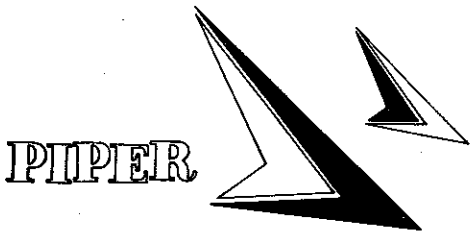
the

COMANCHE 'C'

PA-24-260

Owner's Handbook



Piper Aircraft Corporation, Lock Haven, Pa.
U. S. A.

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 TO HELP YOU OPERATE YOUR COMANCHE WITH SAFETY, CONFIDENCE, AND TO MORE FULLY ACQUAINT YOU WITH THE BASIC PERFORMANCE AND HANDLING CHARACTERISTICS OF THE AIRPLANE, AND TO MORE FULLY EXPLAIN YOUR COMANCHE'S OPERATION THAN IS DESIRABLE TO SET FORTH IN THE AIRPLANE FLIGHT MANUAL.

IF AN INCONSISTENCY OF INFORMATION EXISTS BETWEEN THIS HANDBOOK AND THE AIRPLANE FLIGHT MANUAL APPROVED BY THE F.A.A., THE FLIGHT MANUAL SHALL GOVERN.

Additional copies of this manual, Part No. 753 774, may be obtained from your Piper Dealer.

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

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SECTION I

SPECIFICATIONS

SECTION I

SPECIFICATIONS

PERFORMANCE

Performance figures are for standard PA-24-260 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.

Take-off Ground Run (ft)	1360
Take-off Ground Run (ft) (short field)	820
Take-off Run over 50 ft barrier (ft)	1800
Take-off Distance over 50 ft barrier (short field)(ft)	1400
Best Rate of Climb Speed (mph)	112
Best Rate of Climb (ft per min)	1320
Best Angle of Climb Speed (mph)	88
Service Ceiling (ft)	19,500
Absolute Ceiling (ft)	21,000
Top Speed (mph)	195
Cruising Speed (75% power at sea level) (mph)	174
Optimum Cruising Speed (75% power at 6300 ft) (mph)	185
Stalling Speed (gear and flaps down) (mph)	67
Stalling Speed (gear and flaps up) (mph)	77
Landing Ground Roll (ft)*	965
Landing Ground Roll (ft) (short field)*	690
Landing Distance over 50 ft barrier (ft)*	1540
Landing Distance over 50 ft barrier (short field)(ft)*	1200
Fuel Consumption (2400 rpm 75% power) (gph)	14.1
Fuel Consumption (2400 rpm 65% power) (gph)	12.7
Cruising Range (75% power at 6300 ft) (mi)	1130 #
Cruising Range (65% power at 10,500 ft) (mi)	1225 #
Cruising Range (55% power at 15,000 ft) (mi)	1305 #

WITH AUXILIARY FUEL

*AT MAX. LANDING WEIGHT 3040 LBS.

WEIGHTS

Maximum Take-off Weight	3200
Maximum Landing Weight	3040
Empty Weight (Standard) (lbs.)	1773
USEFUL LOAD (Standard) (lbs.)	1427

POWER PLANT

Engine (Lycoming)	IO-540-N1A5
Rated Horsepower	260
Rated Speed (rpm)	2700
Bore (inches)	5.125
Stroke (inches)	4.375
Displacement (cubic inches)	541.5
Compression Ratio	8.5:1
Dry Weight (pounds)	498

FUEL

Fuel Capacity (gal.) (Standard)	60
Fuel Capacity (gal.) (With Reserve)	90
Unuseable Fuel (Inboard tanks only) (gal.)	4
Fuel Aviation Grade (Min. Octane)	91/96
Oil Capacity (qts.)	12

BAGGAGE

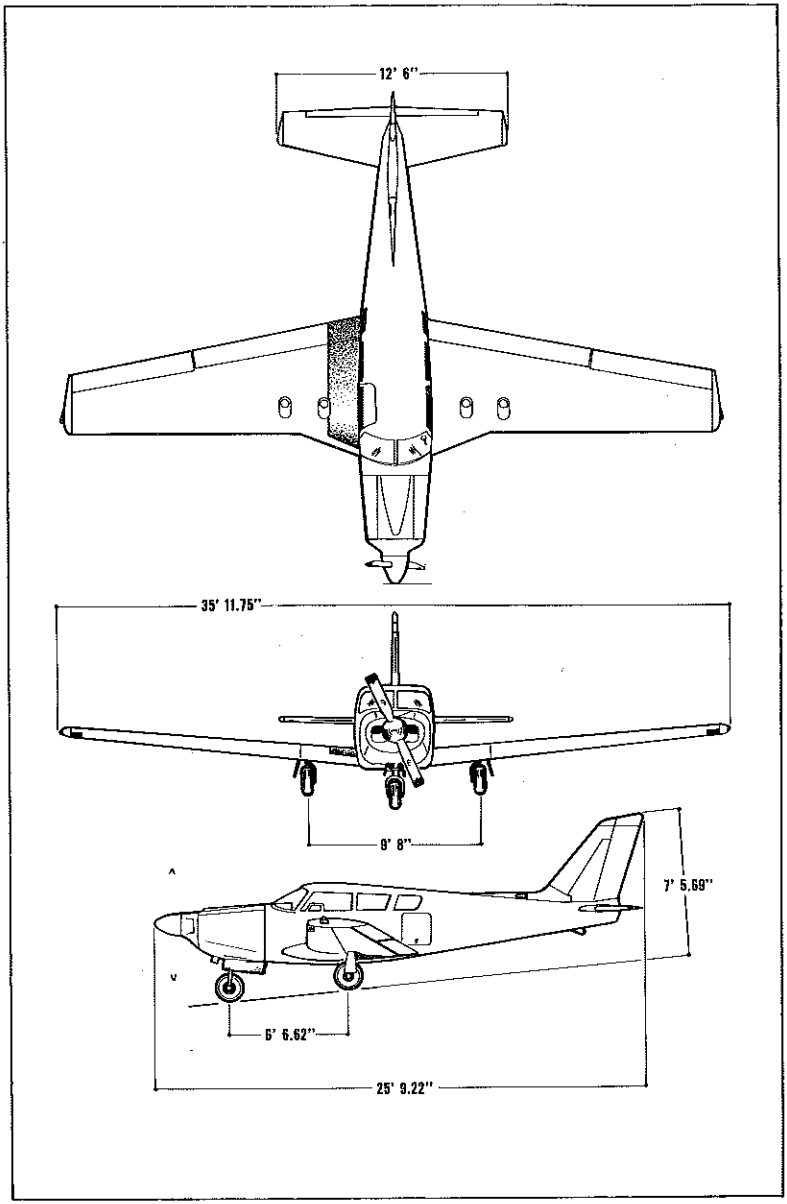
Maximum Baggage (lbs.)	250
Baggage Space (cubic ft.)	20
Baggage Door Size (in.)	19 x 21

DIMENSIONS

Wing Span (ft)	35.98
Wing Area (sq ft)	178
Length (ft)	25.8
Height (ft)	7.47
Wing Loading (lbs per sq ft)	18.0
Power Loading (lbs per HP)	12.3
Propeller Diameter (in.)	77

LANDING GEAR

Wheel Base (ft)		6.55
Wheel Tread (ft)		9.66
Tire Pressure (psi)	Nose	27
	Main	42
Tire Size	Nose (four ply rating)	600 x 6
	Main (six ply rating)	600 x 6


12' 6"
35' 11.75"
9' 8"
7' 5.69"
6' 6.62"
25' 9.22"

SECTION II

DESIGN INFORMATION

SECTION II

DESIGN INFORMATION

ENGINE AND PROPELLER

The Comanche "C" is powered by a Lycoming IO-540-N1A5, fuel injected engine. This engine is rated at 260 HP at 2700 RPM, with a compression ratio of 8.5 to 1 and requires 91/96 minimum octane aviation fuel. The six cylinder, direct drive engine is equipped with a geared starter, 12 volt, 70 ampere alternator, fuel injector, diaphragm fuel pump and dual magneto shielded ignition system.

The engine controls are mounted in a power control quadrant with a friction lock to prevent creeping of the controls. The injector heat system is operated by the control to the right of the quadrant and should be checked for operation during ground run-up. The cowl flap control is positioned to the left of the quadrant underneath the instrument sub-panel.

The engine mount is of steel tubing construction and incorporates vibration absorbing dynafocal mounts. The engine cowl is a cantilever structure, attached at the firewall. Side panels are hinged for quick access to the engine compartment.

The exhaust system consists of single muffler type with exhaust gases directed overboard through a single outlet. Heat for the cabin and defroster are taken from the muffler. A shroud produces the heat for the injector heat system.

Engine oil drainage is accomplished by a quick drain installed on the right side of the engine sump.

The Hartzell HC-E2YR-1B-8467-7R constant speed, controllable propeller is regulated by the center lever of the power controls located in the quadrant.

INDUCTION SYSTEM

The Lycoming IO-540-N induction system is equipped with a Bendix RSA-5AD-1 fuel injector.

This system is based on the principle of measuring airflow and using the airflow signals to operate a servo valve. The accurately regulated fuel pressure established by the servo valve, when applied across a fuel control (jetting system), makes fuel flow proportional to airflow.

Fuel pressure regulation, by means of the servo valve, necessitates only a minimum fuel pressure drop through the entire metering system. This makes it possible to maintain metering pressure above vapor forming conditions, and at the same time requires a fuel inlet pressure sufficiently low so that a diaphragm pump can be used. An inherent feature of the servo system is self-purging which eliminates any possibility of vapor lock and associated problems of difficult starting.

The injection system consists of a Servo Regulator, which meters fuel flow in proportion to airflow to the engine, giving proper fuel air mixture at all engine speeds, and a Flow Divider, which receives the metered fuel and accurately divides fuel flow to each cylinder fuel nozzle.

Installed in the instrument panel is a fuel flow indicator. This instrument is connected to the flow divider and monitors fuel pressure. The instrument converts fuel pressure to an accurate indication of fuel flow in gallons per hour.

NOTE

An increasing or abnormally high fuel flow indication is a possible symptom of restricted injector lines or nozzles.

Induction air for the engine enters a large air duct at the front of the top cowl. The air is directed through a filter, and on

to the injector. A heated alternate air source is incorporated to provide airflow to the engine in case the normal flow of air through the filter is restricted. The alternate air door is spring loaded, and will remain closed during normal operation. The alternate air door will operate automatically, as the normal induction airflow through the filter is restricted, or when the injector heat (INJR.) push-pull control, located on the instrument panel, is placed in the FULL ON position. The control should be placed in the FULL ON position if icing conditions are suspected.

STRUCTURES

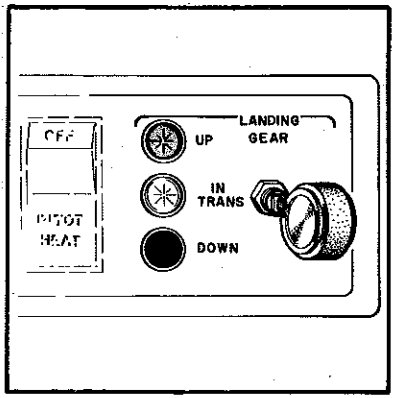
Structures are of sheet aluminum construction, and are designed to ultimate load factors well in excess of normal requirements. All components are completely zinc chromate primed, and exterior surfaces are coated with acrylic lacquer.

The main spars of the wings are joined with high strength butt fittings in the center of the fuselage, making in effect a continuous main spar. The spars are attached to the fuselage at the side of the fuselage. The wings are also attached to the fuselage at the rear spar and at an auxiliary front spar.

Wing airfoil section is a laminar flow type, NACA-64$_2$A215, modified with maximum thickness about 40% aft of the leading edge. This permits the main spar, located at the point of maximum thickness, to pass through the cabin under the center seat, providing unobstructed cabin floor space ahead of the center seat.

LANDING GEAR

The nose gear is steerable with the rudder pedals through a 40 degree arc. During retraction of the gear the steering mech-



Landing Gear Selector Switch

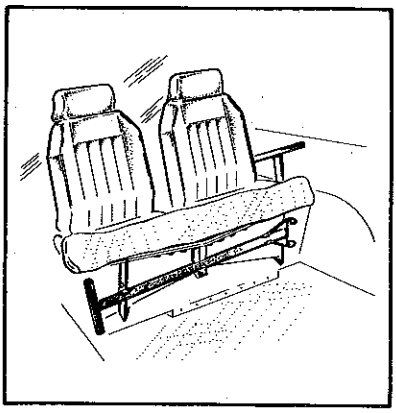
anism is disconnected automatically to reduce rudder pedal loads in flight. The nose gear is equipped with a hydraulic shimmy dampener.

Retraction of the landing gear is accomplished through the use of an electric motor and transmission located under the floorboards, actuating push-pull cables to each main gear and a push-pull tube to the nose gear. The landing gear motor is activated by a selector switch located on the instrument panel.

To guard against inadvertent movement of the landing gear selector on the ground, the handle must be pulled aft before moving it upward. The gear selector is in the shape of a wheel, to differentiate from the electric flap control knob, which has an airfoil shape. As an added safety feature, the warning horn is connected to the gear selector switch. The horn will operate if the selector is moved to the UP position with the master switch on and the weight of the airplane on the landing gear. As a final safety factor to prevent gear retraction on the ground, an anti-retraction switch is installed on the left main gear. This prevents the electric circuit to the landing gear motor from being completed until the gear strut is within three quarter inch of full extension.

The gear indicating lights are located conveniently by the gear selector switch. The green (DOWN) indicating light below the selector switch shows that all gear are down and locked. The amber (UP) light above the gear selector switch is the gear up indication. The white light indicates that the landing gear is in transit. The gear up warning horn will sound when power is reduced (below approximately 12 inches of manifold pressure) on the engine and the gear is not down and locked. GEAR INDICATION LIGHTS ARE DIMMED WHILE THE INSTRUMENT LIGHTS ARE ON.

The brakes are actuated by toe brake pedals mounted on the left set of rudder pedals. Hydraulic brake cylinders are located above the left rudder pedals and are accessible in the cockpit for servicing. Parking brake valves are incorporated in each cylinder. Two cables extending from the parking brake "T" handle are attached to the parking brake valves. To prevent inadvertent application of the parking brake in flight, a safety lock is incorporated in the valves, thus eliminating the possibility of pulling out the "T" handle until pressure is applied by use of the toe brakes.



Tow Bar Stowage

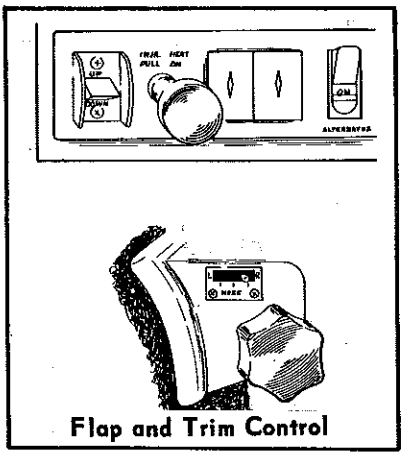
A tow bar is provided with each aircraft. When not in use it is stowed next to the main spar. It may be removed by lifting the flap covering the forward side of the spar and removing the bar from its fasteners.

When towing with power equipment, caution should be used not to turn the nose gear beyond its 20 degree radius from center as this may damage the nose gear and steering mechanism.

CONTROL SYSTEM

The flight controls are the conventional three control type operated by a control column and rudder pedals. For coordinated action of the rudder and ailerons, their control cables are interconnected by a cable-spring system.

Provision for directional and longitudinal trim is provided



Flap and Trim Control

by an adjustable trim mechanism for the rudder and stabilator.

Electrically operated Max-Lift flaps can be lowered and stopped in any desired position. The flap control switch is located on the instrument panel along with a flap position indicator which is marked to show the flap travel. The white arc is a range for take-off operation.

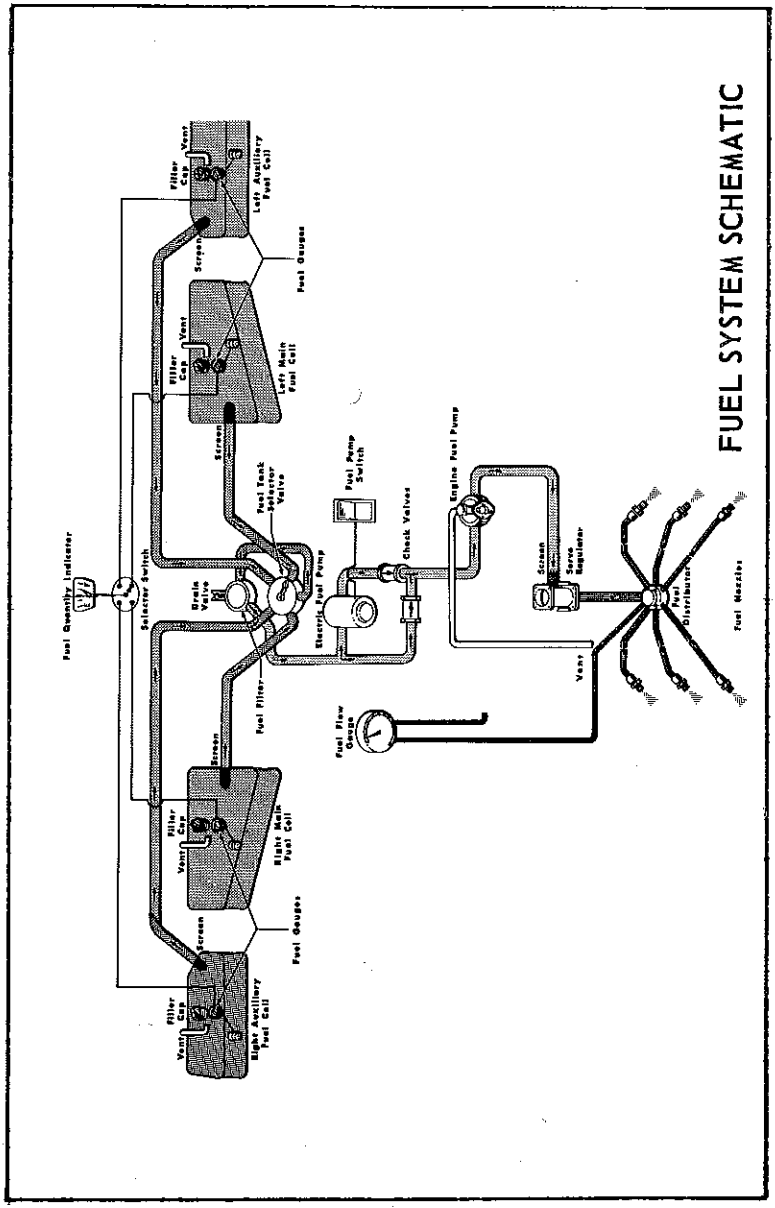
Located in the inboard end of the right flap is a lock which holds the flap in the UP position so that it can be used as a step for entry or exit. A second lock is incorporated to prevent the flap from going full down in case a step load is applied and the up lock is not fully engaged.

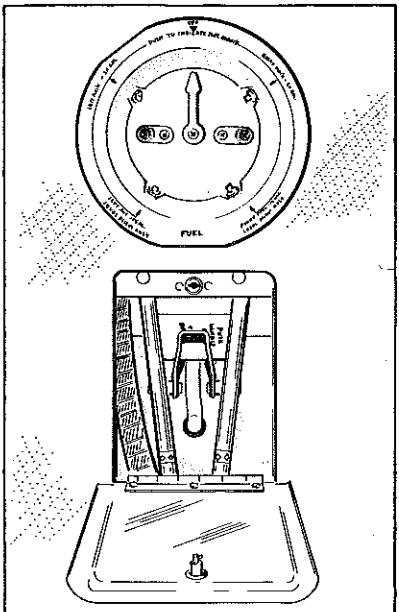
FUEL SYSTEM

The fuel is carried in two rubber-like fuel cells located in the inboard leading edge sections of the wings. Capacity of these cells, which are classified as the main fuel cells is 30 gallons each (28 gallons usable).

As optional equipment, a 30 gallon auxiliary fuel system is available. The system consists of two 15 gallon fuel cells installed in the wings just outboard of the main fuel cells. Use auxiliary fuel in level flight only.

The cells should be kept full of fuel during storage of the airplane to prevent accumulation of moisture and deterioration of the cells. For storage over ten days without fuel, the cells should be coated with light engine oil to keep the rubber from drying out.


FUEL SYSTEM SCHEMATIC
Left Auxiliary Fuel Cell
Fuel Gauges
Left Main Fuel Cell
Fuel Tank Selector Valve
Fuel Pump Switch
Check Valves
Engine Fuel Pump
Fuel Quantity Indicator
Selector Switch
Drain Valve
Electric Fuel Pump
Fuel Filter
Screen
Servo Regulator
Fuel Distributor
Fuel Nozzles
Vent
Fuel Flow Gauge Line
Right Main Fuel Cell
Right Auxiliary Fuel Cell
Filler Cap



Fuel Selector And Drain

During normal operation the fuel is drawn to the engine from the cells by a mechanically operated fuel pump located on the engine accessory section. In the event the engine driven fuel pump fails, an electric auxiliary fuel pump is provided. This pump should be operated during starting, take-offs, and landings.

The fuel selector and strainer units for the system are located between the front seats. Daily draining of the strainer is accomplished in the cockpit by opening the hinged access door located in the floor panel just aft of the fuel selector valve and moving the quick drain valve handle to full aft position. The general procedure for draining the fuel system is to open the strainer quick drain for a few seconds with the fuel cell selector on one cell, then change fuel selector to the opposite cell and repeat the process. The same process applies to the auxiliary fuel system. Allow enough fuel to flow to clear lines as well as the strainer. Positive fuel flow shut-off can be observed through the clear plastic tube which carries fuel overboard.

Fuel quantity is indicated by an electric gauge located in the instrument cluster. This gauge will indicate the amount of fuel in the cell that is selected. An override system is incorporated so that it is possible to check the amount of fuel available in the remaining cells without moving the selector handle to that cell position. This is accomplished by depressing the red button (located on the fuel selector plate) under the desired fuel cell position. The fuel gauge will indicate the amount of fuel avail-

able in that cell. When the red button is released the indicating system will return to its normal operation.

When the fuel selector handle is not in a positive selector detent position, more than one fuel port may be open at the same time. It should be determined that the fuel selector is positioned in a detent, which can be easily felt when moving the handle through its various positions.

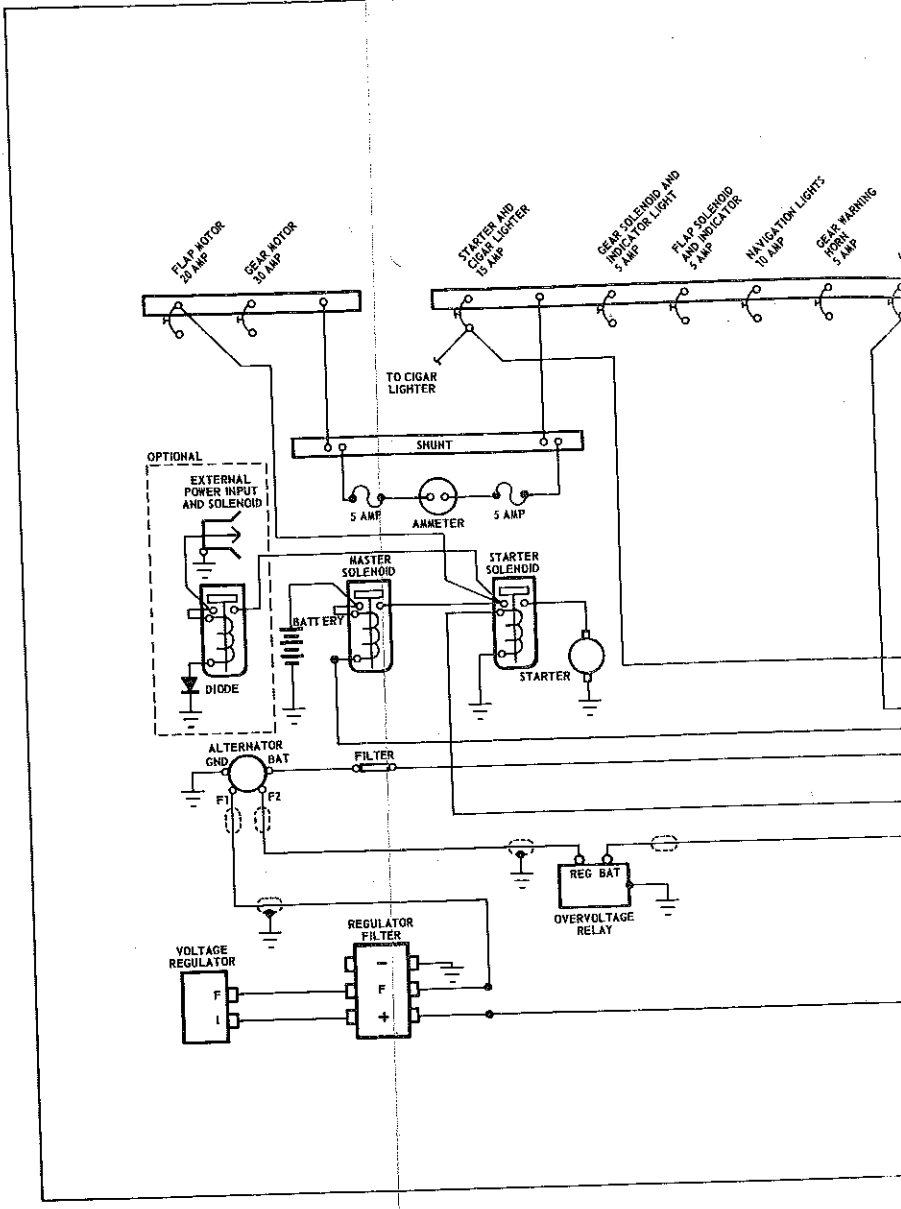
ELECTRICAL SYSTEM

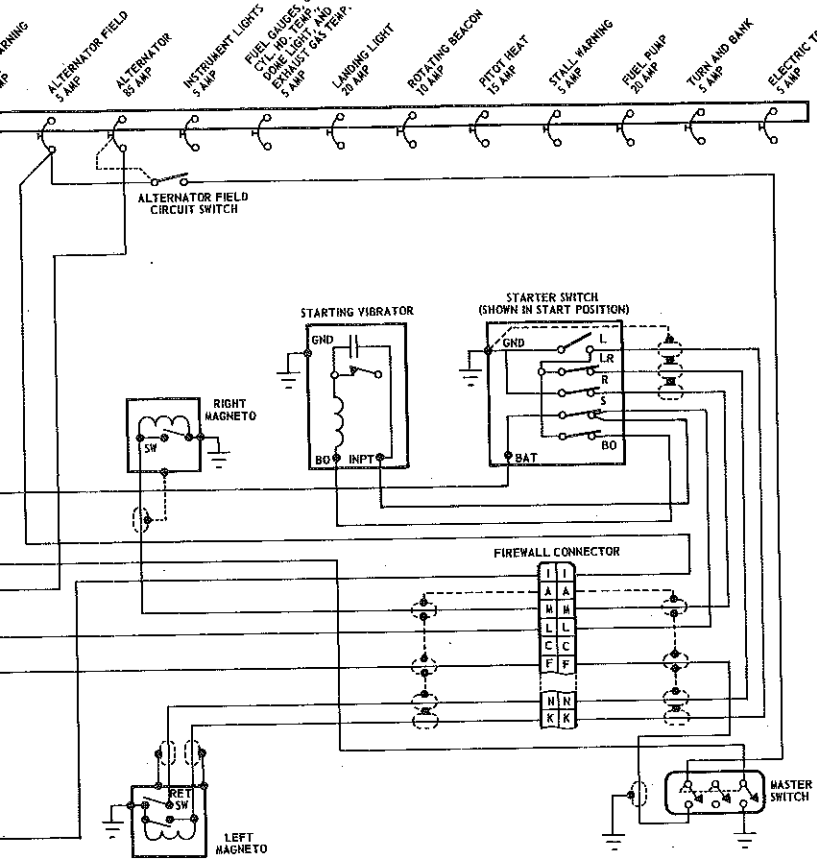
The electrical system includes a 12 volt 70 ampere alternator, providing power at all engine speeds, a transistorized voltage regulator, an overvoltage relay and a 35 ampere hour battery. This results in improved performance for radio and electrical equipment and long battery life.

The voltage regulator is mounted on the top right of the firewall. The battery mounted aft of the baggage compartment is easily accessible for service or inspection through a panel in the rear of the cockpit.

Electrical switches are located in the lower left sub-panel, while the circuit breakers are in the lower right sub-panel. The circuit breakers automatically break the circuit if an overload occurs. To reset circuit breakers, push in the reset button. It may be necessary to allow approximately two minutes for the breakers to cool before resetting them. Corrective action should be taken in event of continual circuit breaker popping. It is possible to manually trip the breakers by pulling out on the reset button. The alternator circuit breaker, mounted on the same panel, is of the switch type and should not be opened without consulting the Service Manual for detailed procedure.

Standard electrical accessories, in addition to those already listed, include a geared starter, stall warning indicator, cigar lighter, ammeter and position lights. Glare ban instrument lighting, pitot heat, auxiliary power unit, and anti-collision light are


FLAP MOTOR 20 AMP
GEAR MOTOR 30 AMP
STARTER AND CIGAR LIGHTER 15 AMP
GEAR SOLENOID AND INDICATOR LIGHT 5 AMP
FLAP SOLENOID AND INDICATOR 5 AMP
NAVIGATION LIGHTS 10 AMP
GEAR WARNING HORN 5 AMP
TO CIGAR LIGHTER
SHUNT
5 AMP
AMMETER
5 AMP
OPTIONAL
EXTERNAL POWER INPUT AND SOLENOID
DIODE
MASTER SOLENOID
BATTERY
STARTER SOLENOID
STARTER
ALTERNATOR
GND
BAT
F1
F2
FILTER
REG BAT
OVERVOLTAGE RELAY
REGULATOR FILTER
VOLTAGE REGULATOR
F
L
-
F
+



ELECTRICAL SYSTEM SCHEMATIC

offered as optional accessories. Circuit provisions are made to handle optional communications and navigational equipment.

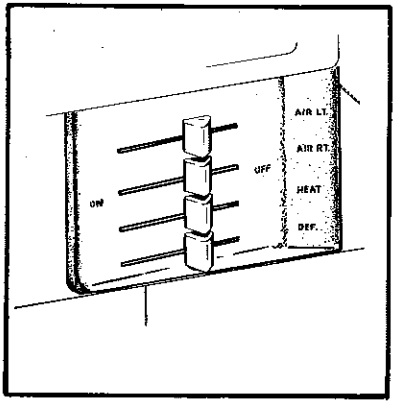
Operation of the alternator system, as far as visual indication to the pilot, is the same as a standard generator system. The ammeter, located in the lower right corner of the instrument panel, will give a constant indication of battery charge, or discharge in case of a malfunction of the system. Should a malfunction of the voltage regulator occur that would cause a high voltage condition, the overvoltage relay will cut the alternator out of the system. Battery power will still be available to the bus bar.

HEATING AND VENTILATING SYSTEM

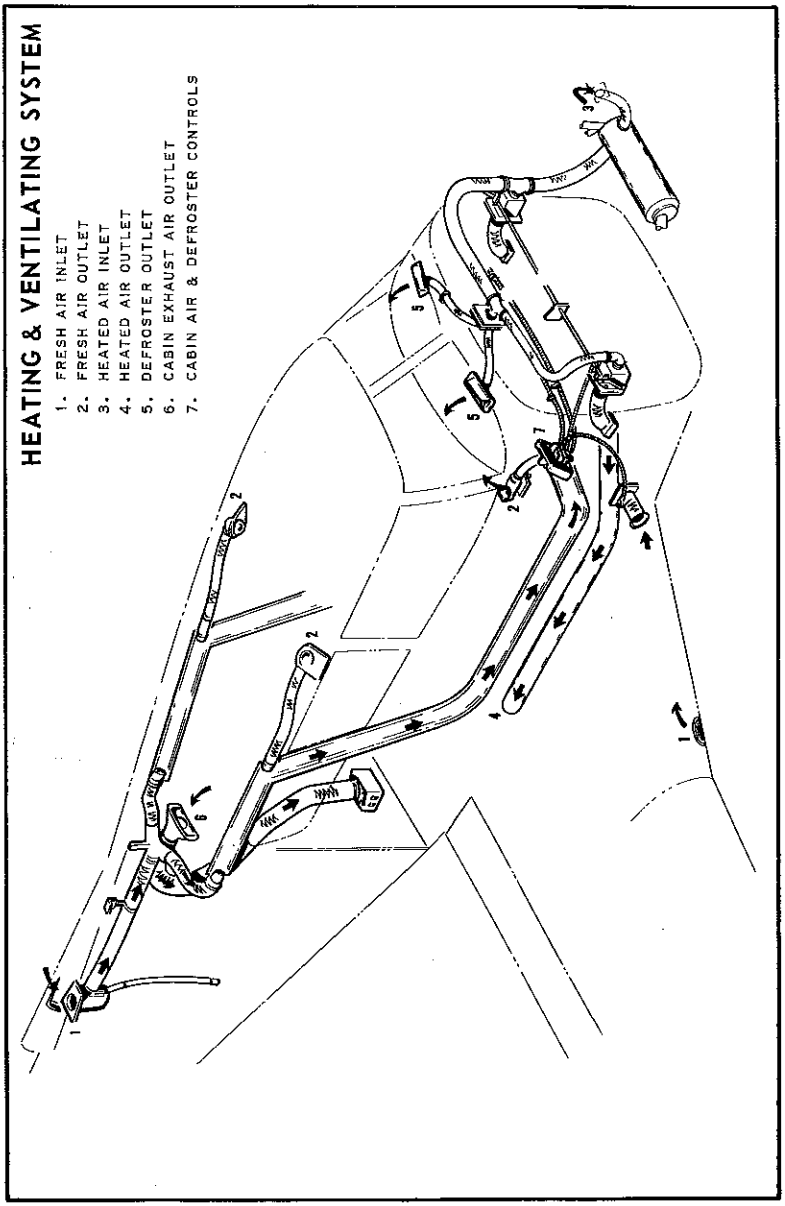
There are four individual controls provided for regulating the heating, defrosting and ventilating air. The controls are located on the lower right side of the instrument panel in a console panel.

Heated air for the cabin interior is provided by a heater shroud attached to the exhaust muffler. Fresh air is picked up at the front of the engine and passes through the heater shroud to control valves for distribution to the cabin.

Warm air for the defroster system is also obtained from the heater shroud. The amount of air applied to the windshield is regulated with the defroster (DEF.) control in the console. Caution should be used if it is necessary to operate the defroster on the ground as prolonged appli-



Heat and Ventilation Controls


HEATING & VENTILATING SYSTEM
1. FRESH AIR INLET
2. FRESH AIR OUTLET
3. HEATED AIR INLET
4. HEATED AIR OUTLET
5. DEFROSTER OUTLET
6. CABIN EXHAUST AIR OUTLET
7. CABIN AIR & DEFROSTER CONTROLS

cation of heat to the windshield may cause distortion.

Fresh air for the cabin interior is picked up from air inlets in the leading edge of each wing. The air passes through the wings to the wing root area and is discharged into the cabin near the floor just forward of the front seats. In addition, two fresh air scoops are located on the dorsal fin. These provide air for two overhead ventilators in the rear seat area and two front seat ventilators located adjacent to the windshield posts. Cabin air is exhausted through an outlet located above the hat shelf.

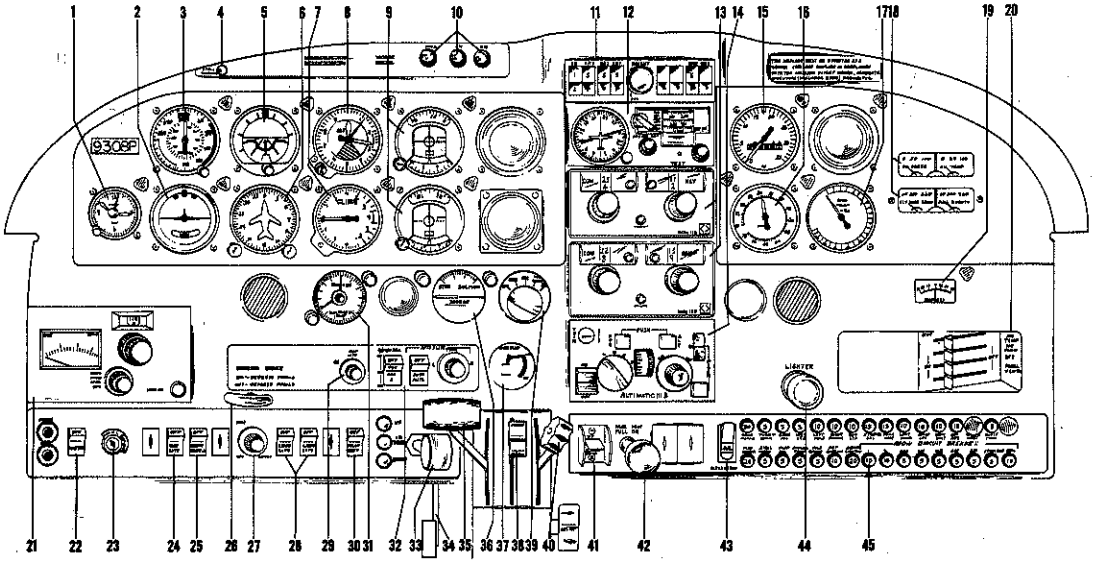
VACUUM SYSTEM

Suction for the vacuum operated Gyro instruments with central air filter system is supplied by an engine driven (dry type) vacuum pump.

A vacuum gauge is installed in the instrument panel to provide a constant indication of vacuum source. Suction is indicated on the gauge in inches of mercury; normal operating range is 4.8 to 5.1 inches. The system is controlled by one adjustable regulator, located under the instrument panel. After initial adjustment the regulator will require very little attention.

INSTRUMENT PANEL

The instrument panel is designed to accommodate the customary advanced flight instruments on the left side in front of the pilot and the engine instruments on the right side. Provision for extra instruments is made in both sections. All instruments in the left side are shock mounted and all are accessible for maintenance by removing the access panel over the instruments.



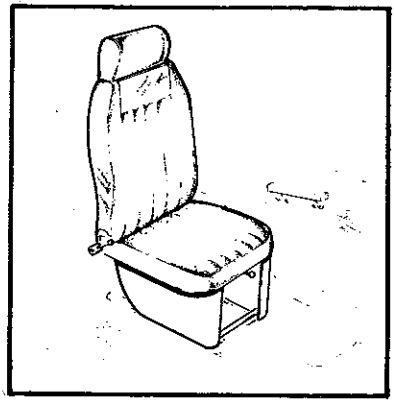
1. CLOCK
2. TURN COORDINATOR
3. AIRSPEED
4. STALL WARNING
5. GYRO HORIZON
6. DIRECTIONAL GYRO
7. RATE OF CLIMB
8. ALTIMETER
9. OMNI INDICATORS
10. MARKER BEACON LIGHTS
11. RADIO SELECTOR PANEL
12. ADF RADIO
13. COMM/NAV. TRANSCEIVERS
14. ALTIMATIC III B
15. TACHOMETER
16. MANIFOLD PRESSURE
17. FUEL FLOW GAUGE
18. ENGINE GAUGES
19. AMMETER
20. HEATER CONTROLS
21. DME
22. MASTER SWITCH
23. MAGNETO & STARTER
24. NAVIGATION LIGHTS
25. ROTATING BEACON
26. PARKING BRAKE
27. POST LIGHT SWITCH
28. LANDING LIGHTS
29. MAP LIGHT SWITCH
30. PITOT HEAT
31. EGT. GAUGE
32. AUTOFLITE
33. GEAR SELECTOR
34. COWL FLAP CONTROLS
35. THROTTLE
36. SUCTION GAUGE
37. FLAP POSITION INDICATOR
38. PROPELLER CONTROL
39. NAV/APPROACH COUPLER
40. MIXTURE CONTROL
41. FLAP ACTUATOR
42. INJECTOR (INJR) HEAT
43. ALT. CIRCUIT BREAKER
44. LIGHTER
45. CIRCUIT BREAKER PANEL

The flight instruments are arranged in the preferred basic T configuration. Gyro Horizon and Directional Gyro are vacuum operated through the use of an engine driven vacuum pump. The Turn Coordinator is an electrically operated instrument, controlled by the master switch, and serves as a standby for the Gyros in case of vacuum system failure. Instrument illumination is produced by an overhead white light controlled by an intensity adjustable switch in the stabilator trim panel. Optional equipment glare ban white lighting is controlled by an intensity adjustable switch in the lower left sub-panel. The power controls are grouped in the centrally located power control quadrant. A separation of the flight and engine instruments is provided by the radio stack.

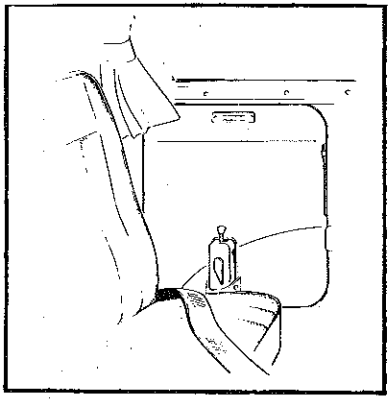
SEATS

The front and center reclining seats are adjustable fore and aft to provide comfort for pilot and passengers. Seat backs may be tipped forward to facilitate ease of entry and exit from the aircraft. They are easily removed by taking out the stops at the end of the mounting tracks and sliding the seats off their tracks.

The optional family seat(s) may be removed, allowing for more baggage area and access to the rear fuselage panel by releasing the snap fasteners that attach the seat backs to the hat shelf and turning the wing fasteners at the back of the seat cushions.



Seat Adjustment Handles



Baggage - Emergency Door

BAGGAGE AREA

Maximum weight in the baggage area, including baggage and/or passenger(s) and family seat(s) is 250 pounds, with up to 20 cubic feet of available space. Baggage may be placed in the aircraft through a 19 x 21 inch door or the passenger entrance. Tie-down straps are available for securing baggage when the family seat(s) are not installed.

The baggage door may also be used as an emergency exit and is opened by holding the inside door knob up and, at the same time, turning the latch clockwise. The baggage door should not be opened in flight as it is difficult to close.

FINISH

All aluminum sheet components are carefully finished inside and outside to assure maximum service life. Both sides of all pieces are alodine treated, and are sprayed with zinc chromate primer. External surfaces are coated with durable acrylic lacquer in attractive high gloss colors. The application of primer to interior surfaces will prevent corrosion of structural and non-structural parts on the inside where there is no access for normal maintenance.

NOTES

SECTION III

OPERATING INSTRUCTIONS

SECTION III

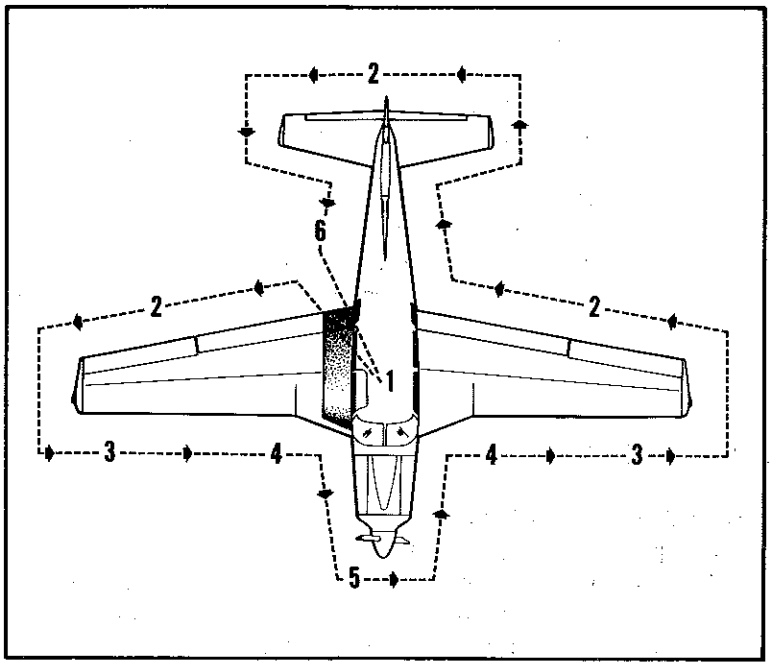
OPERATING INSTRUCTIONS

PREFLIGHT

The following safety procedure instructions must become an integral part of the pilot's operational routine and preflight inspection.

Below is an outline for preflighting the Comanche:

1. a. Ignition and master switches are OFF.
   b. Drain fuel strainer.



2. a. Check for external damage or operational interference to the control surfaces, wings or fuselage.

b. Check for snow, ice, or frost on the wings or control surfaces.

3. a. Check fuel supply.

b. Check fuel cell caps and covers for security (adjust caps to maintain a tight seal).

c. Fuel system vents open.

4. a. Landing gear shock struts properly inflated (approximately 2-3/4" extension).

b. Tires satisfactorily inflated and not excessively worn.

c. Cowling, landing gear doors and inspection covers properly attached and secured.

d. Propeller free of detrimental nicks.

e. No obvious fuel or oil leaks.

f. Engine oil at the proper level. (Insure dipstick is properly seated.)

5. a. Windshield clean and free of defects.

6. a. Tow-bar and control locks detached and properly stowed. Check that baggage-emergency door is secured.

7. a. Upon entering the airplane check that all controls operate normally.

b. Check that the landing gear selector and the other controls are in their proper position.

c. Close and secure the cabin door.

d. Check that required papers are in order and in the airplane.

STARTING ENGINE

Starting Engine When Cold:

1. Open throttle approximately 1/2 inch.

2. Turn on master switch and electric auxiliary fuel pump.

3. Move mixture control to full rich until an indication on the fuel flow meter is noted. (Engine is primed.)

4. Move mixture control to idle cut-off.
5. Engage starter.
6. When engine fires, advance mixture control to full rich. If engine does not fire within 5-10 seconds, disengage starter and reprime.

Starting Engine When Hot:

1. Throttle open approximately 1/2 inch.
2. Mixture in idle cut-off.
3. Electric auxiliary fuel pump off.
4. Engage starter. When engine fires, advance mixture.

Starting Engine When Flooded:

1. Throttle full open.
2. Mixture in idle cut-off.
3. Electric auxiliary fuel pump off.
4. Engage starter. When engine begins to fire, advance mixture and retard throttle.

Turn electric fuel pump on for take-off. Do not take off with a dead battery as some voltage is needed to excite the alternator.

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

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 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. The magnetos should be checked at 2000

RPM with the propeller in high RPM, the drop should not exceed 175 RPM with a differential of not more than 50 RPM. The engine is warm enough for take-off when the throttle can be opened without the engine faltering.

The electric fuel pump should be turned off after starting or during warm-up to make sure that the engine driven pump is operating by noting if fuel flow is maintained. Prior to take-off the electric pump should be turned on again to prevent loss of power during take-off should the engine driven pump fail.

The propeller control should be moved through its complete range during the warm-up to check for proper operation, then left in the full high RPM position. During cold weather operation the propeller should be cycled a minimum of three times to insure that warm engine oil has circulated throughout the entire system.

During the propeller check, as during other ground operations, care must be taken not to run-up the engine with the propeller over loose stones, cinders or other objects which can be picked up by the propeller, and which frequently cause extensive damage to the propeller blades.

TAKE-OFF

Just before take-off the following should be checked:

1. Controls free
2. Flaps set
3. Tabs set
4. Propeller set
5. Mixture set (rich)
6. Cowl flaps set
7. Injector (INJR.) heat OFF
8. Fuel on proper tank
9. Electric fuel pump ON
10. Engine gauges normal
11. Doors locked

In a smooth, steady motion of the throttle apply full power allowing the aircraft to accelerate in the three point attitude until the control surfaces become effective. Then apply slight back pressure on the control column to lift the nose wheel. Under

normal take-off conditions the aircraft will rotate at about 65 MPH. Trying to pull the aircraft off before the proper speed is obtained will only prolong the take-off run. After the take-off has proceeded to the point at which a landing could no longer be made with the wheels down in the event of power failure, the gear should be retracted. As soon as the gear is up and sufficient altitude has been gained, reduce power to climb setting of 25 inches of manifold pressure and 2500 RPM.

For a minimum take-off run the flaps should be lowered to the recommended 15 degrees. With the flaps in this position, the take-off run will be reduced approximately 20 percent.

Normally flaps are not used during crosswind take-offs. It is desirable to hold the nose wheel on the runway until a higher than normal take-off speed is obtained, then apply a definite but not abrupt back pressure to the control column to lift the aircraft from the runway. Once airborne, set up the required crab angle, retract the gear at a safe altitude, and continue the climb-out.

During cold weather operation, when taking off from slush or water covered runways, allow the gear to remain down longer than usual so that any slush remaining on the gears will freeze and be broken away when the gear is retracted.

When taking off from a high altitude field the mixture should be leaned to obtain maximum power. This is done during the pre-take-off check.

CLIMB

The best rate of climb speed at gross weight will be obtained at 112 MPH. The best angle of climb may be obtained at 88 MPH. At lighter than gross weight these speeds are reduced somewhat. For climbing en route a speed of approximately 130 MPH is recommended. This will produce better forward speed and increase visibility over the nose during the climb.

CRUISING

The cruising speed is determined by many factors including power setting, altitude, temperature, weight, and equipment installed.

The normal recommended economy cruising power setting is 65% power. At 10,500 feet this gives a true airspeed of 181 MPH. This power setting is obtained under standard conditions at 2400 RPM and full throttle. Fuel consumption is approximately 12.7 gallons per hour.

The optimum cruising speed at 6300 feet is 185 MPH. (See Power and Performance charts for power settings and performance under various conditions.)

Manual leaning can be accomplished at cruise power settings below 75% of power. Recommended cruise of 2400 RPM gives maximum performance with lower RPM's through 1800 RPM for an economical cruise. Ordinarily an RPM setting should be selected which will give maximum smoothness.

To obtain the desired power, set the manifold pressure and RPM according to the power setting table in this manual. After the desired power settings have been set up, adjust the mixture control according to Avco Lycoming Operator's Manual and current service instructions.

During climbing operation the servo regulator will sense the change in altitude and will automatically lean the mixture.

The continuous use of injector (INJR.) heat during cruising flight reduces power and performance. Unless icing conditions are severe, do not cruise with the heat on. Apply 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, the fuel should be used alternately from each tank. If auxiliary tanks are installed, it is suggested that the fuel in the two auxiliary tanks be used first.

STALLS

STALL SPEED TABLE	
Configuration	(Power Off)
Gear and Flaps Up	77 MPH Calibrated Airspeed
Gear and Flaps Down (Full)	67 MPH Calibrated Airspeed
These figures are at gross weight of 3200 lbs.	

SPINS

Intentional spins are not permitted in this aircraft. However, should one occur, the following recovery technique is recommended.

1. Reduce engine power to idle.
2. Apply full rudder opposite to the direction of rotation.
3. Apply full nose down elevator until the spin stops. (When nose bobs down rapidly, the stall is broken.)
4. During the recovery from the dive that results, use steady back pressure until the aircraft is flying level. (Do not use abrupt elevator movements during this phase and if a buffet is felt during the recovery, release the back pressure slightly.)

The spin recovery may be expedited by using aileron opposite to the direction of rotation.

APPROACH AND LANDING

Before landing check list:

1. Fuel selector on proper tank.
2. Mixture RICH.
3. Propeller set.
4. Cowl flaps SET.
5. Electric fuel pump ON.
6. Landing gear DOWN. (Under 150 MPH check green light ON, warning horn OFF.)
7. Flaps as desired (under 125 MPH).

During the approach, the landing gear can be lowered at speeds under 150 MPH, preferably on the downwind leg. The airplane should be trimmed to approach speed of about 90 MPH and flaps extended. The flaps can be lowered at speeds up to 125 MPH, if desired. The propeller should be set at full RPM or at a high cruising RPM to facilitate an emergency go-around if needed.

The amount of flap used during landings and the speed of the aircraft at contact should be varied according to the wind, the landing surface, and other factors. It is always best to contact ground at the minimum practicable speed consistent with landing conditions.

Normally, the best technique for short and slow landings is to use full flap and a small amount of power, holding the nose up as long as possible before and after ground contact. 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 flap.

Maximum braking effect during short field landings can be obtained by holding full back on the control wheel with flaps up while applying brakes. This forces the tail down and puts more load on the main wheels, resulting in better traction.

Injector heat should not be applied unless there is indication of icing, since the use of injector heat causes a loss in engine power which may be crucial in the event of a go-around, and can induce detonation in this situation.

STOPPING ENGINE

The flaps should be raised and the electric fuel pump turned off at the pilot's discretion. After parking, the radios should be turned off, the propeller set at minimum blade angle, and the engine stopped by placing the mixture control in idle cut-off. The throttle should be left full aft to avoid engine vibration while stopping. Then the ignition and master switches must be turned off and the parking brake set.

EMERGENCY PROCEDURES

Manual Gear Extension:

Manual extension of the landing gear is accomplished with the emergency disengage control located under the floor panel cover between the pilots' seats. The gear cannot be retracted manually once it is in the down and locked position. Check the following before extending the gear manually.

a. Master and gear circuit breakers - IN.

b. Master switch - ON.

c. Instrument lights - OFF (daytime).

To extend the gear, remove the plate covering the emergency disengage control and proceed in these steps as listed on the underside of the cover plate:

a. Reduce power - airspeed not to exceed 100 MPH.

b. Place landing gear selector switch in "gear down locked" position.

c. Disengage motor - raise motor release arm and push forward through full travel.

d. Remove gear extension handle from stowage. If left socket is not in clear position, place handle in right socket. Engage slot and twist clockwise to secure handle. Extend handle and rotate forward until left socket is in clear position. Remove handle and place in left socket and secure. Extend handle. Rotate handle FULL FORWARD to extend landing gear and to engage emergency safety lock. Pull aft on the handle to check that the safety lock has engaged.

e. HANDLE LOCKED in full forward position indicates landing gear is down and emergency safety lock engaged. Gear "down locked" indicator light should be ON. If the gear selector switch is moved to the up position with the emergency safety lock engaged, the white light will indicate that the gear is in transit although the gear will remain down and locked as indicated by the green light.

NOTE

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

Procedure for returning the gear to electric operation:

a. Place the aircraft on jacks.

b. Be sure the landing gear circuit breaker is disengaged and release the landing gear safety lock assembly.

c. Partially retract the gear by pulling the extension handle halfway back.

d. Re-engage the circuit breaker and align the slot in the electric motor drive shaft with the mating pin on the torque tube by using the landing gear control lever.

e. Engage the torque tube pin with the slot in the drive shaft by moving the extension handle.

f. Push torque tube and drive shaft together, then lock by pulling the motor release arm back to normally locked position.

g. Disengage the extension handle and return it to stowage. Check the landing gear operation.

Gear-Up Landing:

A gear-up landing should only be made during an emergency (1) when the surface is too soft or rough to permit a gear-down landing, (2) when a field is too short for a gear-down landing, which might cause more damage through hitting obstructions than the gear-up landing would cause, (3) when a water landing is necessary.

In the event of a gear-up landing, make a normal approach as with gear-down, leave flaps up (to reduce flap and wing damage); close the throttle and cut the master and ignition switches during the flare out, turn the fuel selector off, and contact the ground at minimum speed.

Engine Failure:

The most common cause of engine failure is mismanagement or malfunction of the fuel system. Therefore, the first step to take after engine failure 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 flow and turn on electric fuel pump, if off.
2. Push mixture control to full RICH.
3. Apply injector (INJR.) heat.
4. Check ignition switch.

MOORING

The aircraft should be moved on the ground with the aid of the nose wheel tow-bar provided with each plane and stowed on the front spar.

Tie-down ropes for mooring the airplane can be fastened to the wing tie-down rings and the tail skid.

The aileron and elevator controls should be secured by means of the safety belt to prevent control surface damage. The rudder is held in position by its connections with the steerable nose wheel and does not need to be secured except under unusually high wind conditions.

OPERATING TIPS

In the operation of the Comanche "C", as in that of any other type of aircraft, there are a few points of technique and information that apply particularly to this model. The following

Operating Tips may be helpful:

1. Remember that when the instrument lights are on, the gear position lights are dim.

2. Learn to trim the airplane for take-off so that only a very light back pressure on the wheel is required to rotate the ship from the ground.

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

4. The best speed for take-off is at about 65 MPH under normal conditions. Trying to pull the airplane off the ground at too low an airspeed will increase the take-off roll rather than decrease it.

5. Although it is permissible to extend the landing gear at speeds up to 150 MPH, the loads on the landing gear extension motor and on the gear doors are much lower if slower speeds are used. For this reason, it is recommended that unless there is a good reason to lower the gear at a higher speed, it should normally be extended at speeds below 125 MPH.

6. The flaps can be lowered at airspeeds up to 125 MPH. To reduce flap operating loads, however, it is desirable to slow the airplane to 100 MPH or less before extending the flaps. At these reduced speeds, the load applied to the flaps is greatly reduced.

7. If, under unusual circumstances, the landing gear motor is apparently overloaded and the circuit breaker opens repeatedly, the electric motor can be assisted by applying light hand pressure to the emergency gear lever.

8. Before attempting to reset any circuit breaker, allow a two to five minute cooling off period.

9. When landing and upon making contact with the ground on the main wheels, neutralize the rudder pedals, apply additional back pressure to the control wheel and retract the flaps. This gives best directional control on the ground and provides for full effectiveness of the brakes during the landing roll.

10. In some instances when operating with fuel injection at altitudes over 10,000 feet, surging of the engine may be expe-

rienced. This condition may be eliminated by proper leaning of the mixture or by use of the electric fuel pump.

11. An increasing or abnormally high fuel flow indication is a possible symptom of restricted injector lines or nozzles.

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

Running turning takeoffs should be avoided as fuel flow interruption may occur.

Prolonged slips or skids in any pitch attitude or other unusual or abrupt maneuvers which could cause uncovering of the fuel outlet must be avoided.

RADIO OPERATION

Communications and navigation equipment controls are located in the center of the instrument panel with associated radio selector panel above the radios. Circuit breakers for the equipment are located in the lower right sub-panel.

All sets are turned ON by the switch on the control head of each unit, with the exception of the marker beacon which is energized by the rocker switch in the radio selector panel.

Transmitter selection is made available with rocker type switches also in the radio selector panel.

Each receiver is connected to a three position audio switch in the selector panel allowing connection of the audio output to the speaker, headset, or an OFF, stand-by position.

Two or more sets may be simultaneously connected to either the headset or speaker by placing the selector switches in the desired combination. For example, the ADF and top transceiver may be selected to operate on the speaker, while the lower transceiver is selected for headset operation. Thus, the pilot may listen to the speaker while the copilot monitors the headset.

SECTION IV

PERFORMANCE CHARTS

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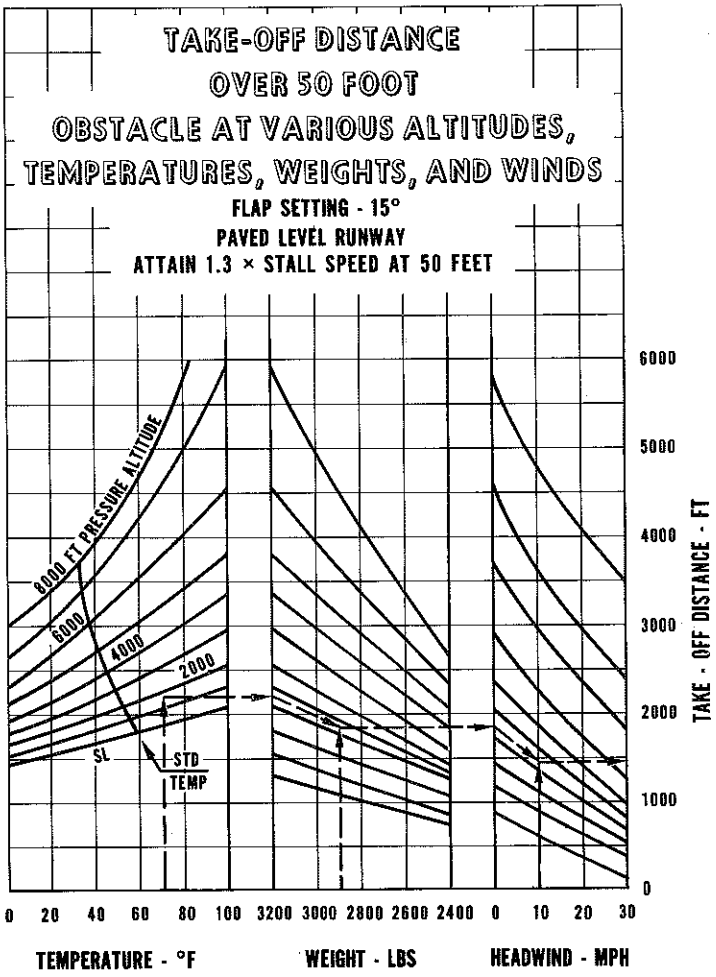
COMANCHE C



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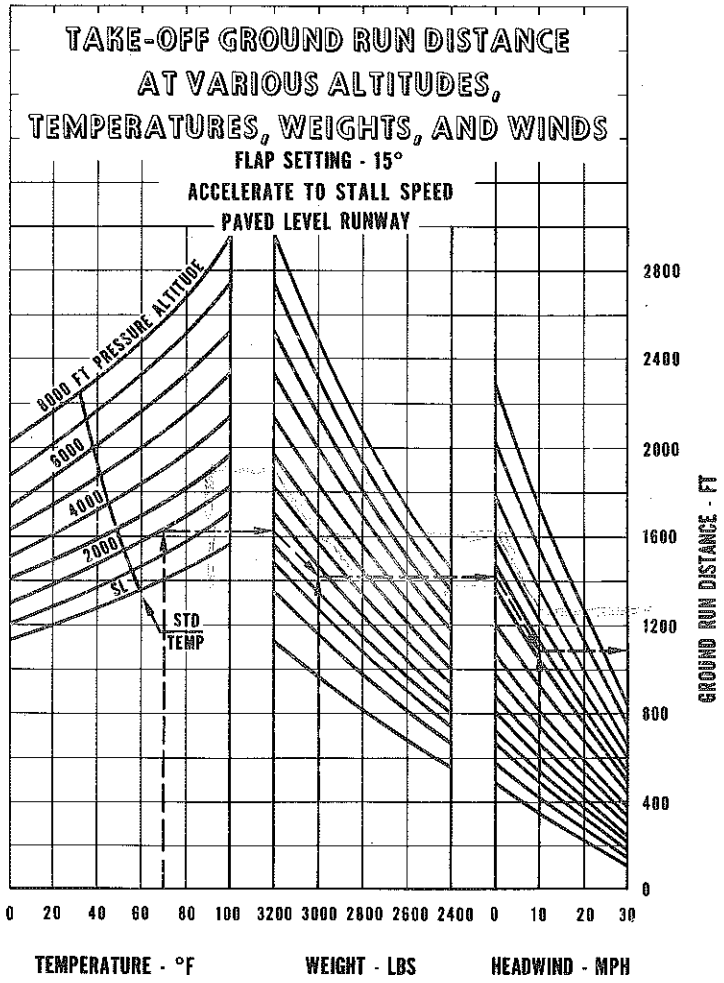

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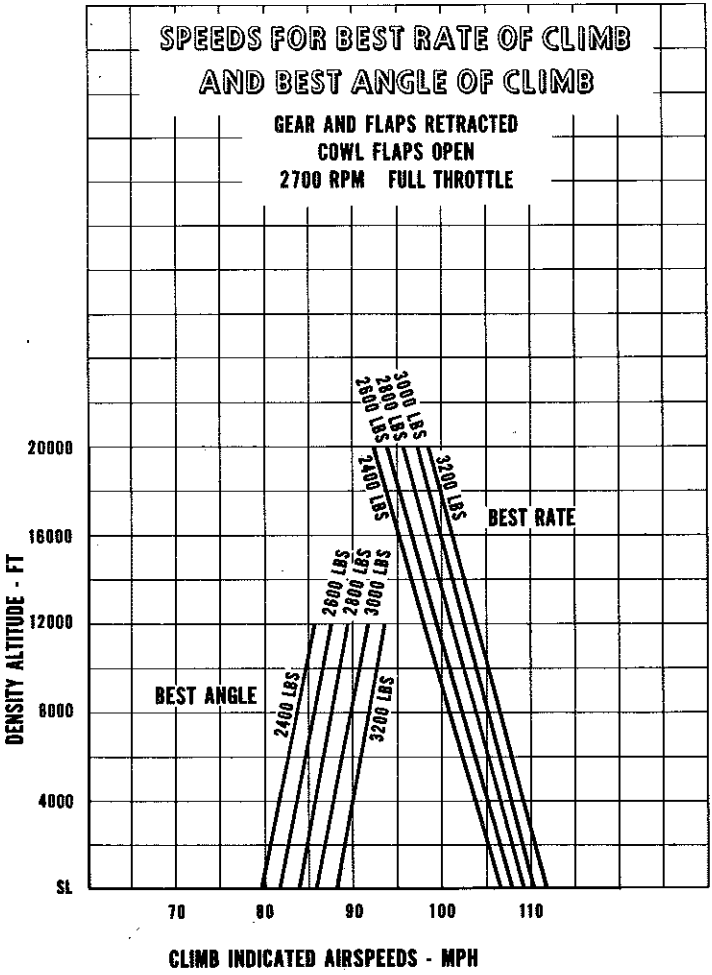

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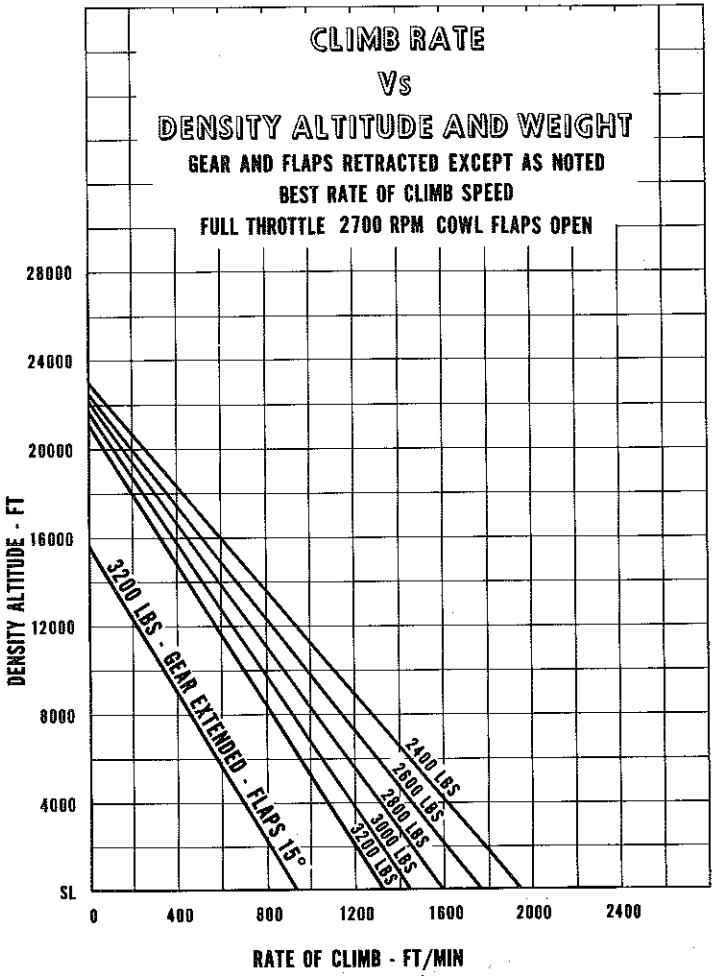

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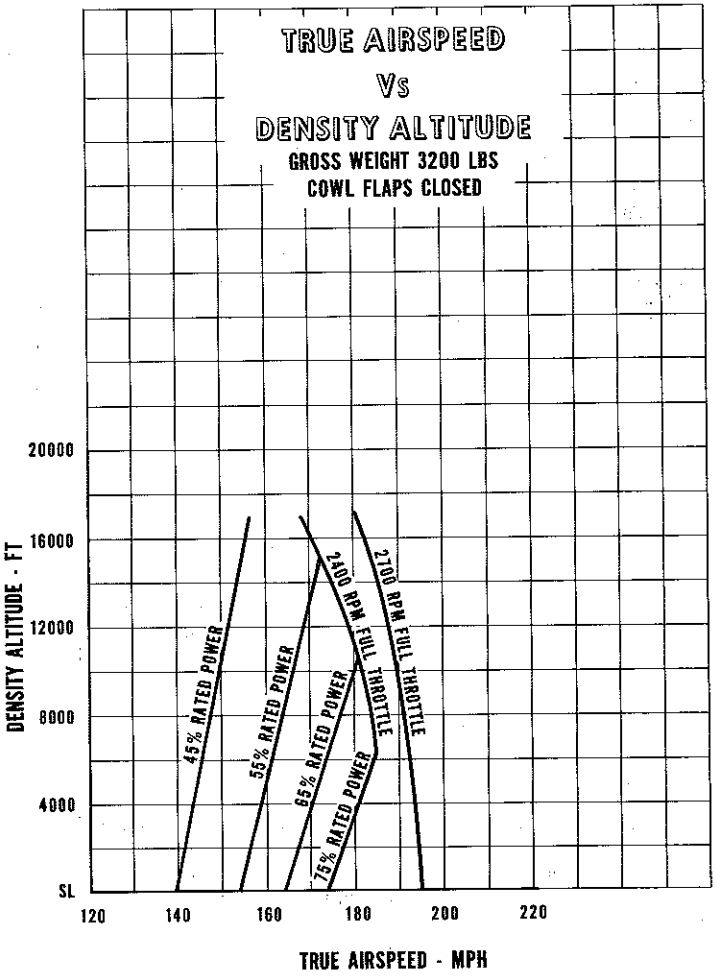

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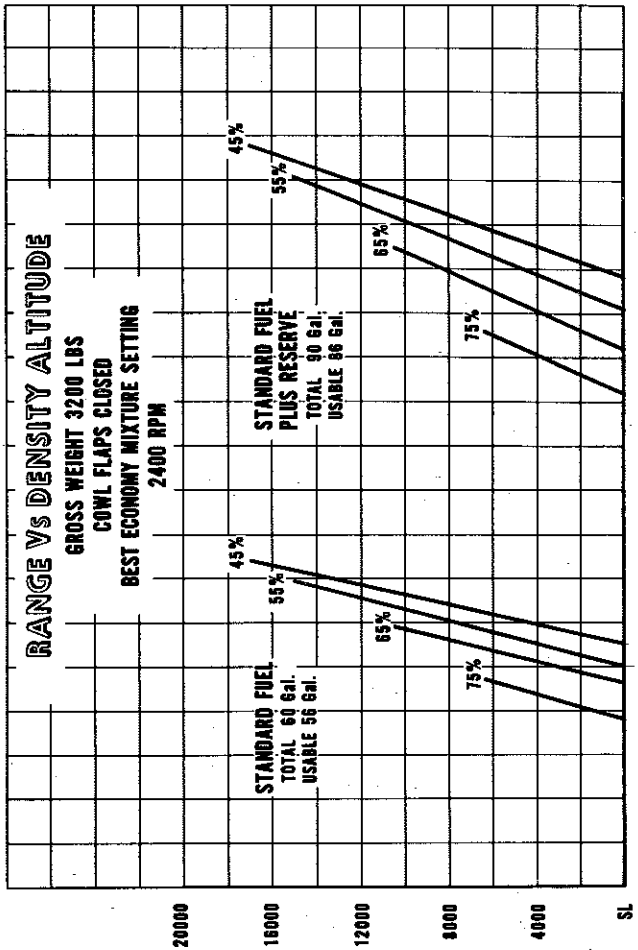

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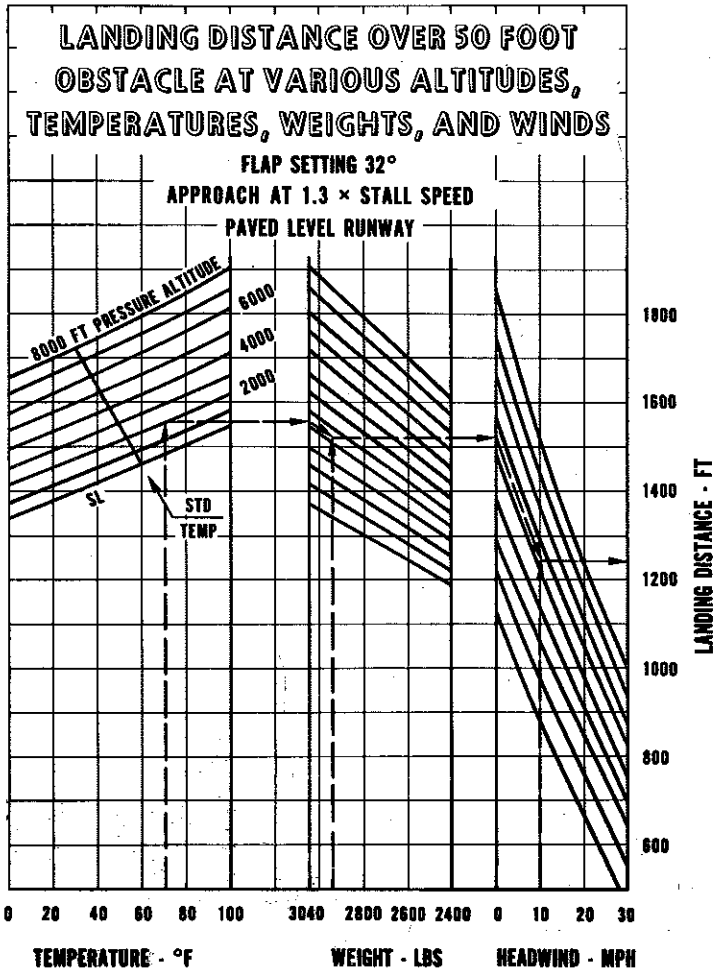

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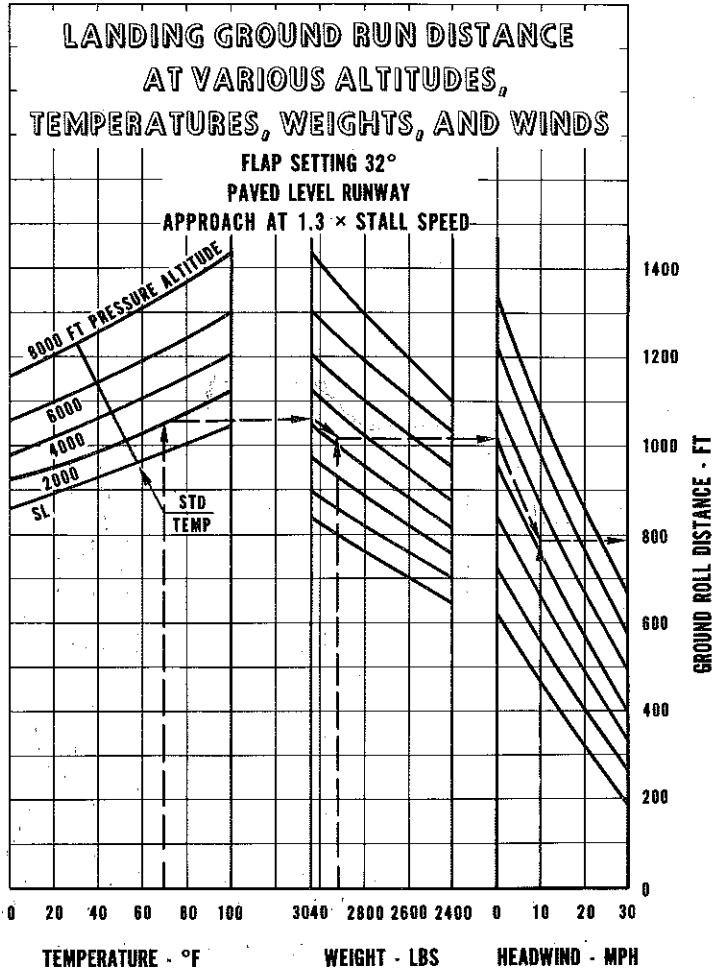

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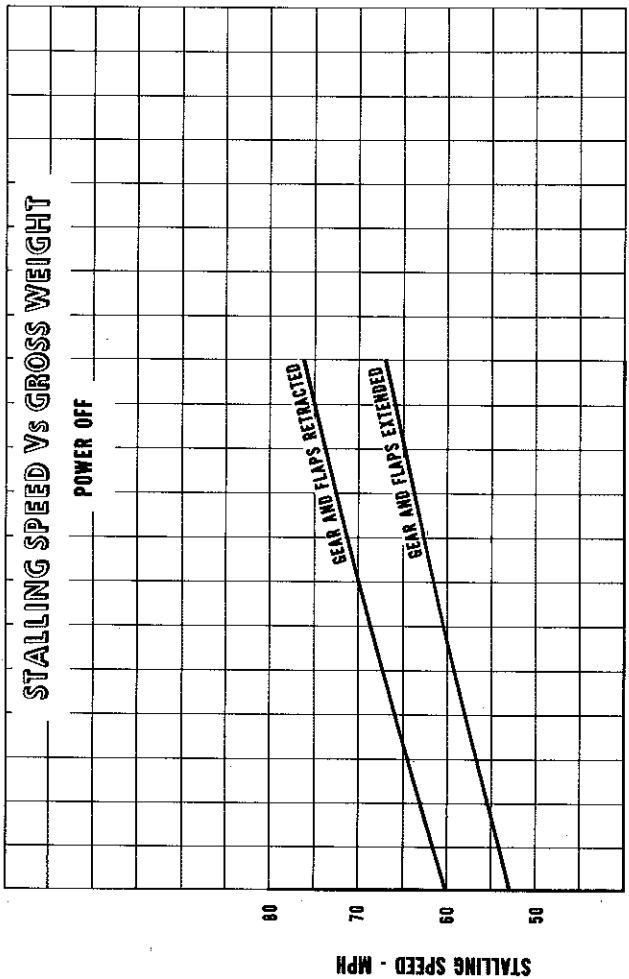

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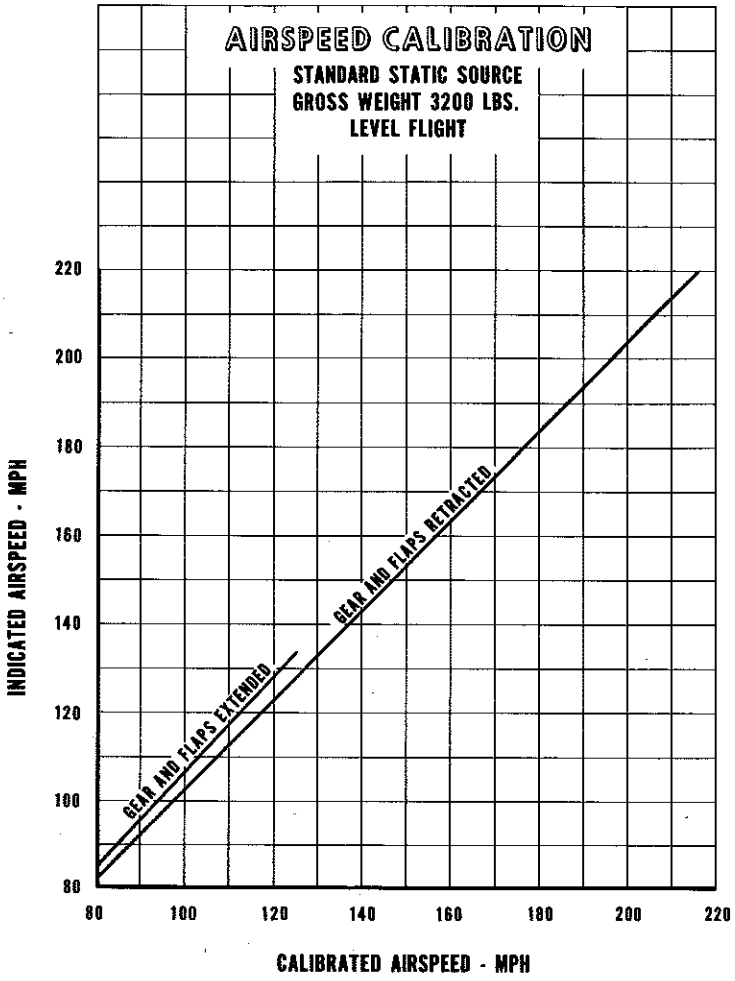

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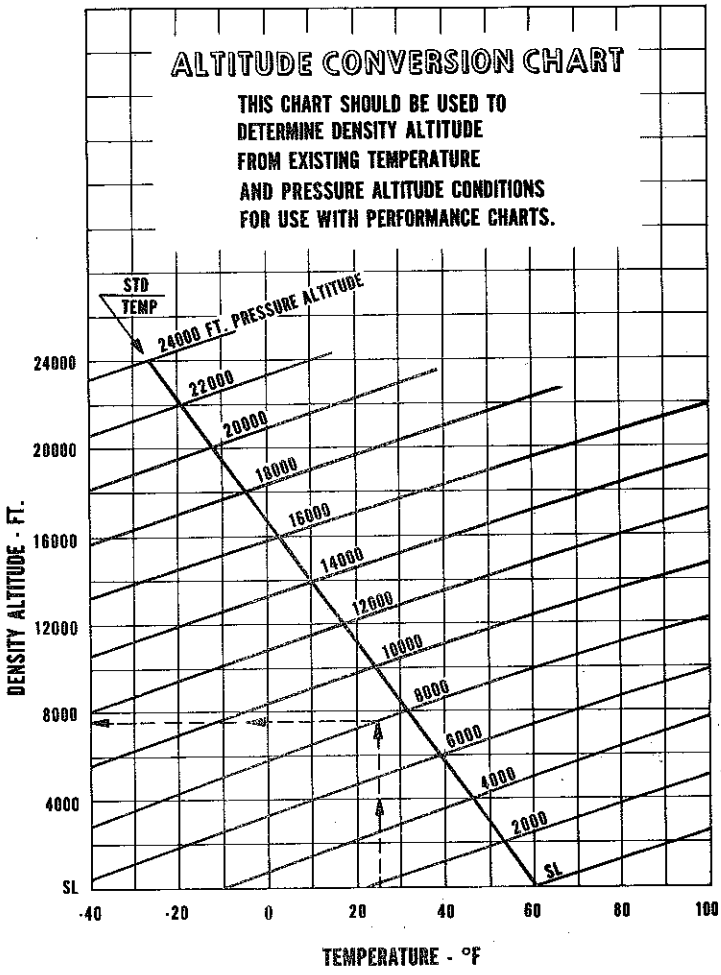


Power Setting Table - Lycoming Model IO-540-M, 260 HP Engine

Press. Alt Feet	Std Alt Temp °F	143 HP – 55% Rated RPM AND MAN. PRESS. 2100	2200	2300	2400	169 HP – 65% Rated RPM AND MAN. PRESS. 2100	2200	2300	2400	195 HP – 75% Rated RPM AND MAN. PRESS. 2200	2300	2400	2500	Press. Alt Feet
SL	59	22.3	21.5	20.7	19.8	25.3	24.1	23.2	22.2	26.9	25.8	24.8	24.0	SL
1,000	55	22.1	21.3	20.5	19.6	25.1	23.9	22.9	22.0	26.6	25.5	24.5	23.7	1,000
2,000	52	21.9	21.0	20.3	19.4	24.8	23.6	22.7	21.8	26.3	25.3	24.3	23.5	2,000
3,000	48	21.7	20.8	20.0	19.2	24.5	23.4	22.5	21.6	26.0	25.0	24.0	23.2	3,000
4,000	45	21.4	20.6	19.8	19.0	24.2	23.1	22.2	21.4	25.7	24.7	23.8	22.9	4,000
5,000	41	21.2	20.3	19.6	18.8	24.0	22.9	22.0	21.1	25.4	24.4	23.5	22.7	5,000
6,000	38	21.0	20.1	19.4	18.6	23.7	22.6	21.7	20.9	–	24.1	23.3	22.4	6,000
7,000	34	20.7	19.9	19.1	18.4	23.5	22.4	21.5	20.7	–	–	23.0	22.2	7,000
8,000	31	20.5	19.6	18.9	18.2	–	22.1	21.2	20.5	–	–	–	21.9	8,000
9,000	27	20.3	19.4	18.7	18.0	–	21.9	21.0	20.3					9,000
10,000	23	20.0	19.2	18.5	17.7	–	–	20.7	20.0					10,000
11,000	19	19.8	18.9	18.2	17.5	–	–	–	19.8					11,000
12,000	16	19.6	18.7	18.0	17.3									12,000
13,000	12	–	18.5	17.8	17.1									13,000
14,000	9	–	–	17.5	16.9									14,000
15,000	5	–	–	17.3	16.7									15,000

To maintain constant power, correct manifold pressure approximately 0.17" Hg for each 10° F variation in induction air temperature from standard altitude temperature. Add manifold pressure for air temperatures above standard; subtract for temperatures below standard.

NOTES

SECTION V

MAINTENANCE

SECTION V

MAINTENANCE

This section of the Comanche "C" Handbook contains information which pertains to minor maintenance of the airplane. Any complex repair or modification should be accomplished by a Piper Service Center or equivalent.

TIRE INFLATION

For maximum service keep the tires inflated to the proper pressure of 42 lbs. on the main wheels and 27 lbs. on the nose wheel. Interchange the tires on the main wheels if necessary to produce even wear. All wheels and tires are balanced before original installation, and the relationship of tire, tube and wheel should be maintained whenever possible upon reinstallation. Out of balance wheels can cause extreme vibration in the landing gear during take-off. In the installation of new components, it may be necessary to rebalance the wheels with the tires mounted.

BATTERY SERVICE

Access to the 12 volt 35 ampere hour battery is through the access panel in the baggage compartment.

The battery should be checked frequently for proper fluid level, but must not be filled above the baffle plates. All con-

nections must be clean and tight.

The battery and battery box should be removed periodically and checked for corrosion. Corrosion effects may be neutralized by applying a solution of baking soda and water, allowing no soda solution to enter the battery. Wash battery and box with clean water and dry.

If the battery is not up to proper charge, recharge starting with a charging rate of 4 amps and finishing with 2 amps. Quick charges are not recommended.

BRAKE SERVICE

The brake system is filled with MIL-H-5606 (petroleum base) hydraulic brake fluid. This should be checked at every 50 hour inspection and replenished when necessary, refilling the brake reservoir on the firewall to the indicated level.

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

To remove the brake disc, lining and backing plate, remove the four bolts through the brake housing, then the main wheels are easily removed by taking off the axle nut and withdrawing the wheel from the axle.

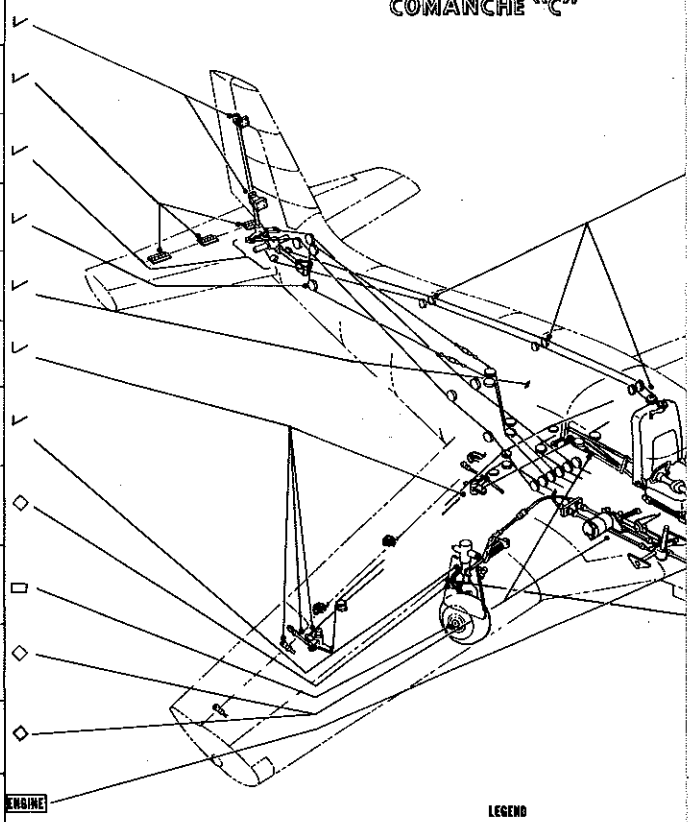
Tires are dismounted from the wheels by deflating the tube, then removing the wheel through-bolts, allowing the wheel halves to be separated.

LANDING GEAR SERVICE

In jacking the aircraft for landing gear and other service, two hydraulic jacks and a tail support should be used. Approximately

LUBRICATION CHART
COMANCHE "C"

	HOURS	LUBRICANT
RUDDER HINGES AND HORN	100	✓
STABILATOR TRIM TAB	100	✓
STABILATOR TRIM MECHANISM	100	✓
STABILATOR CONTROL PULLEYS	100	✓
BAGGAGE DOOR AND MAIN DOOR HINGES	100	✓
AILERON HINGES, PULLEYS AND BELLCRANK FLAP BELLCRANK RIGHT AND LEFT	100	✓
HINGES– MAIN GEAR DOORS, 1 EACH	100	✓
MAIN LANDING GEAR GREASE FITTINGS RIGHT AND LEFT, 6 EACH	100	◇
MAIN WHEEL BEARINGS RIGHT AND LEFT	100	▭
LANDING GEAR AND FLAP TRANSMISSIONS (SEE NOTE 1)	500	◇
LANDING GEAR AND FLAP TRANSMISSION SCREW (SEE NOTE 7)	100	◇
ENGINE OIL SUMP, DRAIN AND FILL 12 QT. CAPACITY (SEE NOTE 2)	50	ENGINE



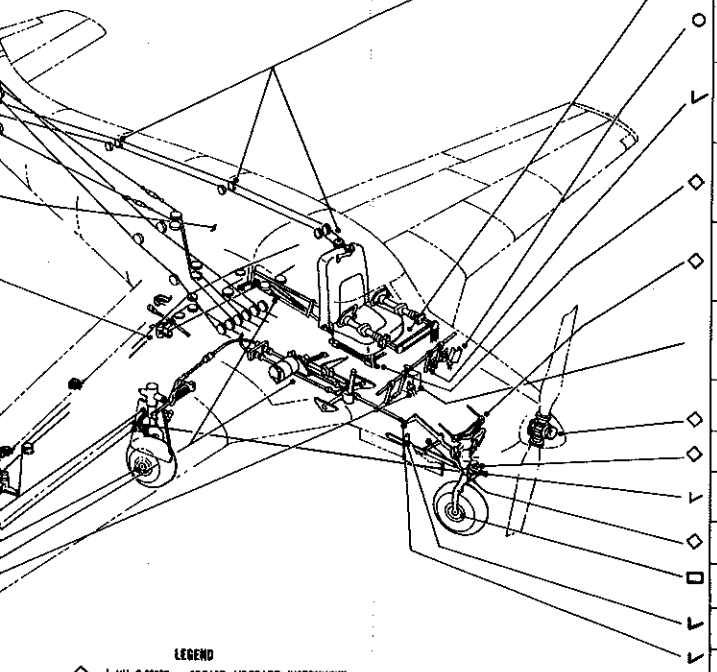
LEGEND

◇	MIL-G-25827	GREASE, AIRCRAFT, INSTRUMENT, GEAR AND ACTUATOR SCREW
✓	MIL-L-7870	OIL–GENERAL PURPOSE LOW TEMP. LUBRICATION
▭	MIL-L-3545	GREASE–LUBRICATION HIGH TEMPERATURE
○	MIL-H-5606	HYDRAULIC FLUID (RED)
ENGINE		SAE 50 ABOVE 60°F AIR TEMP SAE 40 BETWEEN 30°F AND 90°F AIR TEMP SAE 30 BETWEEN 0°F AND 70°F AIR TEMP SAE 30 BELOW 10°F AIR TEMP SEE LYCOMING SERVICE INSTRUCTIONS NO. 1014 FOR USE OF DETERGENT OIL.

NOTES

1. LANDING GEAR AND FLAP TRANSMISSIONS, AND WHEEL BEARINGS – DISASSEMBLE AND CLEAN. WHEN REASSEMBLING TRANSMISSION, FILL WITH LUBRICANT.
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. OLEO STRUTS, AND BRAKE RESERVOIR - FILL PER PLACARDED INSTRUCTIONS, OR REFER TO SERVICE MANUAL, SECTION II.
4. PROPELLER - REMOVE ONE OF THE TWO GREASE FITTINGS FOR EACH BLADE. APPLY GREASE THROUGH REMAINING FITTING UNTIL FRESH GREASE APPEARS AT HOLE OF REMOVED FITTING.
5. BEARINGS AND BUSHINGS - CLEAN EXTERIOR WITH DRY SOLVENT BEFORE RELUBRICATING (EXCEPT SEALED BEARINGS).
6. AIR FILTER – TO CLEAN FILTER, BLOW OUT WITH COMPRESSED AIR FROM GASKET SIDE OR WASH IN WARM WATER AND MILD DETERGENT, AND DRY. DO NOT USE OIL.
7. LANDING GEAR AND FLAP TRANSMISSIONS, AND TRIM SCREWS – WIPE CLEAN AND APPLY A COATING TO SCREW.

LUBRICATION CHART
COMANCHE "C"



LUBRICANT	HOURS	
✓	100	STABILATOR TRIM PULLEYS
✓	100	CONTROL COLUMN
○	50	BRAKE RESERVOIR, MAINTAIN FLUID LEVEL INDICATED ON THE SIDE OF RESERVOIR
✓	100	RUDDER PEDAL AND TRIM ASSEMBLY
◇	100	SEAT ADJUSTMENTS
◇	100	NOSE WHEEL STEERING
	50	INDUCTION AIR FILTER (SEE NOTE 6)
◇	100	PROPELLER GREASE FITTINGS, 4 TOTAL (SEE NOTE 4)
◇	100	NOSE GEAR GREASE FITTING, 6 TOTAL
✓	100	UPPER AND LOWER TORQUE LINK CONNECTING BOLT
◇	100	DRAG LINK GREASE FITTINGS, 5 TOTAL
□	100	NOSE WHEEL BEARING
✓	100	HINGES–NOSE WHEEL DOOR, 2 TOTAL
✓	100	RETRACTION PUSH–PULL ROD END FITTING

LEGEND

◇	MIL-G-23827	GREASE, AIRCRAFT, INSTRUMENT, GEAR AND ACTUATOR SCREW
✓	MIL-L-7870	OIL–GENERAL PURPOSE LOW TEMP. LUBRICATION
□	MIL-L-3545	GREASE–LUBRICATION HIGH TEMPERATURE
○	MIL-H-5606	HYDRAULIC FLUID (RED)
ENGINE		SAE 50 ABOVE 60°F AIR TEMP SAE 40 BETWEEN 30°F AND 90°F AIR TEMP SAE 30 BETWEEN 0°F AND 70°F AIR TEMP SAE 20 BELOW 10°F AIR TEMP

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

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. REMOVE ALL EXCESS GREASE FROM GREASE FITTINGS.

300 lbs. of ballast should be placed on the base of the tail support before jacking up the airplane.

Landing gear oleos should be serviced according to instructions on the units. Under static load the main oleos should show about 2-1/2 inches extension while the nose should be extended 2-3/4 inches.

To add air to the oleo struts, a strut pump is attached at the air valve and the oleo pumped up to the proper position. To add oil, jack the aircraft, release the air through the strut valve and allow the strut to extend fully. Next remove the air valve and fill the unit through this opening. Then compress the oleo to full compression allowing air and excess oil to escape. Then reinsert the valve core and pump up the strut.

FUEL AND OIL REQUIREMENTS

Aviation Grade 91/96 Octane (minimum) fuel must be used, for the use of lower grades of fuel can cause serious engine damage in a very short period of time. This is considered of such importance that the engine warranty is invalidated by such use.

The oil capacity of the Lycoming IO-540-N is 12 quarts and the minimum safe quantity 2-3/4 quarts. The operating oil level is normally kept a quart or more below the maximum to reduce oil consumption. It is recommended that engine oil be changed every 50 hours or sooner under unfavorable conditions. The following grades are required 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

LEVELING AND RIGGING

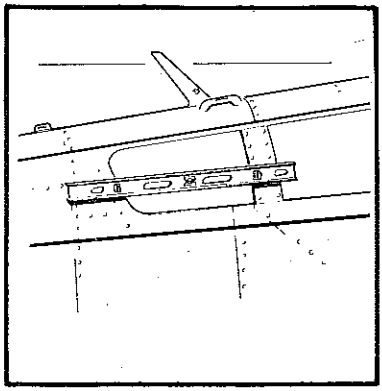
Leveling for purposes of reweighing or rigging is accomplished as follows:

1. Partially withdraw the two machine screws on the side of the fuselage located one fore and one aft of the right rear window. These screws are leveling points and the airplane is longitudinally level when a level placed on the head of these screws indicates level.

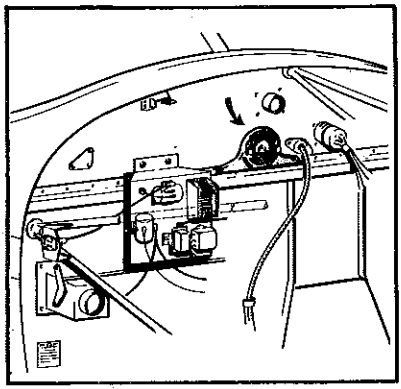
2. To put the airplane in a longitudinally level position on scales, first block the main gear oleos to full extension, then deflate the nose wheel tire until the proper position is reached. For rigging purposes place airplane on jacks.

3. To level the airplane laterally, place a level on or parallel to the hat section channel of the firewall. (Even length spacers may be used to bring the level above any obstacles in the area of the channel.)

Rigging: Although the fixed flight surfaces cannot be adjusted in position for rigging purposes, it may be necessary on occasions to check the position of these surfaces. The movable surfaces all have adjustable stops as well as adjustments on



Longitudinally Leveling



Laterally Leveling

their cables or push-pull connections so that their range of movement can be altered. The positions and travels of the various surfaces are as follows:

1. Wings: 5° dihedral, no twist.
2. Stabilator: No dihedral, trailing edge travel 14° ±1° up, 4° ±1° down.
3. Fin: Vertical and in line with center of fuselage.
4. Ailerons: Travel 19° ±2° up, 15° ±2° down.
5. Flaps: Travel 32° ±1° full down.
6. Rudder: Travel 25° left or right, ±2°.
7. Horizontal Tail Tab Travel: 7° ±1° up, 15° ±1° down.
8. Stabilator Tab Ratio: 1½:1

For purposes of changing the lateral trim, fixed tabs are provided on the ailerons which can be adjusted as necessary.

CARE OF AIR FILTER

The induction air filter must be cleaned at least once every fifty hours and depending on the type of condition existing, it may be necessary to clean the filters daily or every (5) five hours.

The following cleaning procedure is recommended by the manufacturer of the filter:

a. Blow compressed air through the filter, in the opposite direction of normal airflow.

b. To prevent damage to the filter, use less than 100 psi, and keep the nozzle at least one inch away from the filter.

c. Blow air through the filter until no more dust is being removed. The filter is now ready to be inspected.

For further instructions on cleaning see current PA-24 Service Manual.

CARE OF WINDSHIELD AND WINDOWS

A certain amount of care is required to keep the plexiglas windows clean and clear. 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 warm water. Use a soft cloth or sponge. Do not rub.
3. Remove oil, grease or sealing compounds with a cloth soaked in kerosene.
4. After cleaning, apply a thin coat of hard polishing wax. Rub lightly with a soft dry cloth.
5. A severe scratch or mar can be removed by using jeweler's rouge to rub out scratch, smooth on both sides and apply wax.

SERIAL NUMBER PLATE

The serial number plate is located on the firewall. The serial number of the plane should always be used in referring to the airplane in service or warranty matters.

FUEL SYSTEM

The fuel screens in the strainer, the injector screen and fuel nozzles will require cleaning at the first 25 hour inspection and every 50 hour inspection thereafter. The screen in the injector is located in the housing where the fuel inlet line connects to the injector. The fuel strainer located under the floorboards is accessible for cleaning through an access plate on the bottom of

the fuselage. When reassembling the strainer after cleaning, a small amount of grease applied to the gasket will facilitate assembly. Acetone is recommended for cleaning these screens.

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