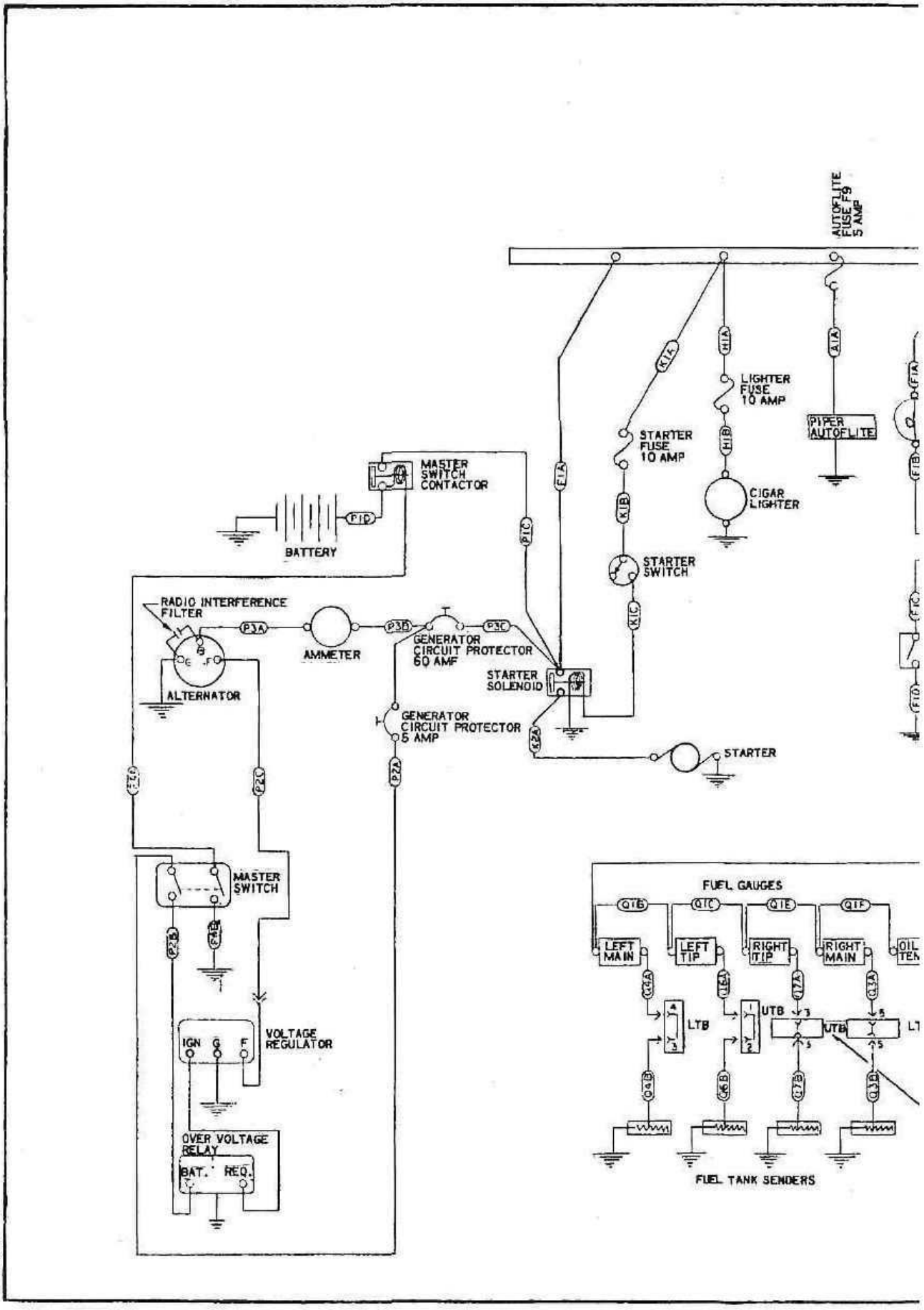
LEGEND

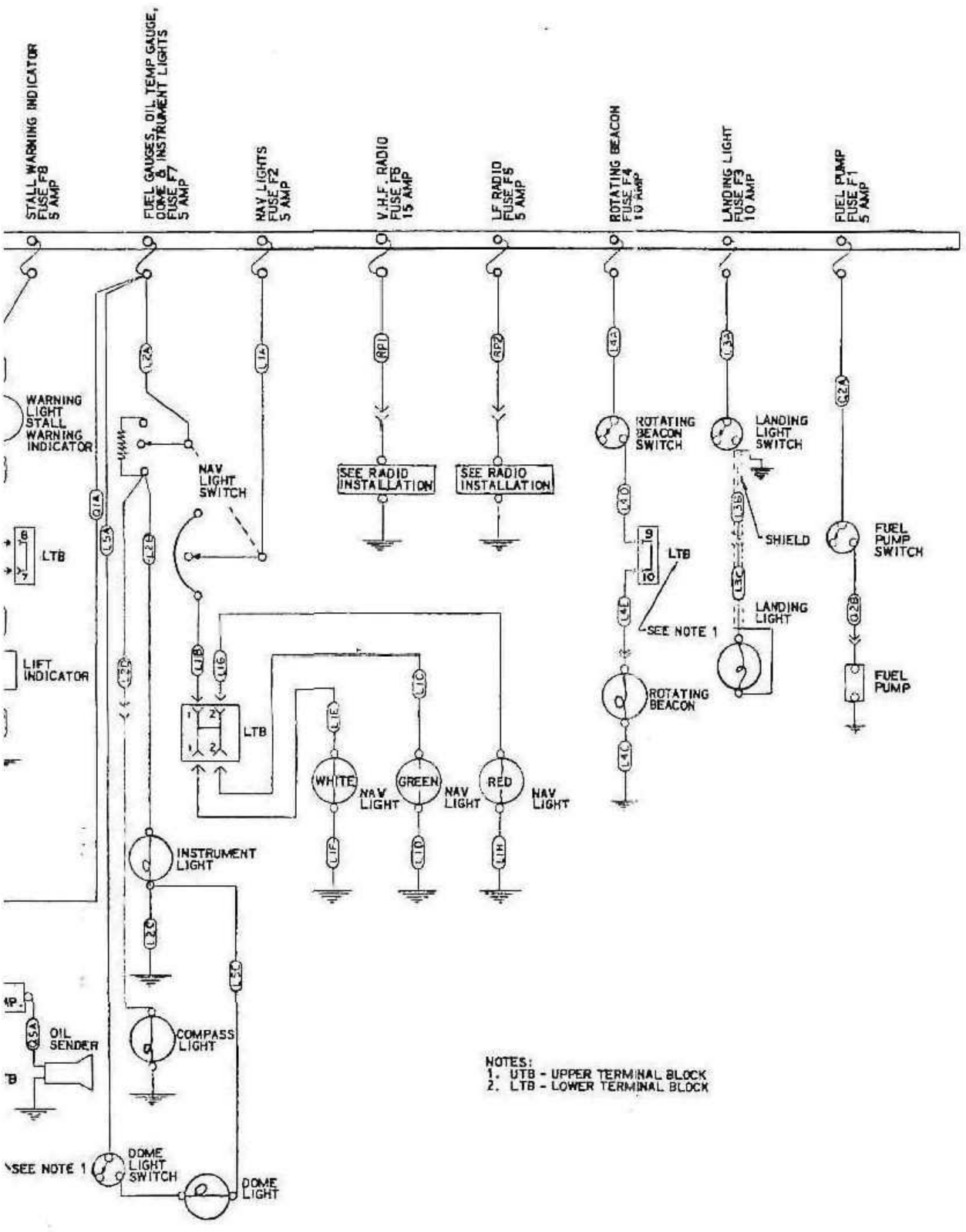
✓	MIL-L-7870 OIL - GENERAL PURPOSE LOW TEMP. LUBRICATION.
△	MIL-G-23827 GREASE - LUBRICATION *GENERAL PURPOSE AIRCRAFT.*
□	MIL-L-3545 GREASE - LUBRICATION HIGH TEMP.
○	MIL-H-5606 HYDRAULIC FLUID (RED).
ENGINE	SAE 50 ABOVE 60°F AIR TEMP. *
	SAE 40 30°F TO 90°F AIR TEMP. *
	SAE 30 0°F TO 70°F AIR TEMP. *
	SAE 20 BELOW 10°F AIR TEMP. *

CAUTIONS

1. DO NOT USE A HYDRAULIC FLUID WITH A CASTOR OIL OR ESTER BASE.
2. DO NOT OVER-LUBRICATE PEDESTAL CONTROLS.
3. *DO NOT APPLY LUBRICANT TO RUBBER PARTS.*
4. UNDER NO CIRCUMSTANCES SHOULD THE TRIM CABLES FROM THE COCKPIT TO THE REAR OF THE FUSELAGE BE LUBRICATED - AS THIS MAY CAUSE SLIPPAGE.
5. REMOVE ALL EXCESS GREASE FROM GREASE FITTINGS.
6. OIL AILERON HINGES EVERY FIFTY HOURS

* NON-DETERGENT. SEE LYCOMING SERVICE INSTRUCTIONS NO. 1014 FOR USE OF DETERGENT OIL.


AUTOFLITE FUSE F9 5 AMP
LIGHTER FUSE 10 AMP
STARTER FUSE 10 AMP
PIPER AUTOFLITE
CIGAR LIGHTER
STARTER SWITCH
MASTER SWITCH CONTACTOR
BATTERY
RADIO INTERFERENCE FILTER
AMMETER
GENERATOR CIRCUIT PROTECTOR 60 AMP
STARTER SOLENOID
ALTERNATOR
GENERATOR CIRCUIT PROTECTOR 5 AMP
STARTER
MASTER SWITCH
VOLTAGE REGULATOR
IGN G F
OVER VOLTAGE RELAY
BAT. REG.
FUEL GAUGES
LEFT MAIN
LEFT TIP
RIGHT TIP
RIGHT MAIN
LTB
UTB
FUEL TANK SENDERS
65583-A



ELECTRICAL SCHEMATIC

INDEX