~~GEWAR DOCKWALD~~
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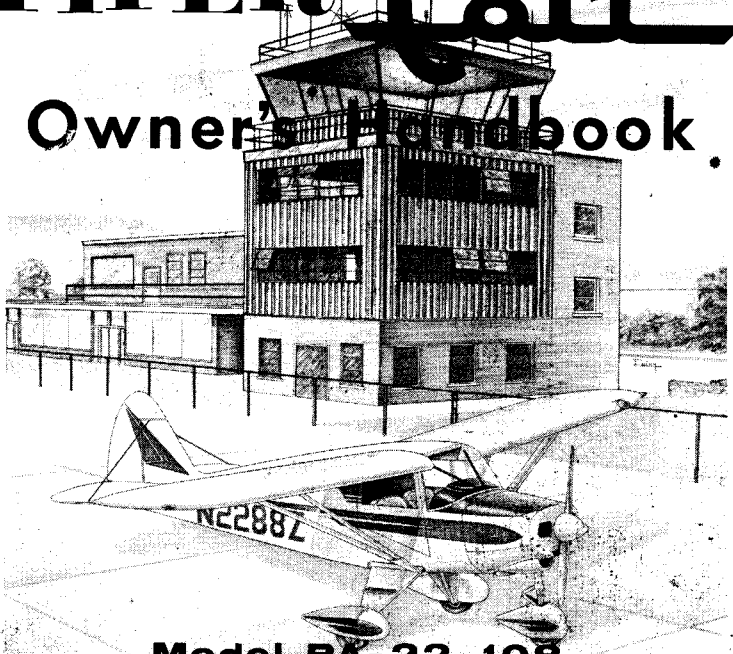
the

PIPER Colt

Owner's Handbook



Model PA-22-108

Piper Aircraft Corporation, Lock Haven, Pa.

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. 753 594, may be obtained from your Piper Dealer.

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SECTION I

SPECIFICATION FEATURES

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Baggage 2

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SPECIFICATION FEATURES:

POWER PLANT	PA-22-108
Engine	Lyc. O-235-C1B or C1
Rated Horsepower	108
Rated Speed RPM	2600
Bore, inches	4-3/8
Stroke, inches	3-7/8
Displacement, cubic inches	233.3
Compression Ratio	6.75:1
Dry Weight, pounds	236
Fuel Consumption (75% power gph, leaned)	6
Oil Sump Capacity, quarts	6
Fuel Aviation Grade Octane	80

PERFORMANCE

Take-off Run (ft)	950
Take-off Over 50 ft. Barrier (ft)	1500
Best Rate of Climb Speed (MPH)	76 Vy 66 kts
Best Angle of Climb Speed (MPH)	60 Vx angles 52 kts
Rate of Climb (ft. per min.)	610
Service Ceiling (ft)	12,000
Absolute Ceiling (ft)	14,000
Top Speed (MPH)	120 105 kts
Cruising Speed (75% power sea level) (MPH)	108
Optimum Cruising Speed (75% power 7000 ft.) (MPH)	115
Fuel Consumption (Gal. per hr., 75% power)	6
Cruising Range (75% power sea level, std. fuel)	3 hrs. 324 mi.
Cruising Range (optimum fuel, 75% power)	6 hrs. 648 mi.
Cruising Range (optimum fuel, 75% power, 7000 ft)	6 hrs. 690 mi.

SPECIFICATION FEATURES: (cont)

PERFORMANCE	PA-22-108	
Stalling Speed (MPH)	57	54 knots.
Landing Roll (ft)	500	
Landing Distance (Over 50 ft. barrier) (ft)	1250	

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.

WEIGHT	PA-22-108
Gross Weight (lbs)	1650
Empty Weight (Standard - lbs)	940
Empty Weight (Super Custom - lbs)	985
USEFUL LOAD (Standard - lbs)	710
USEFUL LOAD (Super Custom - lbs)	665

FUEL

6 lbs/US gal	Fuel Capacity (Standard - gals) U.S.	18
	Fuel Capacity (Optional - gals) U.S. 21# lbs.	36
1.6 lbs/liter	Oil Capacity (qts)	6

BAGGAGE

Maximum Baggage (lbs)	100

SPECIFICATION FEATURES: (cont)

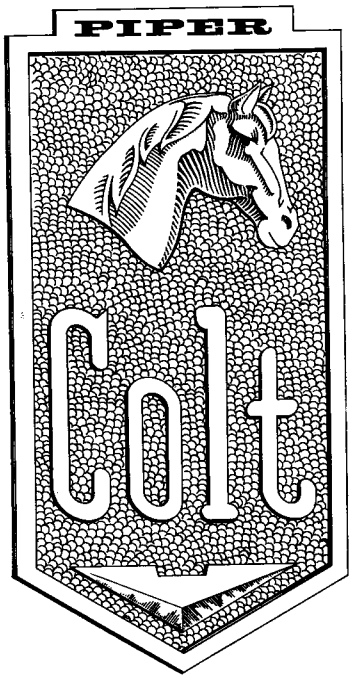
DIMENSIONS	PA-22-108
Wing Span (ft)	30
Wing Area (sq. ft)	147
Length (ft)	20
Height (ft)	6.25
Wing Loading (lbs. per sq. ft.)	11.2
Propeller Diameter, maximum (in.)	74
Power Loading (lbs. per HP)	15.3

LANDING GEAR

Tire Pressure (lbs)	Nose	15
	Main	22

RPM - MAX 2600

RPM STATIC not less than 2200
not more than 2450


PIPER
Colt

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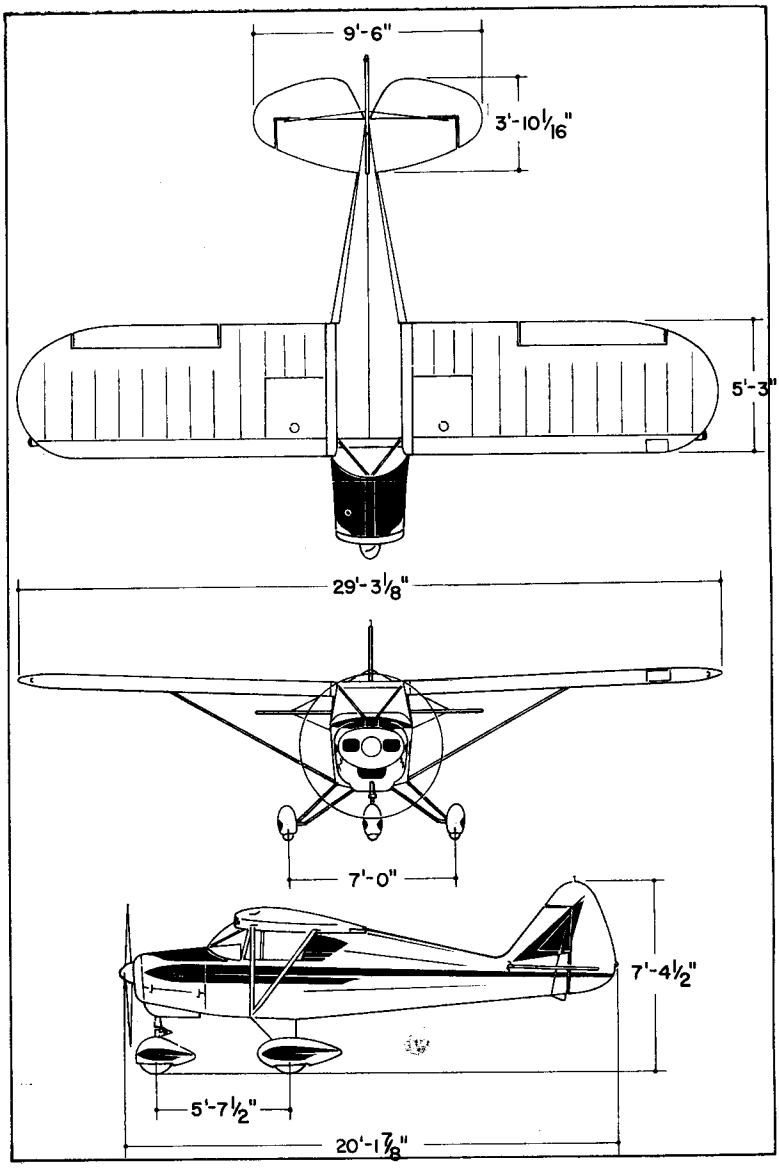
SECTION II

DESIGN INFORMATION

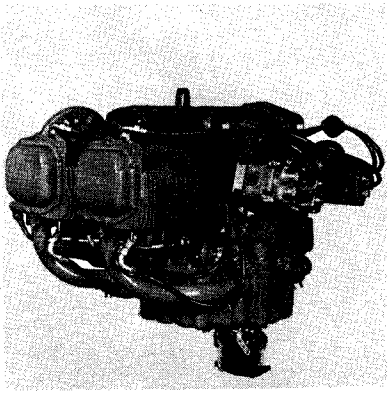
The Piper Colt is designed and manufactured as a versatile aircraft in the personal and business aviation field. It is a two-place, single engine, high wing, land monoplane, constructed of welded steel tubing covered with Grade "A" fabric and finished with fire resistant butyrate dope.

The instrument panel in the Colt is designed to accommodate the primary instruments and radios as well as advanced instrumentation.

The Colt is powered by a Lycoming O-235-C1B or C1 four-cylinder, 108 HP engine which operates on 80 octane Aviation fuel. The propeller used is a Sensenich Model M76AM-2 with a 74 inch diameter.


9'-6"
3'-10 1/16"
5'-3"
29'-3 1/8"
7'-0"
7'-4 1/2"
5'-7 1/2"
20'-1 7/8"

ENGINE AND PROPELLER



Lycoming O-235

The Colt is equipped with a Lycoming engine, Model O-235-C1B or C1 rated at 108 HP at 2600 RPM. The engine is a direct drive, wet sump, horizontally opposed engine with a compression ratio of 6.75:1 which operates on 80 octane Aviation fuel. The engine is furnished with a geared starter, 12 volt generator, and carburetor air box and filter, which should be cleaned regularly. Refer to the Maintenance Section.

Dual ignition is furnished by two Scintilla magnetos. The ignition wiring is arranged so that the left magneto fires the top plugs in the left hand cylinders and the bottom plugs in the right hand cylinder; while the right magneto fires the bottom plugs of the left hand cylinders and the top plugs of the right hand cylinders. This arrangement insures consistent drop-off when switching from both magnetos to either the right or left magneto.

The exhaust system on the Colt is a stainless steel cross-over type incorporating an effective muffler which provides heat for the cabin area as well as the carburetor heat system. The exhaust stack is extended some distance into the slip stream to vent the exhaust gases away from the fuselage as far as possible.

The power plant controls which consist of the throttle, mixture control and carburetor heat; and the ignition starter switch are located across the lower portion of the instrument panel. Engine instruments which include the tachometer, oil pressure and oil temperature will be positioned in different locations depending on the model.

A metal Sensenich propeller Model design M76AM-2 with

Serial Nos. 22-8000 to 22-9522, Model O-235-C1B, Dual Breaker Magnetos
Serial Nos. 22-9522 and up, Model O-235-C1, Impulse Magnetos

a 74 inch diameter is installed as standard equipment on the Colt.

STRUCTURES

The fuselage frame of the Colt is constructed of steel tubes welded together to form a rigid structure. A number of highly stressed members are of chromemolybdenum steel (4130). Other members are of 1025 steel.

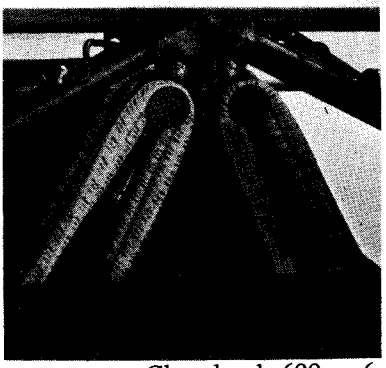
Repairs to the fuselage can be made in the manner approved by the Federal Aviation Agency Manual No. 18, and repair facilities for this type of construction are available universally.

The fuselage is made corrosion resistant by the application of a coat of zinc chromate, followed by a sealer coat of nitrate dope. A third coat of dope-proof lacquer is sprayed on the fuselage members wherever fabric comes in contact with the structure. If the airplane is to be used in salt water areas, the fuselage can be metallized prior to applying the zinc chromate and dope; at the same time the interior of the tubing is coated with linseed oil to prevent internal corrosion.

The wing framework consists of riveted aluminum ribs mounted on extruded aluminum spars with tubular drag and compression struts and high strength stainless steel drag wires. Aluminum sheet is used to form the leading edge and the aileron false spar. An ash wing tip bow provides a light tough member which can withstand considerable wing tip shock without failing.

The wings are attached to the fuselage at the wing hinge fittings on upper fuselage members, and by means of the lift struts which bolt to the lower fuselage members and to the wing spar fittings. The lift struts can be adjusted in length by turning in or out the forked fittings at the lower ends. This adjustment is used to set the rigging of the wings. Any lifting of the airplane at the struts should be done at the extreme end of the strut and not in the center, to prevent bending the struts.

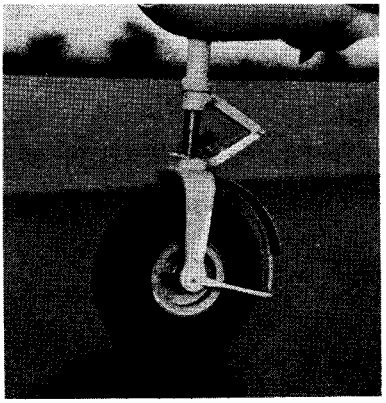
LANDING GEAR AND BRAKE



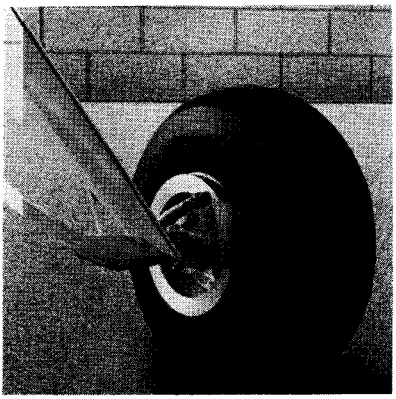
The tri-cycle landing gear on the Colt is designed and constructed to provide the airplane with a rugged undercarriage. The shock absorbing mechanism for the main gear consists of a hydraulic shock absorber combined with shock cords, while the nose gear uses an oleo strut bolted to the engine mount at the firewall. Wheels for the main gear are Cleveland 600 x 6 Model C-38500-H, each are fitted with 600 x 6, 4 ply tires.

The nose gear is steerable through a 40 degree arc by the rudder pedals which actuate steering rods attached to steering arms at the top of the nose gear strut. The nose wheel is the same as the mains with the exception of the brake drum which is not included, the wheel Model number is C-38501-H.

Brakes for the Colt are provided by a Cleveland Model #30-18 hydraulic actuating brake assembly. The brake units are actuated by a hydraulic master cylinder located under the left seat, which is operated by the hand brake lever located under the center of the instrument panel. The brake lever is connected to the master cylinder by a cable and pulley arrangement.



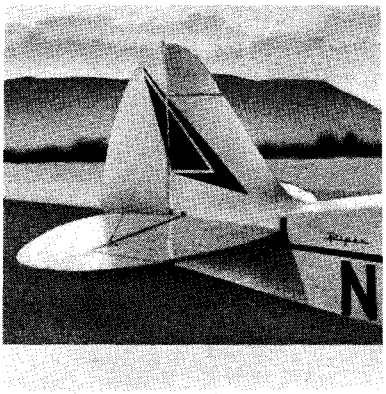
A parking brake valve is attached to the forward side of the firewall with the control located on the left side of the instrument sub-panel. In applying the parking brake, first pull the brake handle back, next pull out the park-



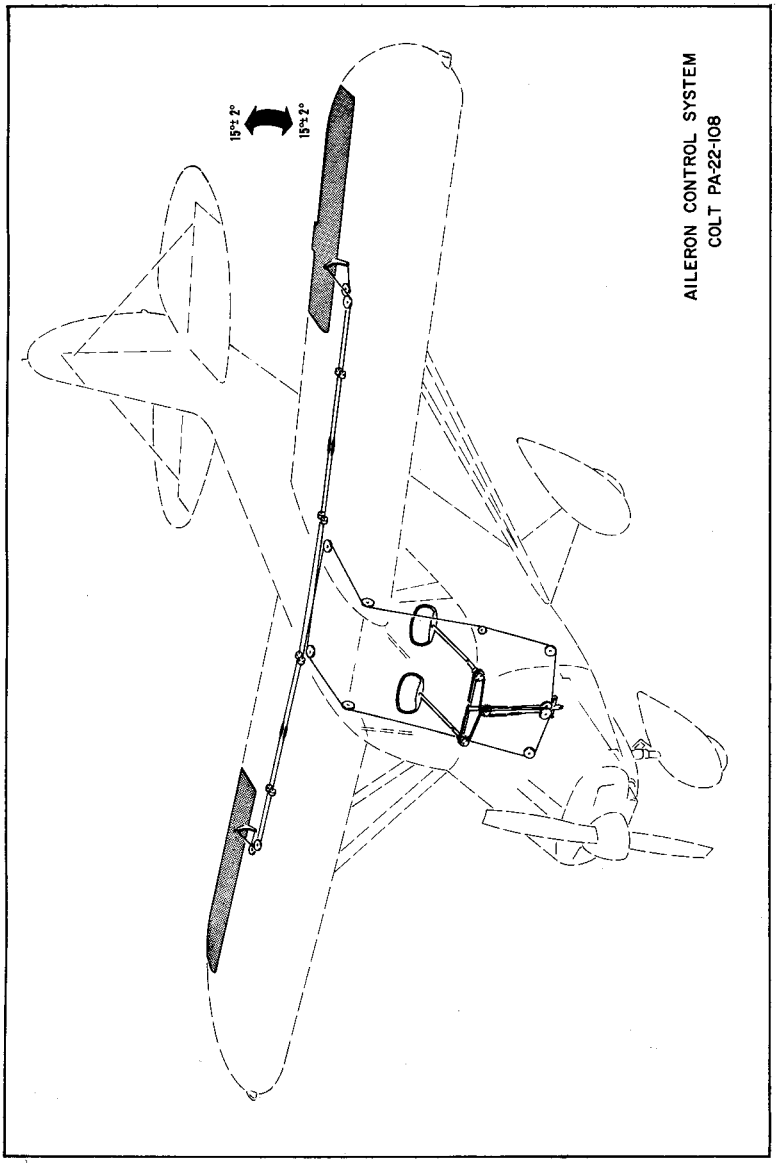
ing brake control, then release the brake handle. To disengage the parking brake, simply push in its control.

CONTROL SYSTEM

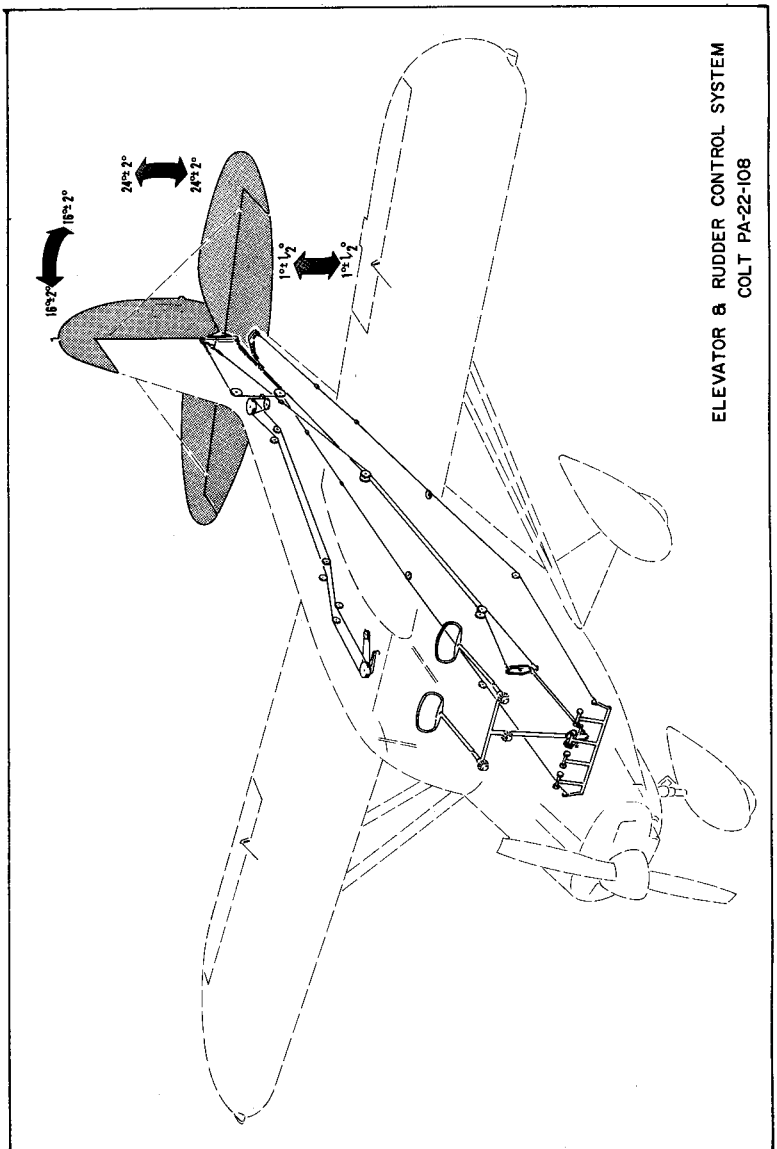
The Colt is controlled in flight by the use of the standard primary control surfaces consisting of the ailerons, elevator and the rudder. Operation of these controls is through the movement of the control column and rudder pedals. The individual surfaces are connected to their control components by the use of cables and push-pull tubes. Provision for longitudinal trim control is provided by an adjustable trim mechanism for the stabilizer which is located on the overhead panel between the seats. Two complete sets of flight controls are provided as standard equipment on the Colt. As the brake lever is accessible from either seat, complete control of the airplane is possible from both the left and right side. The control column can be secured with the safety belt to prevent damage to the control surfaces due to strong winds and etc. while the aircraft is tied down. The rudder will not require securing except when extremely high winds are expected.



Caution must be exercised in using the stabilizers for lifting or lowering the tail of the airplane, also during ground handling steering should not be done with the rudder, which may become distorted if mishandled. A

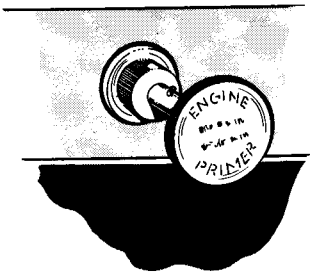


AILERON CONTROL SYSTEM
COLT PA-22-108



ELEVATOR & RUDDER CONTROL SYSTEM
COLT PA-22-108

tow bar available as optional equipment for ground handling. The tow bar is stowed in the baggage compartment.

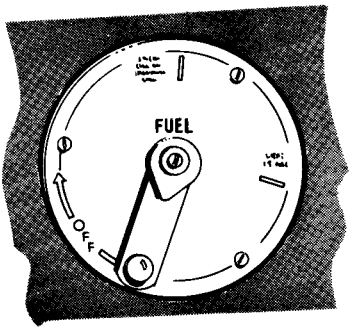


FUEL SYSTEM

The fuel for the Colt is carried in an eighteen gallon fuel tank located in the inboard end of the left wing. Outlet lines at the front and rear of the main tank provides positive flow in all normal flight attitudes. As optional equipment an auxiliary tank, located in the right wing, provides an additional eighteen gallons of fuel. The auxiliary tank must be used in LEVEL FLIGHT ONLY. The main or auxiliary tank are drained individually, according to the position of the fuel selector valve on the left forward cabin wall.

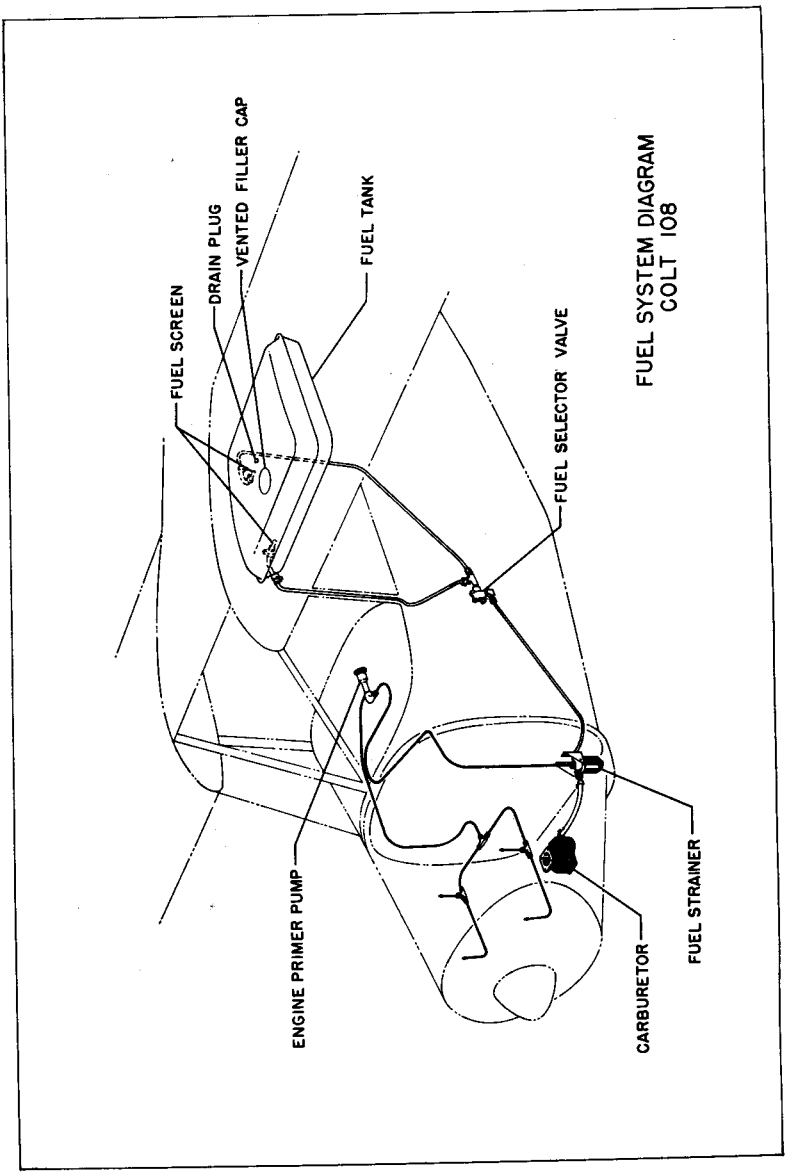
The rear fuel line from the auxiliary tank has a low point under the right front seat at which point is located a quick drain gascolator. The drain in this gascolator, which should be checked frequently for water or sediment, is reached through an opening in the right landing gear belly fairing.

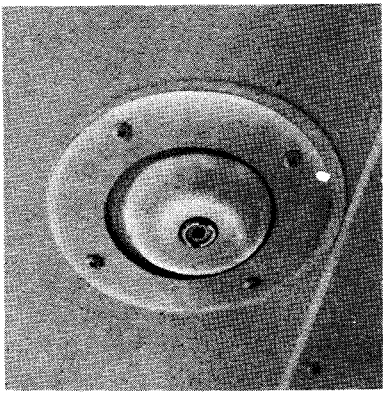
An electric fuel gauge for each tank is located on the instrument panel.



The main fuel strainer, through which all fuel going to the carburetor flows, is located on the lower left engine side of the firewall. It is provided with a quick drain and should be drained regularly.

The engine primer pump on the right side of the instrument panel takes fuel from the


FUEL SYSTEM DIAGRAM
COLT 108
FUEL SCREEN
DRAIN PLUG
VENTED FILLER CAP
FUEL TANK
FUEL SELECTOR VALVE
ENGINE PRIMER PUMP
CARBURETOR
FUEL STRAINER

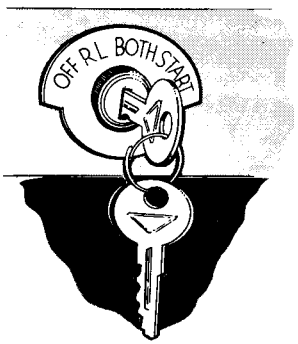


main gascolator and pumps it directly to all four cylinders of the engine. To prevent rich operation of the engine the primer must be locked in at all times except when in use.

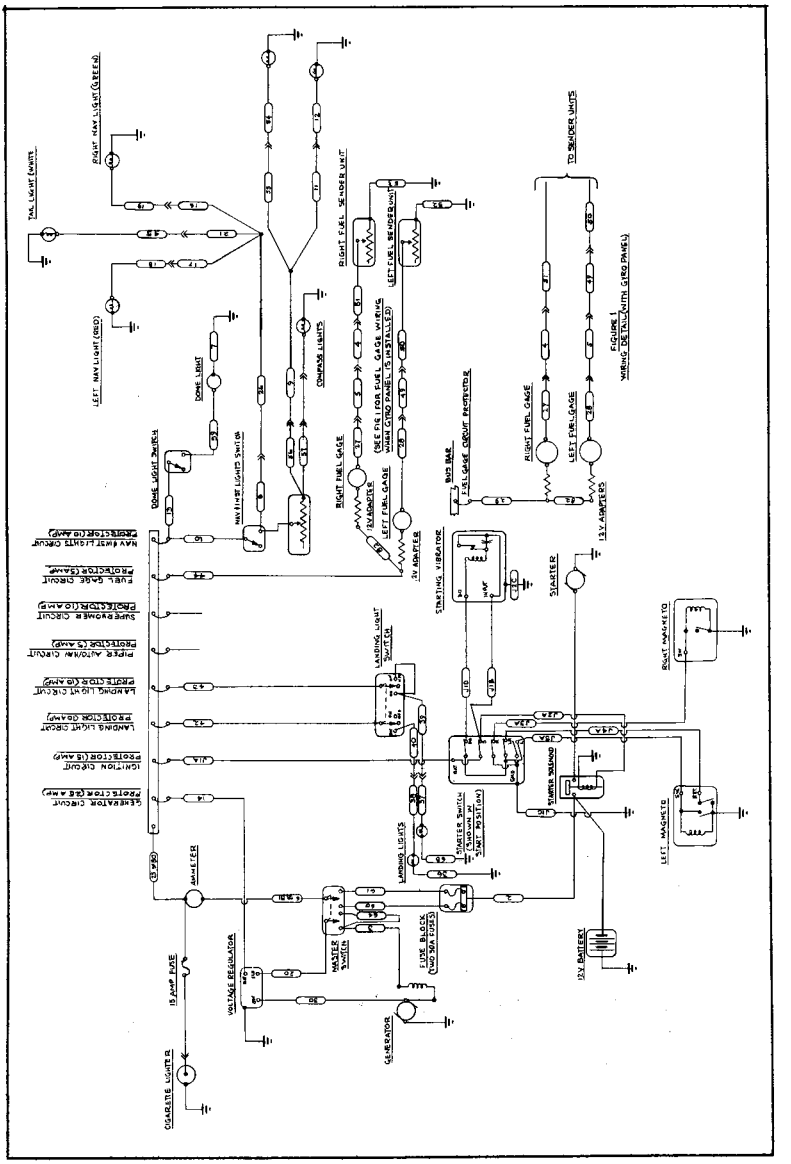
An idle-cut-off is incorporated in the carburetor so that full extension of the mixture control will stop the flow of fuel at the carburetor. The mixture control should always be used for stopping the engine.

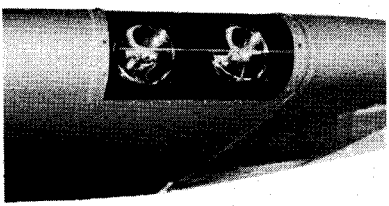
ELECTRICAL SYSTEM

Electrical power for the Colt is supplied by a 12 volt, direct current system. For all normal operations, power is provided by a 12 volt, 25 ampere generator. A 12 volt, 24 ampere hour battery is used in the system to furnish power for starting and as a reserve power source in case of generator failure. The battery is located under the right seat in a sealed stainless steel battery box.



Electrical switches and circuit breakers for the different systems are located on the lower left instrument panel. The circuit breakers automatically break the electrical circuit if an overload is applied to the system, preventing damage to the component and wiring. To reset the circuit breakers simply push in the reset button. Allow approximately

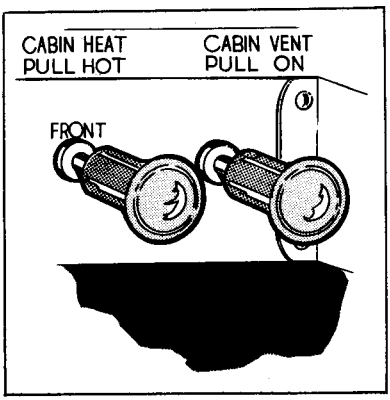

TAIL LIGHT (WHITE)
RIGHT NAV LIGHT (GREEN)
LEFT NAV LIGHT (RED)
DOME LIGHT
COMPASS LIGHTS
RIGHT FUEL SENDER UNIT
LEFT FUEL SENDER UNIT
TO SENDER UNITS
RIGHT FUEL GAGE
LEFT FUEL GAGE
13V AMPERES
BUS BAR
FUEL GAGE CIRCUIT PROTECTOR
(SEE PIC 1 FOR FUEL GAGE WIRING WHEN GYRO PANEL IS INSTALLED)
FIGURE 1
WIRING DETAIL (WITH GYRO PANEL)
DOME LIGHT SWITCH
NAV LIGHTS SWITCH
RHEOSTAT
2V AMPERES
STARTING VIBRATOR
STARTER
RIGHT MAGNETO
LEFT MAGNETO
NAV LIGHT LIGHTS CIRCUIT PROTECTOR (10 AMP)
FUEL GAGE CIRCUIT PROTECTOR (5 AMP)
SUPERCHARGER CIRCUIT PROTECTOR (10 AMP)
PITOT HEAT CIRCUIT PROTECTOR (5 AMP)
LANDING LIGHT CIRCUIT PROTECTOR (10 AMP)
LANDING LIGHT CIRCUIT PROTECTION (10 AMP)
IGNITION CIRCUIT PROTECTOR (15 AMP)
GENERATOR CIRCUIT PROTECTOR (35 AMP)
LANDING LIGHT SWITCH
STARTER SWITCH (UNDER PEDESTAL)
STARTER SOLENOID
AMMETER
15 AMP FUSE
CIGARETTE LIGHTER
VOLTAGE REGULATOR
MASTER SWITCH
FUSE BLOCK (AND 30A FUSES)
GENERATOR
12V BATTERY



two minutes for breakers to cool prior to resetting. Continual popping out of a circuit breaker indicates trouble in that particular circuit and must be checked prior to operation. It is possible to manually trip the breaker by pulling out on the reset button.

Landing, position and panel lights are provided as optional equipment for the Colt. The landing light, which consists of two individual lamps is installed in the outboard end of the left wing. One lamp of the unit is directed downward for taxiing, while the other lamp is directed outward, both lamps are used for landing. The position and panel lights are operated by a rheostat switch on the left side of the instrument panel. The position lights are turned on by the first movement of the switch; panel light intensity is decreased by further rotation of the control.

HEATING AND VENTILATING SYSTEM



Heat for the cabin interior and the defroster system is provided by a heater muff attached to the exhaust system. When the heater control on the right side of the instrument panel is pulled out, the defroster will also operate.

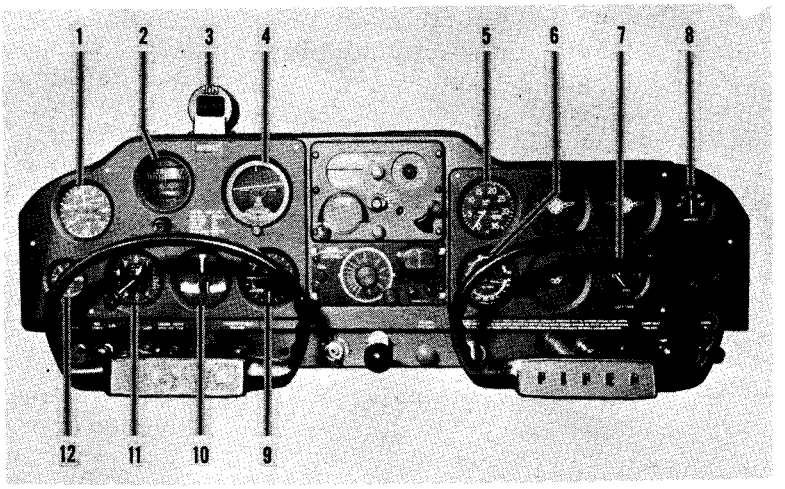
Ventilation for the cabin is obtained by a controllable airscoop on the pilots side, and window vents in both the

right and left side windows.

INSTRUMENT PANEL

The instrument panel in the Colt is designed to provide the utmost in flexibility of arrangement with a maximum of utility. General design of the panel provides that the advanced flight instruments can be installed on the left panel in front of the pilot, while the remaining instruments are installed in the right panel. Access to the back of the instruments is available through a large removable panel on top of the instrument panel.

Face plates and insert panels are available for two panel arrangements. The standard panel consists of the required engine instruments plus airspeed, altimeter and compass.



1. Airspeed Indicator
2. Directional Gyro
3. Compass
4. Gyro Horizon
5. RPM
6. Oil Pressure and Temperature Gauge
7. Fuel Gauge
8. Ammeter
9. Rate of Climb
10. Turn and Bank Instrument
11. Altimeter
12. Clock

The gyro panel accommodates the above mentioned instruments plus an artifical horizon, directional gyro, needle-ball, rate of climb and a clock. Blank holes are available for installation of radio navigation indicators or other instruments if desired.

The radio equipment is stacked in the center of the panel for ease of operation from either seat. The speaker, when installed, is located in the overhead trim panel.

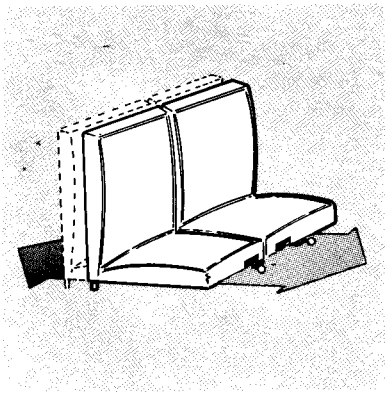
Engine controls are located along the bottom of the instrument panel. The throttle, mixture control, and carburetor heat control are all the standard push-pull type.

BAGGAGE COMPARTMENT

The baggage compartment in the Colt is located behind the seats. Access to the compartment is through the main cabin door by tilting the backs of the seats forward. Maximum placarded weight of the baggage area is 100 pounds.

CABIN INTERIOR

The interior of the Colt is provided with individual adjustable seats to provide ample room for personal comfort. The seats are adjusted fore and aft by pulling up on the knob, located on the inboard corner of each seat and moving the seat to the desired location. In fixing the seats in any given position be sure that the locking pin is securely engaged.



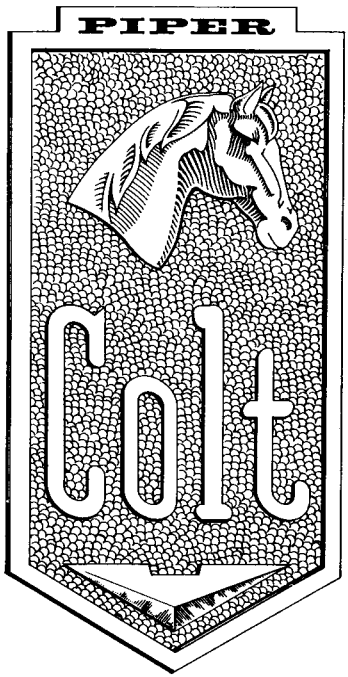
To remove either of the front seats (the brake master cylinder is under the left, and the battery is under the right), slide the seat all the way forward until it is

against the stop, reach under, and to the rear of the inboard seat track and locate the stop pin which protrudes through the bottom of the seat tube, depress this pin and slide the seat on forward until it is free of the track.

FINISH

The Duraclad finish on the Colt consists of fire resistant butyrate dope on the fabric surfaces, and enamel on all metal surfaces. Duraclad provides, in addition to the fire resisting qualities, a high-luster, more attractive finish which has a much longer life than earlier nitrate finishes.

All of the surfaces, inside and outside, are finished in Duraclad. This finish must not be covered over with any incompatible materials. The use of different material from that originally applied will damage the finish.


PIPER
Colt

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SECTION III

OPERATING INSTRUCTIONS

GENERAL

The following information set forth in this section will pertain to normal operation of the Colt under normal conditions.

The order in which the information is presented will follow the general trend of operation for the airplane. Limitations and performance data have been obtained by flight test and engineering calculation, using a standard airplane flown at gross weight under standard conditions at sea level, or stated altitude.

PREFLIGHT

The preflight is a careful, visual inspection prior to flight. A procedure should be adapted by the individual and strictly adhered to. After a short time of using one set standard, the inspection will become habit forming, consequently giving a thorough picture of the condition of the airplane while requiring less time to complete.

Following is an outline for preflighting the Colt:

1. As the aircraft is approached check the general appearance, mainly the tops of wings and fuselage for damage, such as tears in the fabric, deformed ribs, etc. (During winter operation check for ice and snow.)

2. Check the master and ignition switch for "OFF" position.

3. Open the right engine cowling. Check the engine and attaching parts for security and general condition. Check the oil supply for - 6 quarts.

4. Check the condition of the propeller, security of the cowling, condition of the nose gear assembly and the strut for proper extension of 3-1/2 inches, also the nose tire for

proper inflation.

5. Drain the fuel strainer located on the lower left corner of the firewall. Allow a sufficient amount of fuel to drain in order that the system be clear of any sediment.

6. Check the general condition of the windshield.

7. Check the fuel tank cap for security and drain the tank sump.

8. Check the condition of the left main tire and landing gear.

9. Check the left lift struts for security and general condition.

10. Check the leading edge of the left wing for dents and general appearance.

11. Check the condition and operation of the landing light and position lights if installed.

12. Check the general condition of the wing tip, aileron, aileron attachments, wing trailing edge and left side of fuselage.

13. Check tail surfaces for freedom of movement, security and general condition.

14. Check the tail light for security and operation.

15. Check the general condition of the right side of fuselage, wing trailing edge, aileron, aileron attachment and wing tip.

16. Check operation and security of right position light if installed.

17. Check the leading edge of the right wing for dents and general appearance.

18. Check the right lift struts for security and general condition.

19. Check the condition of the right main tire and landing gear.

BEFORE OPERATION

1. Fasten safety belt and check the belt in the right seat. If the right seat is not occupied secure the belt.

2. Operate the flight controls and check for freedom of

movement and proper operation.

3. Set the parking brake.

STARTING ENGINE

1. Mixture control full in, "RICH" position.
2. Carburetor heat control full in, "COLD" position.
3. Prime. When engine is cold (under 40° F) prime three to five strokes after turning fuel valve to main tank, if the engine is warm, do not prime.
4. Check the propeller area for being clear.
5. Turn the master switch, located under the left front corner of the left seat, to the "ON" position.
6. Check all radios for being "OFF"
7. Open the throttle 1/4 inch.
8. Turn the ignition switch to the "START" position and hold until engine starts. (Limit starter operation to 30 seconds) When the switch is released it will return to the "BOTH" position.

NOTE

If the above procedure does not start the engine, reprime and repeat the process. If the engine is overprimed, open the throttle and turn the engine over with the starter. If the engine still fails to operate, check for malfunctioning of ignition or fuel systems.

WARM-UP

1. 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 cause. In cold weather it will take a few seconds longer to get an oil pressure indication.
2. Set the throttle to obtain 800 to 1200 RPM for warm-up. Hold the ground time to a minimum, generally two minutes warm-up is sufficient in warm weather and four minutes in

cold weather. A general rule of thumb for engine warm-up is: the engine is warm enough for operation, when the throttle can be opened without the engine faltering.

3. Leave the carburetor heat control in the "COLD" position unless icing conditions are prevailing.

TAXIING

Control of the Colt, with the tri-cycle gear, is so improved that the general tendency is to taxi at excessive speed. Generally, taxiing the Colt is accomplished by releasing the brakes, then using just enough power to get the airplane rolling and to keep it moving. The brakes should be operated as soon as the airplane is moving in order to check their operation. Normal steering of the Colt is done with the rudder pedals.

When taxiing in a crosswind hold the speed to a minimum and use the brakes with caution. If it is necessary to taxi over extremely rough fields do so by using low speed and engine R.P.M. Holding full back on the control column will relieve some of the weight on the nose gear.

GROUND CHECK BEFORE TAKE-OFF

1. For the ground check, stop the aircraft in an area which is free from loose stones, etc., and on a heading which will position the aircraft into the wind.

2. Set the parking brake.

3. Check the fuel selector for being on the main tank. The auxiliary fuel system, if installed, is placarded for LEVEL FLIGHT ONLY.

4. Check the fuel supply.

5. Run the engine to 1800 R.P.M. for magneto check, turn the ignition switch from "BOTH" to "LEFT", back to "BOTH", then "BOTH" to "RIGHT" and back to "BOTH". The R.P.M. should not exceed 125 R.P.M. drop.

NOTE

If the switch is accidentally turned to the "OFF" position, close the throttle before turning the switch to "BOTH".

6. While the engine is still operating at 1800 R.P.M. apply carburetor heat. A slight drop in R.P.M. should be noted if it is operating properly. Return heat control to the "COLD" position.

7. Check the engine oil pressure gauge for an indication of between 65 and 85 psi. The gauge is marked in green for normal operation.

8. Run the engine between 1000 and 1200 R.P.M. to check the generator operation, which will be noted by a movement of the ammeter needle as the generator system cuts "in" and "out".

9. Close the throttle and check the engine for an idle speed.

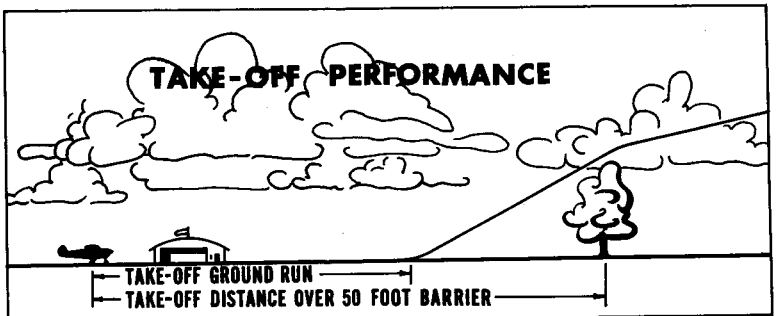
10. Check and set flight instruments as required.

11. Set stabilizer trim to approximately neutral, the exact setting is determined by the loading of the airplane.

12. Operate the flight controls and check for freedom of movement and proper operation.

TAKE-OFF

With the tri-cycle gear on the Colt the take-off is made easier due to the improved controllability of the aircraft on the ground. In general, the normal take-off procedure for the Colt is to line the aircraft with the runway, then in a smooth steady motion of the throttle apply full power. Allow the aircraft to accelerate in the three-point attitude, until the control surfaces become effective. Then apply a slight



TAKE-OFF DISTANCE UNDER VARIED CONDITIONS

Weight	Altitude	Air Temp.	Ground run at wind velocity: 0 mph.	10 mph.	20 mph.	Total distance at wind velocity: 0 mph.	10 mph.	20 mph.
1400	SEA LEVEL	40	790	510	280	1170	850	540
1650		40	1140	770	440	1600	1190	790
1400		60	850	560	300	1240	920	600
1650		60	1230	830	470	1700	1230	800
1400		80	910	610	320	1320	990	650
1650		80	1330	890	500	1820	1360	900
1400	2000	30	970	650	370	1340	1000	660
1650		30	1410	980	580	1910	1380	900
1400		50	1030	690	390	1430	1070	700
1650		50	1530	1030	600	2040	1450	940
1400		70	1090	730	410	1520	1130	750
1650		70	1650	1080	620	2210	1650	1120
1400	4000	20	1130	770	430	1620	1200	790
1650		20	1720	1180	690	2380	1730	1130
1400		40	1230	830	470	1750	1290	850
1650		40	1880	1250	740	2590	1920	1290
1400		60	1330	890	500	1880	1370	900
1650		60	2050	1380	820	2800	2170	1480

Example shown in shaded areas:

Airplane weight 1650 lbs., airport altitude 2000 ft., air temperature 70° F., wind velocity 10 mph.= take-off ground run distance 1080 ft., total take-off distance over 50 ft. barrier 1650 ft. Also see Take-off Performance Chart on page 35.

back pressure on the control column to lift the nose wheel, at approximately 65 M.P.H. indicated airspeed, at gross weight, the Colt will leave the runway. Once airborne, lower the nose to allow the aircraft to accelerate to approximately 75 M.P.H., which has been determined to be the best rate of climb speed at gross weight. Allow the aircraft to obtain a safe altitude before reducing power. The altitude at which power can be reduced is determined by the aircraft loading, field elevation, etc.

For take-offs in heavy grass, snow or in other speed retarding surfaces, drag on the landing gear can be reduced by raising the nose wheel off the surface during the take-off run by applying back pressure on the control column shortly after the throttle is opened.

Crosswind take-offs in the Colt should be made similarly to those in normal winds, with the exception that the control surfaces must be used more to maintain directional control during the take-off roll. It also may be 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, and continue the climb out.

CLIMB

Normal climb speed for the Colt at gross weight is approximately 75 M.P.H. indicated airspeed. To obtain detailed information of climb data refer to the Chart in Section IV.

CRUISING

The cruising speed of the Colt is determined by many factors, including power setting, altitude, temperature and equipment on the airplane; such as antennas, venturi tubes, etc.

The normal cruising power is 75% of the rated horsepower of the engine or 81 HP for the O-235-C1B engine. The specification cruising speed at 75% of power at sea level, under standard conditions, is 108 M.P.H. For altitude cruising speed and power curves refer to Charts in Section IV.

Maintaining 75% of power at altitude up to 7,000 feet, above which this power setting can no longer be obtained, results in an increase in true airspeed of about 1.3 M.P.H. per thousand feet above sea level. Indicated airspeed will normally decrease about 1 M.P.H. per thousand feet if 75% power is maintained.

With a fixed pitch propeller on the Colt, 75% of power can be maintained at altitude by increasing the R.P.M. as altitude is increased. The maximum continuous engine speed for all operation is 2600 R.P.M.

Fuel consumption during sea level cruising is given on a chart in Section IV. The fuel consumption, as is the airspeed, is affected by various flight conditions. Correct use of the mixture control will reduce fuel consumption very appreciably. The mixture should be leaned while cruising at any altitude over 5000 feet and at lower altitudes in accordance with the engine manufacturers specification. The mixture should also be leaned at full throttle at any time at which an increase in R.P.M. can be obtained.

To adjust the mixture properly, pull out the control slowly until a decrease in R.P.M. is noted; then push the control forward just enough to regain the lost R.P.M.

A cruise-stop is incorporated in the throttle mechanism of the Colt. This stop is set to give 75% of power at low altitudes under normal conditions. If a higher or lower power setting is desired, it can be obtained by installing or removing small spacers in the throttle friction lock according to instructions attached to the throttle.

The cruise-stop is intended to give consistent power settings at lower altitudes without reference to the tachometer. It also provides a more or less fixed R.P.M., the variance of which indicates the presence of ice or other causes of mal-

Level flight is recommended.

function.

To determine the proper cruising R.P.M. for 75% of power, fly the aircraft as near sea level as practicable at full throttle until maximum speed is reached. Note the R.P.M. at top speed, level flight. Then reduce the maximum R.P.M. by 10% and cruise at 90% of full R.P.M. The correct cruising R.P.M., which is the proper setting for the cruise-stop, will give specification cruising airspeed and fuel consumption.

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

STALLS

The stall speed for the Colt at gross weight is approximately 57 M.P.H. indicated airspeed. Lighter loads will result in slower stalling speeds. For approved maneuvers and entry speeds refer to the Colt Flight Manual.

POWER OFF STALL SPEEDS

MAXIMUM WEIGHT AT FORWARD CENTER OF GRAVITY				
ANGLE OF BANK	 0°	 20°	 40°	 60°
STALL SPEED	57	59	65	80
SPEEDS ARE MPH, IAS				

1.3 Stall = 74 mph.

APPROACH AND LANDING

The approach technique is as follows: Trim the aircraft to a 70 M.P.H. glide. Mixture should be full rich, fuel on main tank, if auxiliary tank is installed, and carburetor heat off unless carburetor icing conditions prevail. Reduce the speed during the flare-out, and touch the ground in a standard three point position approximately at the stalling speed.

On the Colt, the control wheel should be held back far enough to keep the plane in a nose high attitude as long as possible. This shortens the landing run by producing maximum drag on the wings. As the plane slows down, allow the nose wheel to drop to the runway and apply brakes if necessary.

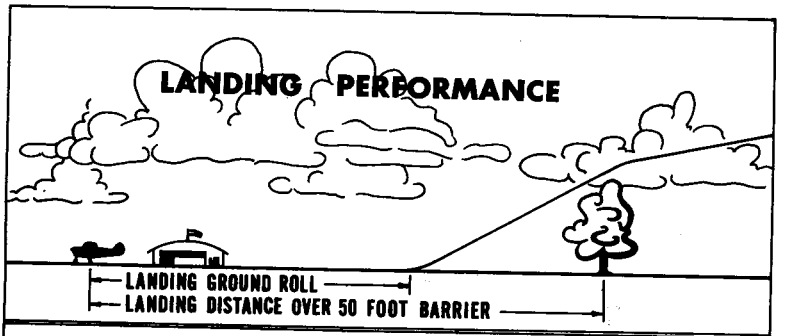
In high wind conditions, particularly in strong crosswinds, it may be desirable to approach the runway in a more level attitude at an airspeed which assures ample controllability regardless of gusts. In this case the ground can be contacted at airspeeds appreciably higher than in normal landings, and the airplane held in a level attitude at all times on the ground at the minimum practicable speed consistent with landing conditions.

Crosswind landings in the Colt should be approached with drift being compensated for by holding the windward wing down or by crabbing into the wind. The airplane should be straightened out the instant before ground contact and then controlled on the ground with the steerable nose wheel which should be held on the ground with forward control wheel pressure.

GROUND HANDLING AND MOORING

Moving or towing of the Colt is most easily accomplished with a nose gear tow bar which is available as optional equipment. In flight storage of the tow bar is in the baggage compartment.

Wing tie-down rings are available as optional equipment



LANDING DISTANCE UNDER VARIED CONDITIONS

Weight	Altitude	Air Temp.	Landing roll - max. breaking effort 0 mph.	10 mph.	20 mph.	Total distance at wind velocity 0 mph.	10 mph.	20 mph.
1400	SEA LEVEL	40	420	340	260	780	660	550
1650		40	490	400	310	850	720	600
1400	LEVEL	60	440	360	280	800	680	570
1650		60	500	420	330	860	740	620
1400	1525	80	460	350	300	820	700	590
1650		80	530	430	340	890	750	630
1400	2000	30	440	360	280	800	680	570
1650		30	500	420	330	860	740	620
1400		50	460	380	290	820	700	580
1650	FEET	50	530	440	340	890	760	630
1400	1535	70	480	400	300	880	720	590
1650		70	550	460	350	910	780	640
1400	4000	20	460	390	300	820	710	590
1650		20	540	440	350	900	760	640
1400		40	480	400	320	840	720	610
1650	FEET	40	560	460	370	920	780	660
1400		60	500	410	330	860	730	620
1650		60	580	480	390	940	800	680

Example shown in shaded areas:

Airplane weight 1650 lbs., airport altitude 2000 ft., air temperature 70° F., wind velocity 10 mph.= stopping distance with maximum breaking effort 460 ft., total landing distance from over 50 ft. barrier 780 ft. Also see Landing Performance Chart on page 40.

for installation at the wing strut intersections. If the tie-down rings are not installed, the forward strut at the wing connection can be used for tieing down. Use caution to prevent damage to the strut or the fabric. The tail skid is used to secure the tail section.

If severe weather conditions are anticipated the control column should be restrained with the safety belt to prevent damage to the control surfaces.

WEIGHT AND BALANCE

For weight and balance data see the weight and balance form for the airplane, which gives the exact weight of the airplane, equipment installed and the permissible center of gravity conditions.

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PIPER COLT
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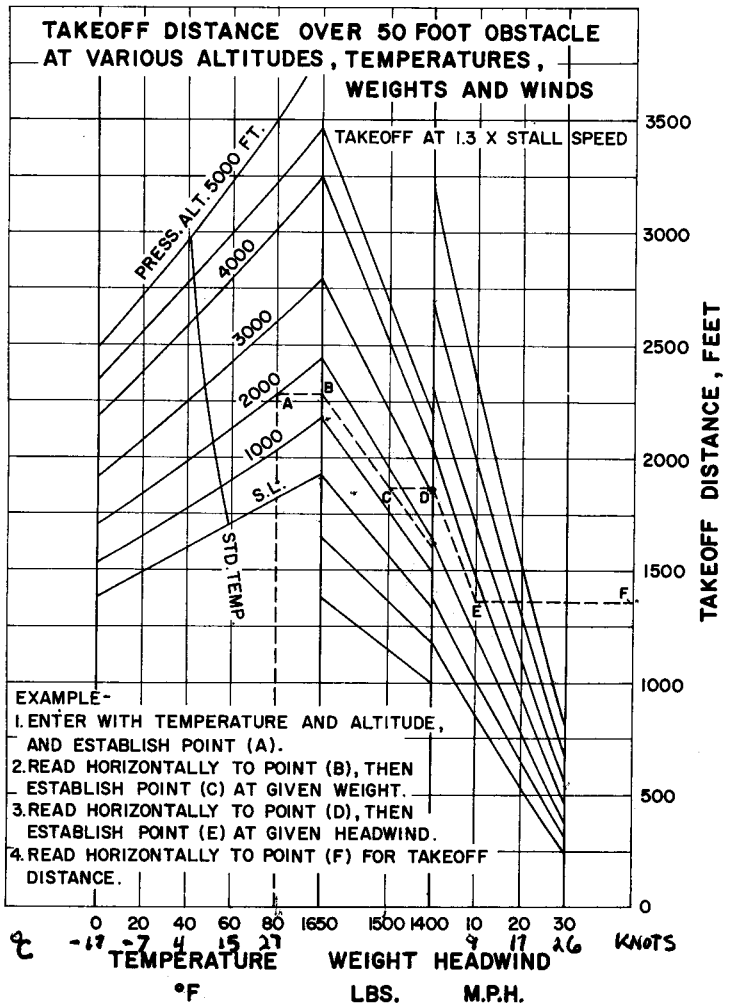

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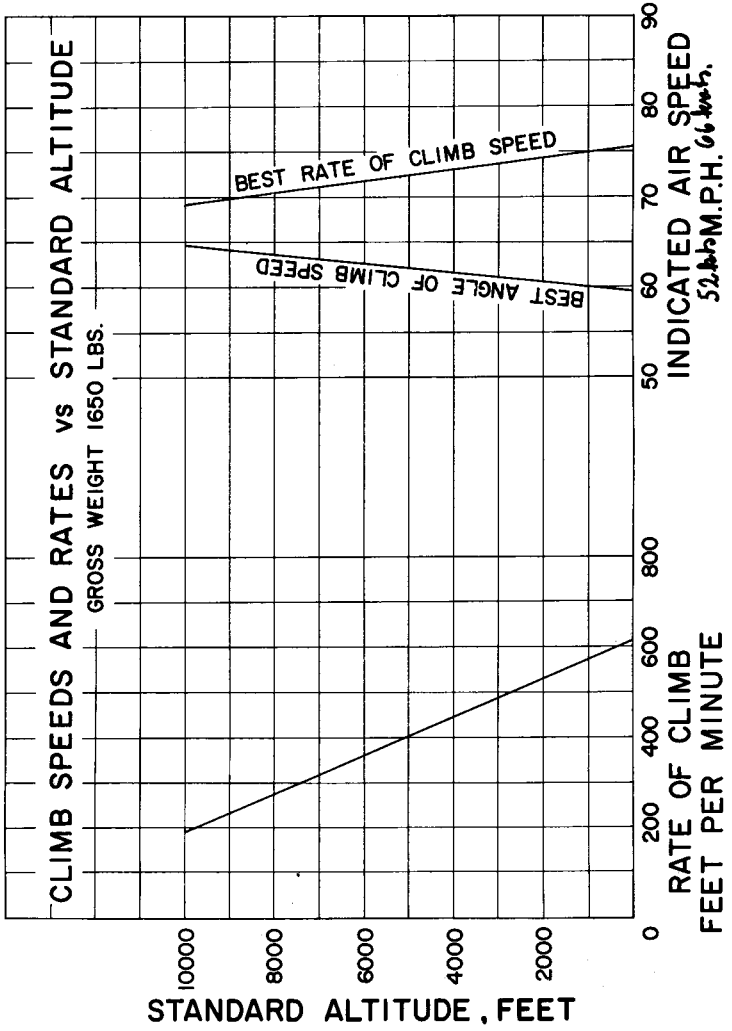

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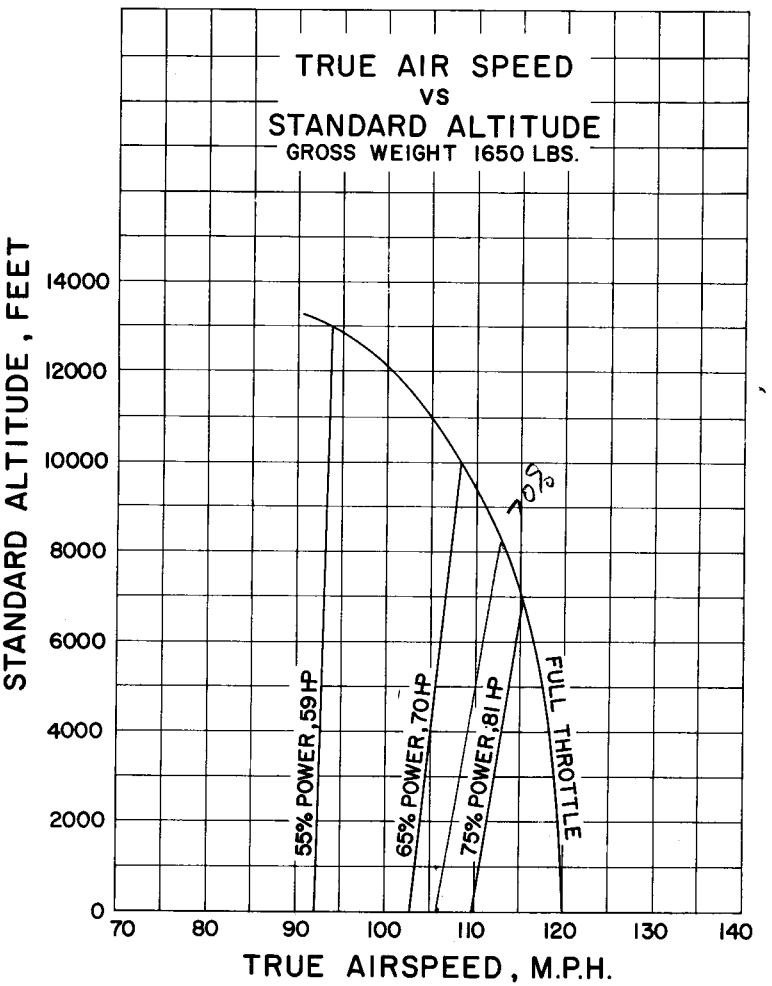

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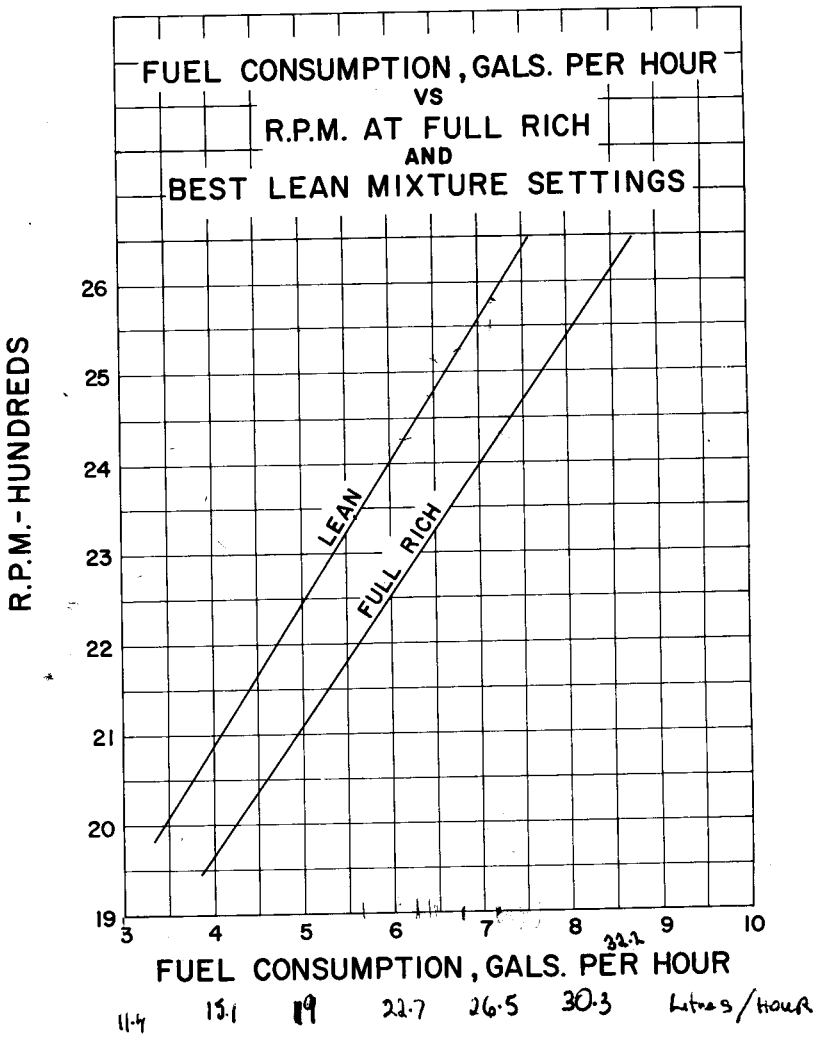

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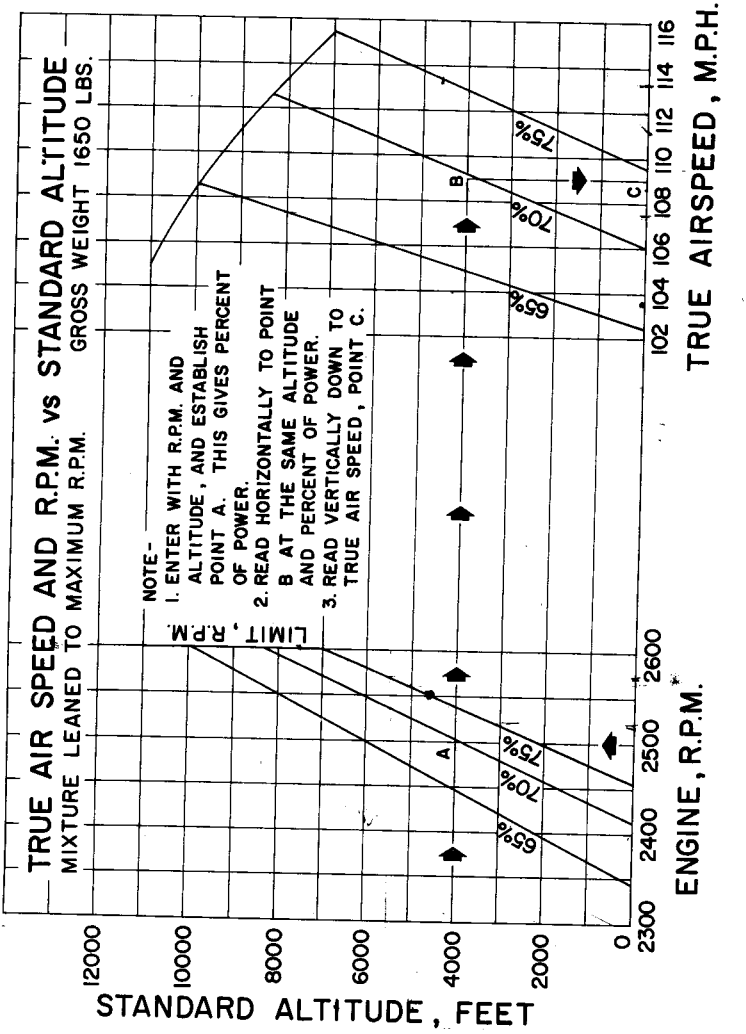

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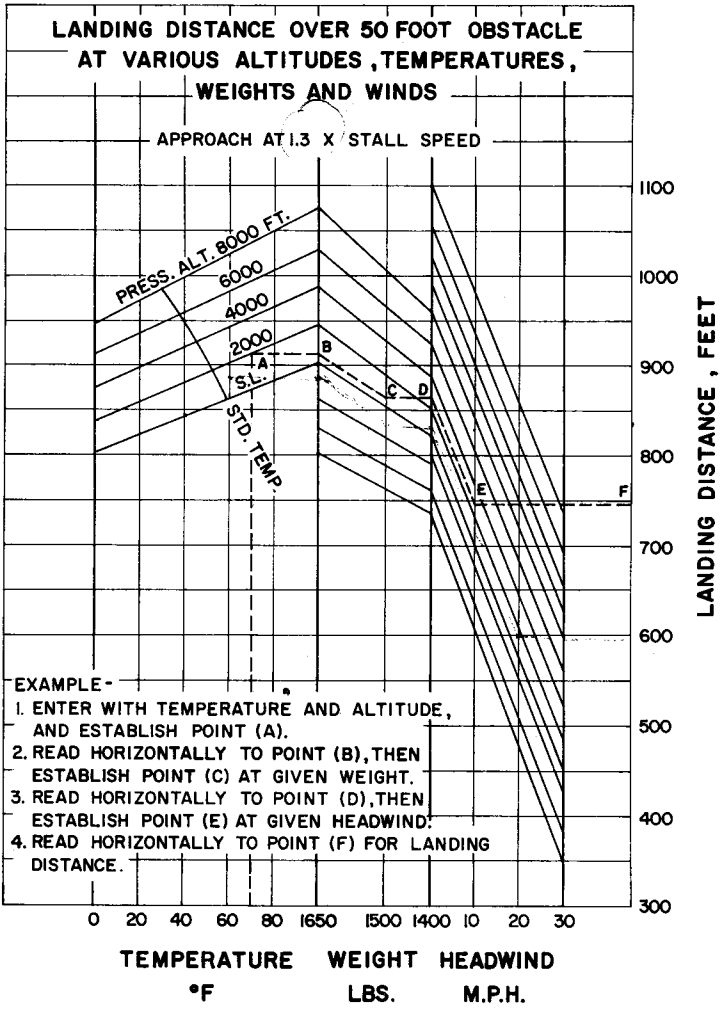

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SECTION V

MAINTENANCE

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

TIRE INFLATION

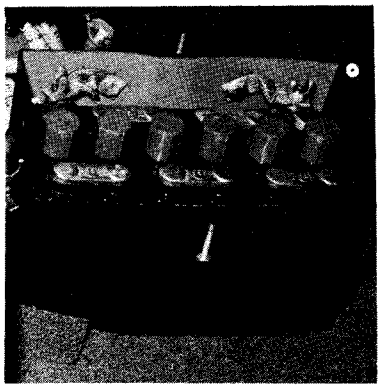
For maximum service from the tires, keep the Colt main tires at 22 lbs., and the nose tire at 15 lbs. Reverse the tires on the wheels, if necessary, to produce even wear.

BATTERY SERVICE

A 12 volt, 24 ampere hour battery is installed under the right front seat in a stainless steel battery box. Access to the battery is obtained by removing the seat.

The battery should be checked frequently for proper fluid level, but must not be filled above the baffle plates. All connections must be clean and tight.

If the battery is not up to proper charge, recharge starting with a charging rate of 4 amps and finishing with 2 amps. If a quick charge is desired for the battery, the master switch must be off during charging.



BRAKE SERVICE

The brake master cylinder in the Colt is a dependable

diaphragm type requiring a minimum of servicing. It can be refilled when necessary at the filler plug on top of the cylinder. Univis No. 40 (petroleum base) hydraulic oil is used here as in the hydraulic units on other Piper products.

To refill the cylinder (1) apply hand brake hard, forcing fluid into brake lines and shoes; (2) apply parking brake to lock fluid in position; (3) remove filler plug and add oil until cylinder is full; (4) replace plug, release brakes, and check wheels to see that they still turn freely — if not, release a small amount of fluid at the brake bleeder valve at the wheel, and recheck.

To fill the brake system with fluid initially, (1) loosen brake bleeder valve at wheels; (2) add fluid at cylinder until fluid flows from bleeders, then tighten valves; (3) install plug at cylinder; (4) apply brake and parking brake to force fluid downward in system; (5) open bleeder valves to allow air to escape at wheels; (6) continue to add fluid at cylinder and bleed air from valve until air is eliminated, then refill cylinder and check wheels for free movement.

The position of the hand brake control should be such that hand movement in the cockpit is nearly horizontal rather than upwards. An adjustment of the cable length is provided at the cylinder to position the brake handle. Usually an excessive travel of the brake handle indicates that brake fluid needs replenishing.

The brakes can be adjusted for clearance between the brake shoes and the drums by rotating two cams located on the brake flange as follows:

(1) Place the axle of the wheel to be adjusted on a jack or block so that the wheel turns freely.

(2) Loosen the lock nuts which lock cams in position.

(3) Rotate the cams until the wheel can just be turned without brake friction.

(4) Tighten the lock nuts, making sure that the cams do not change position while being locked in place.

The main wheels are removed by detaching hub caps and dust caps, removing the axle nuts, and sliding the wheel

from the axle. To remove the nose wheel, remove one axle nut, slide the axle through the nose wheel fork, and drop the wheel from its fork. In reinstalling the nose wheel, the axle nuts should not be drawn up tight enough to bind wheel bearings.

Tires (600 x 6 balanced four ply on all wheels) are dismounted from wheels by (1) deflating tubes; (2) removing wheel from axle; (3) taking stop nuts from wheel through-bolts; (4) withdrawing the two halves of wheel from tire.

LANDING GEAR SERVICE

The Hydrasorb units on the Colt incorporate a hydraulic shock absorber unit and two 8" x 5/7" shock cords. The units can be removed for servicing as follows: (1) raise the airplane until the main wheels do not touch; (2) remove the front seat; (3) remove the upper Hydrasorb attaching bolts and raise the main gear to lower the Hydrasorb unit; (4) detach lower end of units.

The shock cords on the Hydrasorb units should be replaced if they become weakened. The hydraulic units cannot be repaired and must also be replaced when worn.

The nose wheel mounting on the Colt is readily removed for service as follows:

(1) Push tail of plane down until tail skid rests on ground. Hold tail in this position with tie down or by resting a load on the stabilizer. (It is suggested that sand bags be laid on a plywood sheet on the inboard part of the stabilizers. Care must be taken not to damage the stabilizer adjustment mechanism or the fabric.) This raises nose wheel from the ground so that it can be removed.

(2) Remove bottom cowl.

(3) Detach steering rods from nose wheel steering arms at top of strut.

(4) Remove nuts from lower motor mount bolts, on firewall, and drive the bolts back to the motor mount bushings, being careful not to drive the bolts completely through the bushings as all the engine weight will be applied to upper

motor attachments, causing damage to the mount. Then remove bolts from upper attachment of nose wheel mount to motor mount.

(5) Slide nose wheel unit forward and down to clear it of motor mount.

The nose wheel shock absorbing unit is an oleo-pneumatic strut in which the air operating under pressure serves as the taxiing shock absorber, while the oil absorbs the major loads. The entire oleo can be detached from the nose wheel mount as follows:

(1) After detaching bottom cowl, unsafety the oleo retainer nut on top of unit, and remove cap screw in top of steering arm assembly.

(2) Remove through bolt from steering arm assembly and detach assembly.

(3) Insert screw driver in slot in retainer nut and hold screw driver against the oleo housing to prevent the nut from turning.

(4) Rotate oleo unit by turning nose wheel to unscrew the unit from the retainer nut. When the nut is free the oleo may be removed from its housing.

Replacement of the oleo is done by reversing this procedure. A dust shield is located on top of the upper bearing and should be properly in place there after the oleo is reinstalled. At this time the sealing of the bearings should also be checked, and the retainer nut pulled down to the proper position. To get a snug fit of the oleo strut on the bearings, pull the nut up tight, then back it off enough so that the oleo can be rotated freely but has no play.

The chrome-plated oleo piston tube is removed in order to replace seals, which consist of 2 "O" rings and a rubber wiper strip, located on the bearing block assembly. The oleo unit can be disassembled with the nose wheel housing and the outer tube of the oleo strut in place on the airplane as follows:

(1) Let air escape from air valve at top of unit, then remove valve core.

(2) Detach lower end of oleo torque link assembly from

fork block.

(3) Remove lower snap ring, located inside and at bottom of outer oleo strut tube, with small nosed pliers.

(4) Slide piston tube and bearing block assembly out of outer tube.

(5) Remove upper snap ring on piston tube.

(6) Slide bearing block off top of piston tube, taking precaution not to damage "O" rings in the process.

To reassemble to oleo unit, reverse this procedure, being very careful to see that the snap rings are properly reinstalled.

Univis No. 40 petroleum base hydraulic oil is used in the nose oleo. To add oil to the unit, first release all the air through the air valve, allowing the oleo to compress fully. Next remove the air valve core and fill the unit through this opening, extending the strut slowly while adding fluid. Compress the oleo again to within 1/4" of full compression, allowing excess oil to overflow and working out any trapped air. Then reinsert the air valve and pump up the strut.

The nose wheel oleo strut of the Colt is properly extended when 3-1/2" of the chrome plated tube is exposed with the plane in normal ground attitude at normal flight weight (no occupants or baggage). This dimension is controlled by changing the air pressure in the unit.

To add air to the nose gear, first unfasten the right side of the bottom engine cowl. Unscrew the air valve cap on top of the oleo unit and attach a high capacity air hose or pump. Increase the air pressure in the oleo until five or six inches of the chrome strut is exposed. Then release air from the valve in short spurts until the 3-1/2" dimension is obtained. Rock the airplane longitudinally, working the nose wheel oleo to make sure of proper extension after normal operation.

Shimmy of the steerable nose wheel is controlled by means of a shimmy dampener which is attached to the right side of the nose wheel mount. This dampener should require no servicing other than routine inspection during periodic checks. In case of damage or malfunctioning, the dampener should be replaced rather than repaired. In installation of the dampener, vertical

alignment of the piston rod with nose wheel steering arm must be maintained to prevent binding of the rod during its full travel.

Steering of the nose wheel is effected by use of the rudder pedals which acuate steering rods connected to steering arms at the top of the nose wheel unit. The length of the steering rods can be adjusted at either end by turning the threaded eye bolts in or out. Adjustment is normally accomplished at the forward end of the rods, and should be done in such a way that the nose wheel is in line with the fore and aft axis of the plane when the rudder pedals and the rudder are centered. Alignment of the nose wheel can be checked by pushing the airplane back and forth with the rudder centered to determine that the plane follows a perfectly straight line. Turning arc of the nose wheel is 20 degrees in each direction and is adjusted at stops on the steering arm.

FUEL AND OIL REQUIREMENTS

Aviation fuel with a minumum grade of 80/87 octane must be used in the O-235-C1B engine. Under no circumstances should lower grade fuels be used, and the use of such fuels will invalidate the engine warranty.

The tank and line sumps should be drained regularly to remove water or sediment.

The oil capacity of the Lycoming O-235-C1B is 6 quarts. It is recommended that engine oil be changed every 50 flying hours (sooner under unfavorable conditions). The minimum safe quantity of oil required is 2 quarts. The following grades are recommended for the specified temperatures:

Temperatures above 60° F . . . . S.A.E. 50
Temperatures 30° F to 90° F. . . S.A.E. 40
Temperatures 0° F to 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 and depending on the type of condition existing, it may be necessary to clean the filters daily or every five hours. Extra filters are inexpensive and should be kept on hand and used for quick replacement.

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

(1) Remove filter from carburetor air box.

(2) Wash thoroughly, soiled face flown in cleaning fluid and allow to dry. (Cleaning fluid may be gasoline, kerosene, or naphtha).

(3) Immerse filter in mixture of three parts oil, specification MIL-L-6082, grade 1100 SAE 60 and one part corrosion preventative compound, specification AN-VV-C-576, and allow to drain for two to four hours. (SAE 50 may be used in lieu of grade SAE 60.)

(4) Wipe off excess oil and reassemble to carburetor air box.

CARE OF WINDSHIELD AND WINDOWS

The windshield and windows are made of plexiglass and a certain amount of care is required to keep them clean and clear. The following procedure is suggested:

(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 soft dry cloth.

(5) A severe scratch or mar can be removed by using jewelers rouge to rub out scratch, smooth on both sides and apply wax.

SERIAL NUMBER PLATE

The serial number-plate on the Colt is located on the right front floorboard under the carpet.

LEVELING AND RIGGING

(1) Leveling — Place adjustable jacks or blocks under the axle extension so that the jacks or blocks do not touch the brake lines or connections. Raise each wheel by pushing up on the lift struts on one side and pulling down on the opposite side. All lifting or pulling pressure must be applied as near to the wing attachment points as possible to be sure that the lift struts will not be bowed.

To level the airplane laterally, remove lower right wing root fairing, drop a plumb bob on a string from the hole located on the side of the upper door frame member approximately 5-3/4 inches aft of the front door frame member, to the center punch mark located on the seat front tube just inside the door. Adjust the jacks or blocks until the plumb bob centers over the mark.

The airplane is longitudinally leveled either by raising the nose wheel with blocks or lowering it by releasing air from the tire until the plumb bob is centered.

(2) Dihedral Angle — Stretch a length of string from wing tip to wing tip along the top of the wing at the front spar location. Measure down from the string to the top of the fuselage front wing hinge fittings a distance of 4-7/8 inches. Adjust the front lift strut fork fittings in or out to produce this dimension.

To check for equal dihedral in each wing use a 30-inch level held spanwise against the underside of the wing at the front spar location. Note the amount of off level on one wing and see if the other wing has the same amount of off level. Adjust the front lift strut forks in on one side and out on the other to get the same amount of off level in both wings. Check the 4-7/8 inch dimension after this adjustment to see that it has not been affected by the equalizing adjustment.

(3) Wash-Out — Place a 1-3/8 inch block under the wing at the rear spar location at the outboard aileron rib. Place a 30-inch level chord-wise across this block with the front end of the level at the front spar location. The bubble will center if the wing has the proper 2-1/2 degree washout. Adjust the rear lift strut forks in or out to bring the bubble to center.

(4) Tail Assembly — Level the stabilizers at the rear spar with the airplane in level position. Adjustment is accomplished by the tightening and loosening of the tail brace wires. Take up as many turns as the opposite wires are let out, to keep the same tension on the wires. Do not scratch or mar the wires with pliers or wrenches as this may cause the wires to fracture. Plumb the rudder hinge line. Slight adjustments can be accomplished by firmly pushing against the fin rear spar in that direction required to bring the hinges in line.

(5) Control Surface

Aileron	15° up	15° down
Elevator	24° up	12° down
Rudder	16° R	16° L
Stabilizer	1° up	6-1/2° down

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