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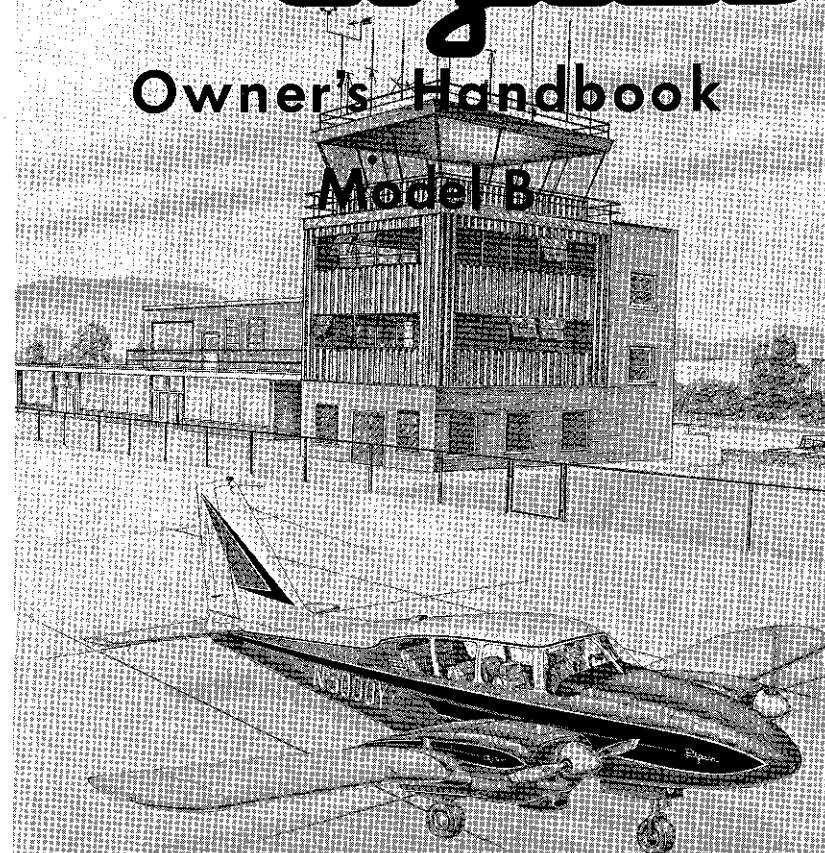


**AZTEC B
OWNER'S HANDBOOK**

the
PIPER *Aztec*

Owner's Handbook

Model B



Model PA-23-250 (Six-Place)

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

Additional copies of this manual may be purchased by writing to the SERVICE SPARES DEPARTMENT, PIPER AIRCRAFT CORPORATION, Lock Haven, Pennsylvania, 17745, U. S. A.

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SECTION I

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SPECIFICATIONS:POWER PLANTPA-23-250 (six place)

Engine	Lyc. O-540-A1D5
Rated Horsepower	250
Rated Speed, RPM	2575
Bore, inches	5-1/8
Stroke, inches	4-3/8
Displacement, cubic inches	541.5
Compression Ratio	8.5:1
Dry Weight, pounds	396
Fuel Consumption (65% power, gph, leaned)	12
Oil Sump Capacity, quarts	12
Fuel Aviation Grade Octane	91/96

PERFORMANCE

Take-off Run (ft.)	750
Take-off Run over 50 ft. barrier	1100
Minimum Controllable Single Engine Speed (MPH)	80
Best Rate of Climb Speed (MPH)	112
Rate of Climb (ft. per min.)	1650
Best Angle of Climb Speed (MPH)	92
Best Single Engine Rate of Climb Speed (MPH)	110
Single Engine Rate of Climb (left engine out) (ft. per min.)	350
Absolute Ceiling (ft.)	22,500
Service Ceiling (ft.)	21,000
Single Engine Absolute Ceiling (left engine out) (ft.)	8800
Single Engine Service Ceiling (ft.) (left engine out)	7400
Top Speed (MPH)	215
Optimum Cruising Speed (75% power at 7,000) (MPH)	205

SECTION I

THE PIPER AZTEC "B"

SPECIFICATIONS: (cont)PERFORMANCEPA-23-250 (six place)

Cruising Speed (65% power at 10,000 ft.) (MPH)	200
Sea Level Cruise Speed (75% power) (MPH)	191
Stalling Speed (MPH) (flaps down)	62
Landing Roll (ft.)	900
Landing Roll over 50 ft. barrier	1260
Fuel Consumption (Gal. per hr. at 75% power) (gph)	28
Fuel Consumption (gal. per hr. at 65% power) (gph)	24
Cruising Range (maximum at 75% power at 7,000 ft.) (mi.)	1025
Cruising Range (maximum at 65% power at 10,000 ft.)	1200
Cruising Range (45% power at 10,000 ft.)	1400

Published figures are for Standard airplanes flown at gross weight under standard conditions at sea level unless otherwise stated.

WEIGHTPA-23-250 (six place)

Gross Weight (lbs.)	4800
Empty Weight (Standard) (lb.)	2900
Empty Weight (AutoFlite) (lbs.)	2990
USEFUL LOAD (Standard) (lbs.)	1900
USEFUL LOAD (AutoFlite) (lbs.)	1810

FUEL AND OIL

Fuel Capacity (gal.)	144
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THE PIPER AZTEC "B"

SECTION I

SPECIFICATIONS: (cont)FUEL AND OILPA-23-250 (six place)

Fuel Aviation Grade (Octane)	91/96
Oil Capacity (qts.)	12

BAGGAGE

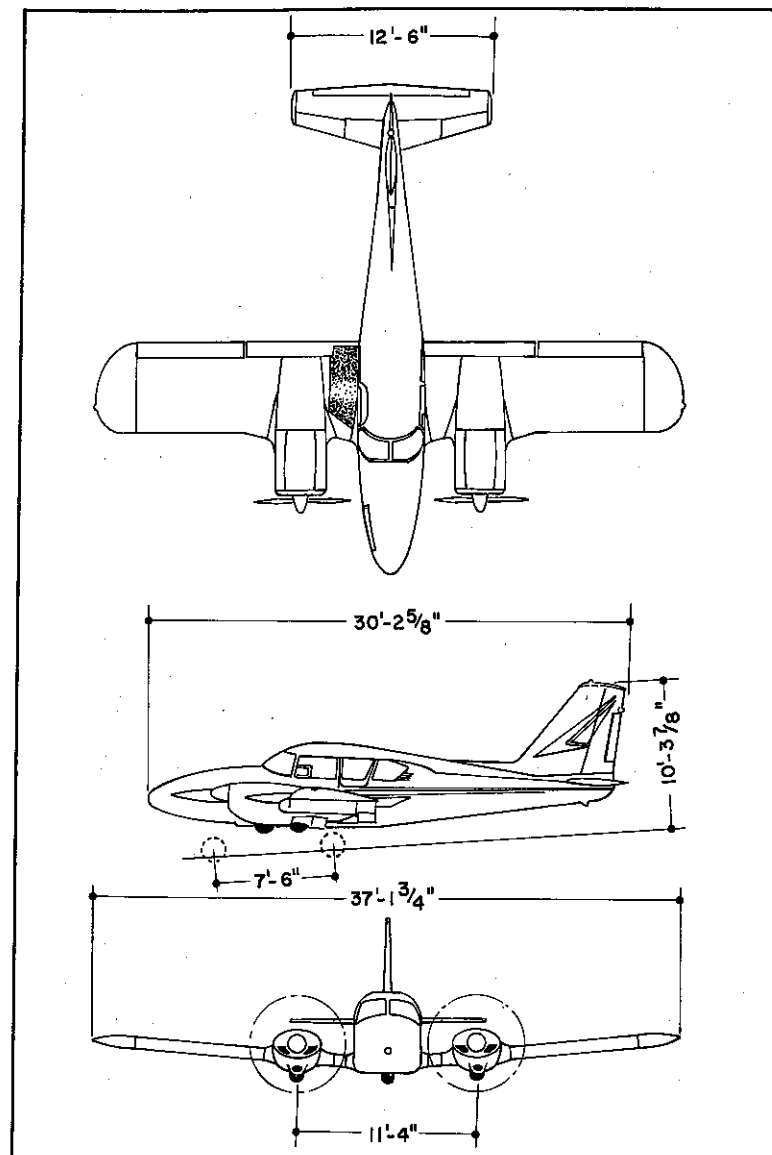
Maximum Baggage (lbs.) Forward Compart.	150
Maximum Baggage (lbs.) Rear Compart.	150
Baggage Space (cubic ft.) Forward Compart.	17.75
Baggage Space (cubic ft.) Rear Compart.	20.25
Baggage Door Size (in.) Forward Compart.	19.5 x 30.5
Baggage Door Size (in.) Rear Compart.	22.5 x 22.5

DIMENSIONS

Wing Span (ft.)	37' - 1-3/4"
Wing Area (sq. ft.)	207.56
Length (ft.)	30' - 2-5/8"
Height (ft.)	10.3
Wing Loading (lbs. per sq. ft.)	23.5
Power Loading (lbs. per HP)	9.6
Propeller Diameter - Max. (in.)	74

LANDING GEAR

Wheel Base (ft.)	7.3
Wheel Tread	11.3
Tire Pressure	Nose 27
	Main 42
Tire Size	Nose (four ply rating) 600 x 6
	Main (eight ply rating) 700 x 6



SECTION II

DESIGN INFORMATION

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SECTION II

DESIGN INFORMATION

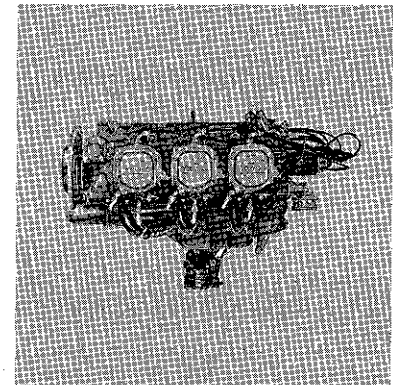
ENGINES AND PROPELLERS

The Lycoming O-540-A engines in the Aztec are rated at 250 HP at 2575 RPM. These engines have a compression ratio of 8.5:1 and use 91/96 minimum octane Aviation fuel.

Both engines on the standard and AutoFlite Aztec are equipped with a geared starter, generator, vacuum pump, float type carburetor, two magnetos, shielded harness, shielded spark plugs, diaphragm fuel pump, propeller governor and an oil thermostat. The left engine only is equipped with a hydraulic pump.

Engine mounts are of steel tubing construction and incorporate vibration absorbing Lord mounts. Engine cowls are largely interchangeable and are cantilever structures attached at the firewall. Side panels are quickly removable by means of quick release fasteners. The nose section is split for quick removal.

The exhaust system is a straight type with exhaust gases directed into muffled jet augments tubes located on the outboard side of each engine. This system provides for exhaust elimination without power loss, and effective engine cooling through the pumping action of the exhaust gases into the augments tubes, which draws cooling air through the engine compartment; no cowl flaps or cooling flanges are needed on the cowl. Higher aircraft speeds are obtainable with this system due to reduced cooling drag and due to extra



thrust furnished by the exhaust augmentation.

Efficient aluminum oil coolers are mounted on the rear of each engine firewall. Engine oil drainage is accomplished with quick oil drain valves located on the left rear corner of the engine crankcases.

Carburetor air is directed through quickly removable filters, located in the nose cowl, to the carburetor air boxes. Heated air for the carburetors is taken from shrouds on the exhaust manifolds through flexible tubes to the air boxes. (See Section III, for carburetor heat application.)

The propellers on the Aztec are Hartzell HC-82XK-2C1 or HC-A2XK-2 constant-speed controllable full-feathering units. These are controlled entirely by use of the propeller pitch levers located in the center of the control quadrant. Feathering of the propellers is accomplished by moving the controls fully aft through the high pitch detent into the feathering position. Feathering takes place in approximately three seconds. A propeller is unfeathered by moving the prop control ahead and engaging the starter. (See Section III, for complete feathering and unfeathering instructions.)

FUSELAGE AND WING STRUCTURES

The Aztec fuselage is a composition of four basic units: The sheet metal tail cone, cabin section, nose section, and the steel tubular structure which extends from the tail cone to the nose wheel. The steel tube unit is intended to withstand the high loads imposed on the center section region of the airplane, and provides an extra safety factor in this area.

Finish on the tubular unit, as on all steel tube structures are zinc chromate primer with synthetic enamel.

The wing structure is lightweight but rugged, and consists of a massive stepped-down main spar, a front and rear spar, lateral stringers, longitudinal ribs, stressed skin sheets, and a readily detachable wing tip section. The rectangular plan form of the wing permits the use of many interchangeable parts and simplifies the construction while providing for excellent

stability and performance characteristics.

The wings are attached to the fuselage steel tubular structure with fittings at the sides and in the center of this structure, and the main spars are bolted to each other with high strength butt fittings in the center of the fuselage, making in effect a continuous main spar. This arrangement combines high strength and lightweight qualities, since heavy wing hinge fittings on the spars and fuselage are eliminated and an elaborate carry-through structure through the center section of the fuselage is no longer needed.

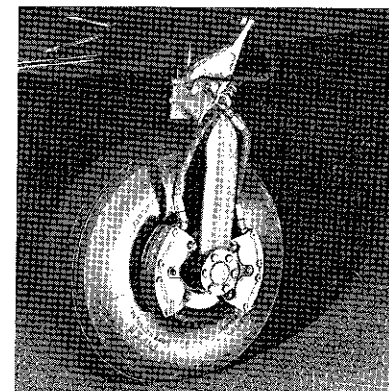
LANDING GEAR

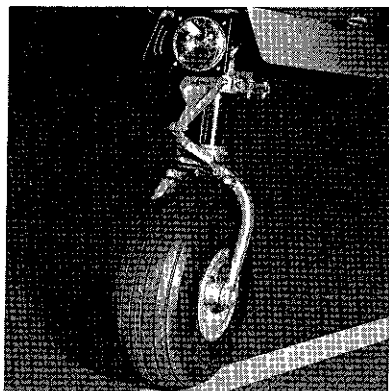
All three landing gear units on the Aztec incorporate the same soft acting air-oil struts, and contain many directly interchangeable parts. (See Section V, for gear maintenance.)

Main wheels are 600 x 6 Cleveland Aircraft Products units with disc type brakes and 700 x 6 tires with an eight ply rating. The nose wheel is a Cleveland 600 x 6 model fitted with a 600 x 6 with a four ply rating. All tires have tubes. (See Section V, for tire service.)

Main gear brakes are actuated by toe brake pedals on the left set of rudder pedals. Hydraulic brake cylinders located in front of the left rudder pedals are readily accessible in the cockpit for servicing. A brake fluid reservoir which is connected to the brake cylinders with flexible lines provides a reserve of fluid for the brake system, and is mounted on the fuselage structure inside the left nose access panel. (See Section V, for brake service.)

Parking brake valves, operated by a control on the left side of the instrument





panel, are installed ahead of the forward cabin bulkhead and are also serviced through the left nose access panel.

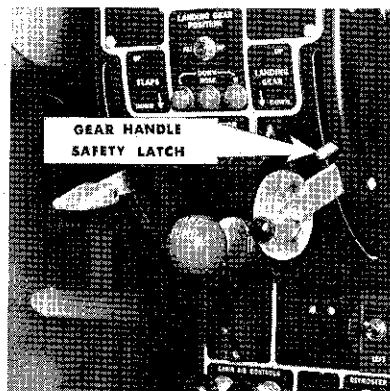
The nose wheel is steerable through a 30 degree arc through use of the rudder pedals. As the nose gear retracts, the steering linkage becomes disconnected from the gear so that rudder pedal action with the gear retracted is not im-

peded by nose gear operation.

The position of the landing gear is indicated by four light bulbs located on the pedestal. When the three green lights are on, all three legs of the gear are down and locked; when the amber light is on, the gear is entirely up, and when no light is on, the gear is in an intermediate position.

A red light in the landing gear control knob flashes when the gear is up and either one of the throttles is pulled back. When both throttles are closed beyond a given power setting, (approximately 12" hg. manifold pressure) with wheels not down, the landing gear warning horn sounds.

To guard against inadvertent retraction of the landing gear on the ground, a mechanical latch, which must be operated before the landing gear control can be moved upward, is positioned just above the control lever. The control knob is in the shape of a wheel to differentiate it from the flap control knob which has an air-foil shape. There is also an anti-retraction valve located on the left main gear which



prevents a build-up of hydraulic pressure in the retraction system while the weight of the airplane is resting on its wheels.

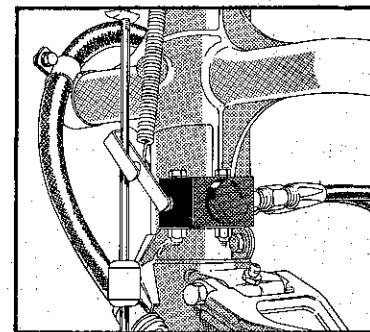
HYDRAULIC SYSTEM

The hydraulic system is used for the extension and retraction of both the landing gear and flaps. The operation of these units is accomplished by the landing gear and flap selector valve unit which is housed within the control pedestal under the engine controls. Pressure is supplied to the control unit from an engine driven pump mounted on the left engine.

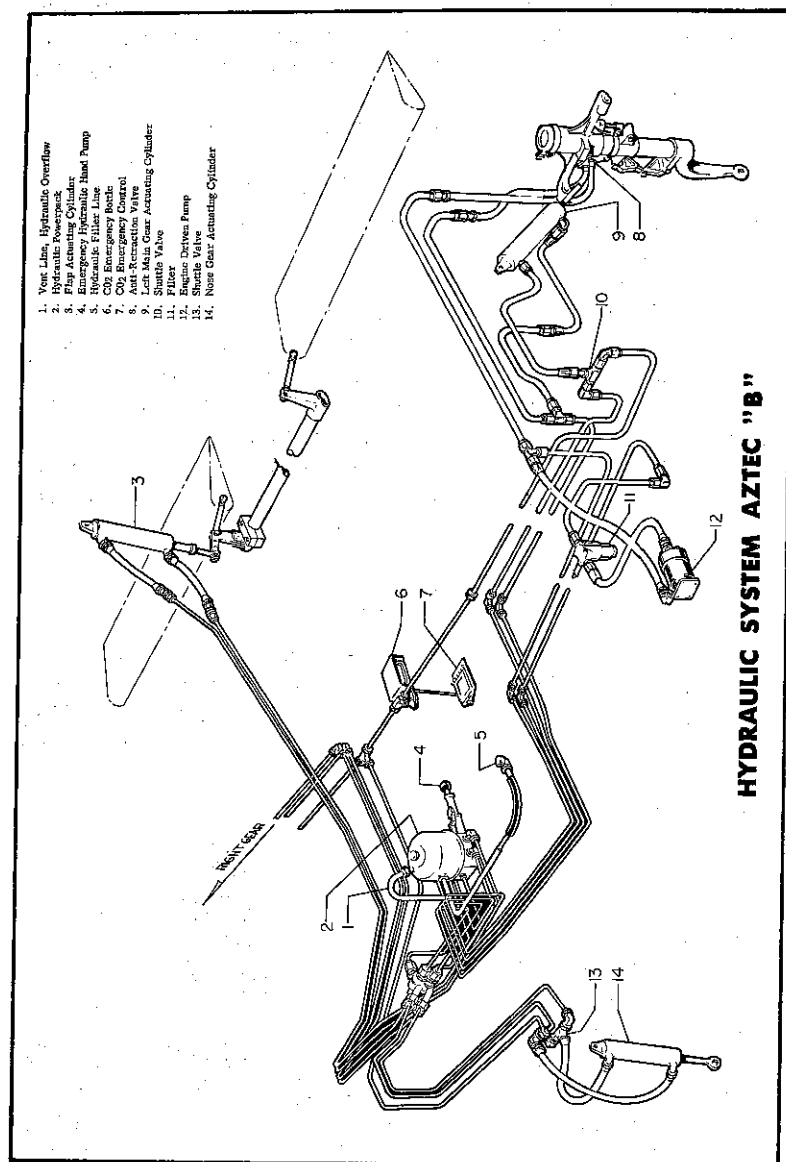
To effect extension or retraction of the gear and flaps, the controls which protrude through the face of the pedestal are moved from the center "OFF" in the desired direction. When the selected component is fully extended or retracted, hydraulic pressure within the selector valve unit forces the control back to a "Neutral" or "Off" position, which allows the hydraulic fluid to circulate freely between the pump and the control unit. Also, it isolates the activating cylinders and associated lines from the hydraulic fluid supply. This prevents complete loss of fluid in the event of a leak in the lines between the selector valve and the component or at the actuating cylinders. The return of the control handle to the "Off" position is also a secondary indication that the components have reached full extension or retraction. The landing gear position lights and the flap indicator should be used as primary indications.

Gear retraction and extension will occur normally in 10 to 12 seconds. The flap operation requires about 4 seconds.

The emergency hydraulic hand pump, which is integral with the selector valve unit, is used to obtain hydraulic pressure in event of failure of the hydraulic pump on the left



Anti-Retracton Valve



engine. To operate the emergency pump, the handle should be extended to its full length by pulling aft and positioning the control handle as desired. 38 to 40 pump strokes are required to raise or lower the landing gear.

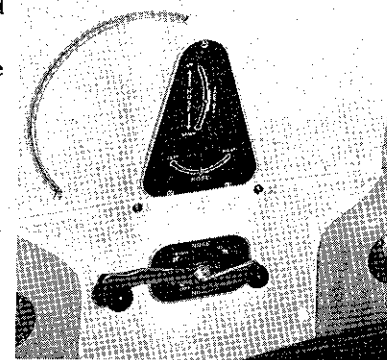
For emergency extension of the landing gear, if failure of the hydraulic system should occur due to line breakage or selector valve malfunction, an independent CO₂ system is available to extend the landing gear. (See Section III, Emergency Landing Gear Extension.)

Included on the left main gear is an oleo actuated by-pass valve which makes it impossible to retract the landing gear while the weight of the airplane is on the gear. This valve is open when the oleo strut is compressed and by-passes all hydraulic fluid, on the pressure side of the system, to the return side, preventing any pressure build-up in the retraction system. When the oleo strut is extended as in flight, or when the aircraft is on jacks, the valve is closed, permitting the system to operate in the normal manner.

CONTROL SYSTEM AND SURFACES

Dual wheel and rudder flight controls are provided in the Aztec as standard equipment. All controls are light yet solid and effective in flight at all speeds down through the stalling speed. The nose wheel is steerable on the ground through the rudder pedals. The left set of rudder pedals are equipped with toe brakes.

All control surfaces are cable controlled and are conventional sheet metal structures, fitted with cast aluminum hinges and needle bearings. The flaps are actuated by a hydraulic cylinder located in the right side of the cabin wall. Access to this cylinder is obtained by the removal of



the upholstered interior panel directly under the forward corner of the rear window.

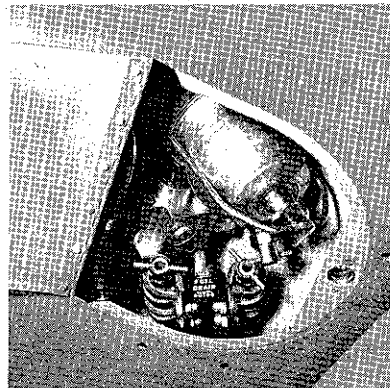
The ailerons and rudder are connected by cables with the control wheel and rudder pedals. The rudder has a servo tab which also acts as a directional trim tab, actuated by a crank in the center of the forward cabin ceiling.

The horizontal tail is a stabilator, with an anti-servo tab which also acts as longitudinal trim tab, actuated by a larger crank adjacent to the rudder tab crank in the center of the forward cabin ceiling. The stabilator provides extra stability and controllability with less size, drag and weight than with conventional horizontal tail surfaces.

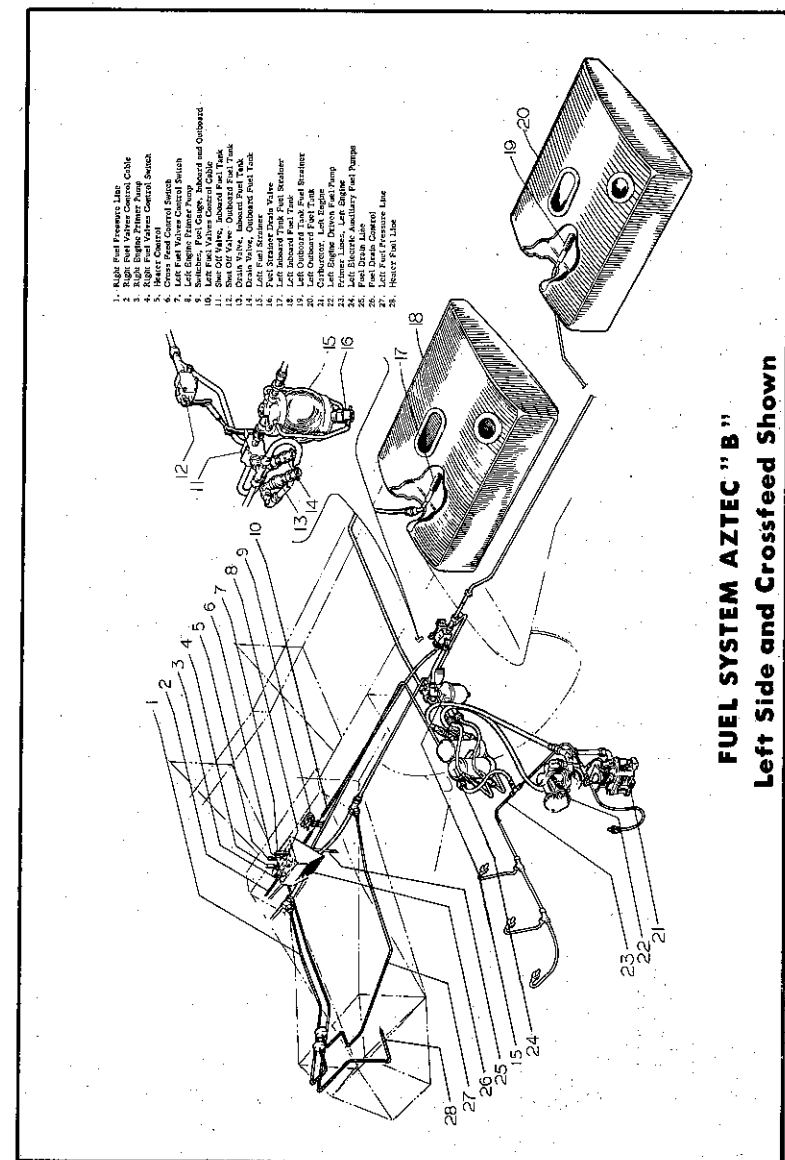
FUEL SYSTEM

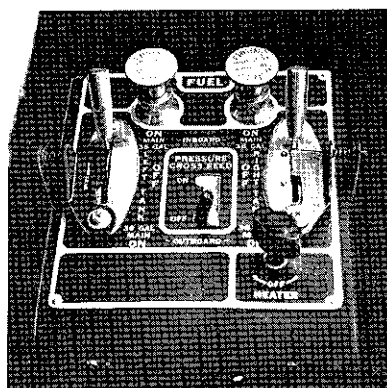
Four thirty-six gallon flexible fuel cells located out-board of the engines provide fuel storage in the Aztec. The cells should be kept full of fuel during storage of the airplane to prevent accumulation of moisture, and to prevent deterioration of the cells. For long term storage without fuel, the cells should be coated with light engine oil to keep from drying out.

The fuel system in the Aztec is simple, but completely effective. Fuel can be pumped from any tank to both engines, through use of the engine driven and/or electric fuel pumps.



For normal operation, fuel is pumped by the engine driven pumps from the tanks directly to the adjacent carburetors. The fuel valves can be left on at all times and the crossfeed left in the off position. Electric auxiliary fuel pumps, located in the engine compartments, are installed in bypass fuel lines between the tanks and the engine driven





critical times.

If one of the engine driven pumps fails, the electric pumps to that engine can be turned on to supply the fuel. However, if desired, the fuel can be pumped by the operating engine driven pump to the failed pump engine simply by turning on the cross-feed. The good pump will then be supplying both engines from its tank. If this tank runs low on fuel, fuel can be drawn from the opposite tank by turning on the electric pumps on the failed pump side, leaving the crossfeed on, and turning the fuel valve on the empty tank off. Then the electric pumps on the failed pump side will be supplying both engines from its tank.

Fuel can thus be used from one tank or the other, by shutting off one main valve and turning on the crossfeed, to balance fuel loads or for other purposes. For all normal operation, it is recommended that fuel be pumped directly from the tanks to their respective engines, with the crossfeed off.

The fuel valve controls and crossfeed control are located with the engine primer pumps in fuel control panel between the front seats. Two electric fuel gauges in the engine gauge cluster on the instrument panel indicate the fuel quantity in each tank. (Caution) The electric fuel gauges indicate the fuel quantity in the tank selected by the fuel selector handle located in the fuel control box. The electric fuel pump switches are on the lower left side of the instrument panel.

pumps. The electric pumps can be used to provide pressure in the event of failure of the engine driven pumps. They are normally turned on to check their operation before starting the engines, turned off after starting, to check engine-driven pumps and left on during take-off and landing, to preclude the possibility of fuel pressure loss due to pump failure at

A crossfeed line drain valve control is mounted on the front face of the fuel control panel box. This valve should be opened occasionally, with the crossfeed on, the left electric fuel pump on, and then the right electric fuel pump on to allow any water that might accumulate at that point to be drained out. The heater fuel control is also placed on the fuel control panel, so that fuel to the heater can be turned off if necessary.

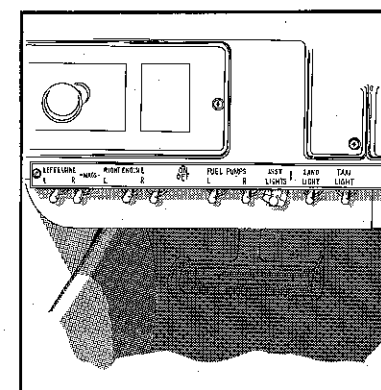
The fuel strainers and fuel line drain valves are located in the inboard sides of the main wheel wells. They are fitted with quick drains and should be drained regularly through their small access ports. In order to check the fuel system for possible moisture content, the inboard fuel cell line quick drain valve should be opened and drained and the quick drain valve on the fuel strainer should be opened and drained. This procedure should be repeated at the three quick drain valves located in the other main wheel well. Fuel screens are provided at the tank outlets, in the carburetors and in the fuel pumps.

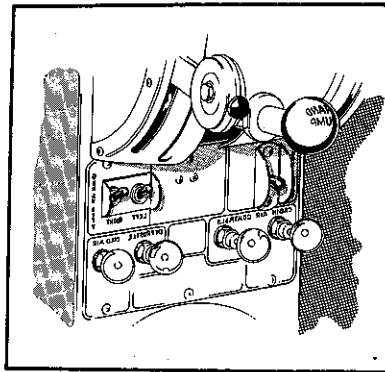
Idle cut-offs are incorporated in the carburetors and should always be used to stop the engines. This is accomplished by pulling the mixture control levers to the rearmost position.

ELECTRICAL SYSTEM

The master and generator switches for the electrical system are located on the lower portion of the control pedestal, along with the heating and ventilating control panel. Other electrical switches and circuit breakers are grouped on the lower left side of the instrument panel.

The starter switch is located immediately above the parking brake handle on the

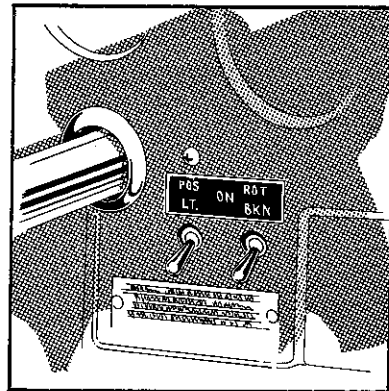




extreme left side of the instrument panel. This switch is spring loaded and locks in the center "Off" position. To operate, pull out on the switch and hold to left or right as desired. After starting, release the switch and it will return to the off and locked position.

Automatic circuit breakers are provided for all electrical circuits. These units automatically break the electrical circuit if an overload is applied to the system, preventing damage to the wires. To reset the circuit breakers, simply push in the buttons. Continual popping out of a circuit button indicates trouble in the electrical system and should be investigated. The circuit breakers can be manually tripped by pulling on knobs to isolate or determine the source of electrical trouble.

A 12-volt 33-ampere hour battery, enclosed in a sealed stainless steel battery box, is mounted in the nose section on the right side. (See Section V, for battery service.) Two 12 volt 50 ampere generators are installed as standard equipment.



The position lights and rotating beacon are turned on by separate switches located to the right of the control column. The landing and taxiing lights are also operated by individual switches located on the switch panel. Instrument lighting is provided by two spot lights (equipped with red lenses) installed in the center of the cabin ceiling. These lights

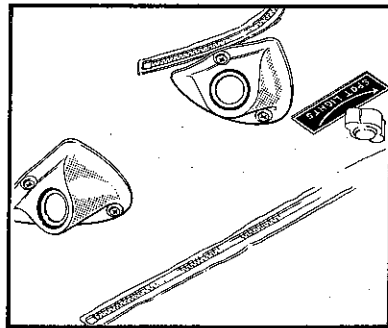
ELECTRICAL LOAD ANALYSIS AZTEC - 12 VOLT

A. MAXIMUM PROBABLE CONTINUOUS LOAD — (less radio equipment):

ITEM	NUMBER USED PER AZTEC	TOTAL CURRENT IN AMPERES	
		12.0 Volts	14.3 Volts
Flap Gauge	1		
Fuel Gauge	2		
Oil Temperature Gauge	2		
Carb. Temperature Gauge	1	.5	.6
L. G. Indicating Lights	1	.08	.1
Master Contactor	1	.6	.7
Navigation Lights	3		
Instrument Lights	2		
Compass Lights	1	4.6	5.5
Turn and Bank	1	.9	1.1
Heater (operating)	1	5.7	6.8
Pitot (operating)	1	10.9	13.0
Rotating Beacon (Grimes)	1	5.0	5.9

B. INTERMITTENT LOADS:

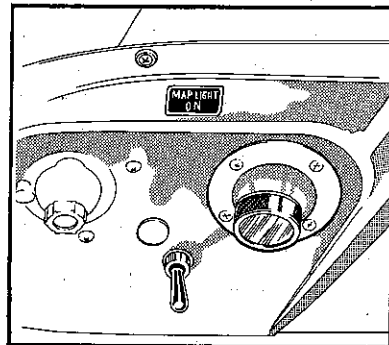
Dome Light	1		.6
Landing Lights	2	24.5	29.0
Fuel Pumps	4	1.6	1.9
Landing Gear Horn	1	.7	.8
Starter Solenoids	2	10.0 ea.	
Cigar Lighter	1	6.6	7.9



Instrument Spot Lights

lights are controlled by a rheostat switch located with the other electrical switches. Operation of the rheostat is the same as for the spot lights. Located in the cabin ceiling just aft of the windshield, on both the right and left sides, are installed two map lights equipped with clear lenses. The units are movable to provide light as desired for map reading, etc. Each light is operated by the switch located adjacent to the unit. Lighting in the cabin, interior is provided by a dome light installed in the center of the cabin ceiling. A switch is incorporated in the unit.

Generator switches are mounted on the lower right side of the pedestal. A voltage regulator for each generator is attached to the adjacent firewall. A paralleling relay equally divides the total electrical load between generators. When one engine is stopped a reverse current relay automatically disconnects that generator from the circuit.



Map Light

As optional equipment an external power receptacle

is available.

WARNING

When utilizing external power source, airplane master switch must be in the "OFF" position.

FINISH

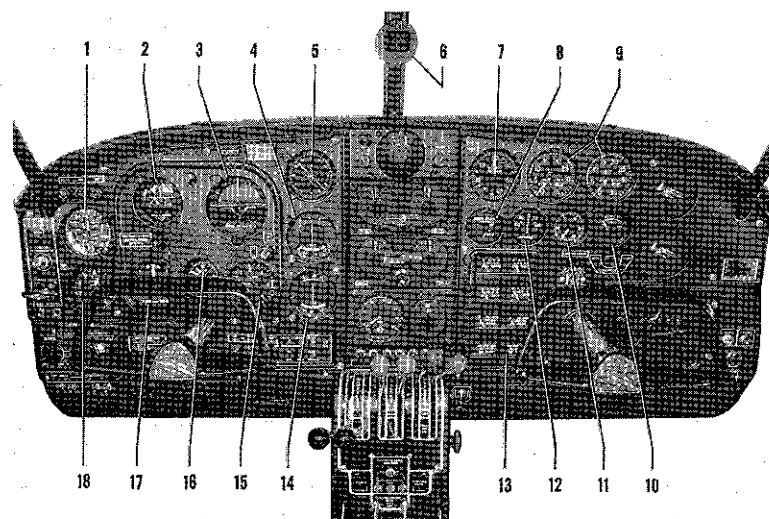
All aluminum sheet components of the Aztecs are carefully finished inside and outside to assure maximum service life. Both sides of all pieces are alodine treated, and sprayed with zinc chromate primer. External surfaces are coated with durable acrylic lacquer in attractive high gloss colors. The application 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.

Steel tubular structures are also finished with zinc chromate primer and enamel.

INSTRUMENT PANEL

The instrument panel of the Aztec has been designed to accommodate all of the customary advanced flight instruments on the left side in front of the pilot, and all required engine instruments on the right side. Provision for extra instruments has been made in both sections. The flight instrument group in shock mounted in an easily removed sub-panel. All instruments are accessible for maintenance by removing the instrument access panel over the instruments. Also the right and left instrument panels have been constructed so that they may be removed if desired for ease of maintenance.

The Artificial Horizon and Directional Gyro in the flight group are vacuum operated through use of vacuum pumps installed on both engines. A check valve is installed in the vacuum system so that in case of a pump failure the system will automatically continue to operate on the remaining vacuum source. The Turn and Bank is an electrically operated instru-



INSTRUMENT PANEL ARRANGEMENT

- | | |
|----------------------------|-----------------------------|
| 1. Airspeed Indicator | 10. Manifold Temp. Gauge |
| 2. Directional Gyro | 11. Suction Gauge |
| 3. Artificial Horizon | 12. Ammeter |
| 4. Omni Indicator | 13. Instrument Cluster |
| 5. ADF Radio Compass | 14. Omni Indicator |
| 6. Compass | 15. Rate of Climb Indicator |
| 7. Manifold Pressure Gauge | 16. Eight Day Clock |
| 8. Flap Indicator | 17. Turn and Bank Indicator |
| 9. Tachometer | 18. Altimeter |

ment and serves as a standby for the Gyros in case of vacuum system failure. The vacuum gauge in the engine instrument group should indicate 4.50 to 5.0 inches of suction, required to operate the gyros.

Two recording tachometers are provided to eliminate the need for constant reference to aircraft and engine log books. An engine instrument cluster, at the bottom of the engine group, includes two oil pressures, two

oil temperatures, two fuel pressures, two fuel quantity gauges. The gauges in this cluster can be replaced individually by removing the column of four gauges in which the defective unit is incorporated, then detaching the proper gauge from this column.

Radio units are installed in the center of the main panel. Radio power supplies are mounted on a shelf located at the rear of the forward baggage compartment.

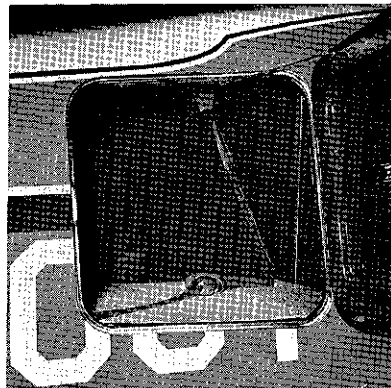
RADIO EQUIPMENT

In the standard model of the Aztec, provisions for radio installations include dual microphone and headset jacks, a microphone and headset mounting bracket, a loud speaker, wiring to these units and panel space for at least four radio sets. Radios, in different combinations, are available and are specifically chosen to provide in the Aztec all of the most recent radio developments normally desired in this type of aircraft.

SEATS

All seats in the Aztec are constructed of steel tubing, with no-sag springs and foam cushions. The front seats are adjustable fore and aft through a seven inch range by operation of a release control under the front of each seat. The right front seat is also adjustable aft beyond the normal range to provide ease of entry to the pilot's seat. Both front seats are easily removed by taking out the lower bolts in the stop plates at the rear of the seat structure, swinging the stop plates laterally and sliding the seats forward off their tracks.

The rear seat area is equipped with two individual bucket type seats and a couch type seat across the full width of the cabin which will accommodate two people. To remove the two rear bucket seats, stop plates on the track are taken off, and the seats moved fore or aft as required to disengage from their tracks. The rear seat can easily be removed for added cabin space. The top of the seat is removed first by pulling it



forward, then lifting it out. The bottom of the seat is pulled forward to disengage pins at the rear, then pushed back to disengage seat supports from the floorboards.

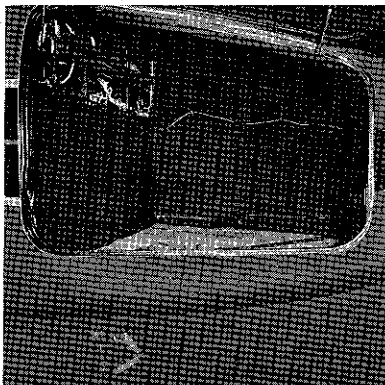
The four reclining seats are provided with headrests.

CABIN FEATURES

Arm rests for all seats, coat hangers, ash trays, a cigarette lighter, a spacious map drawer and glove compartment are all standard on the Aztec. The cabin door and baggage doors are equipped with locks. The locks on both baggage doors are operated by one key, while the cabin door has a separate key. A tow bar is provided with each airplane and, when not in use, is stowed in the forward baggage compartment.

BAGGAGE COMPARTMENTS

There are two large baggage compartments provided in the Aztec, each compartment is placarded for 150 pounds. The forward compartment provides 17.75 cubic feet of space accessible through a large rectangular door measuring 19.5 x 30.5 inches. The rear compartment has an area of 20.25 cubic feet with a large 22.5 inch square door hinged on the forward side.



Located in the forward baggage compartment is a shelf to provide ample room for the installation of power supplies, etc. for the various radios that are installed.

HEATING AND VENTILATING

The flow of air for cooling or heating the Aztec cabin may be controlled by the four knobs on the cabin air control panel, and by individual overhead outlets. Air is exhausted through an outlet on the rear trim panel of the cabin.

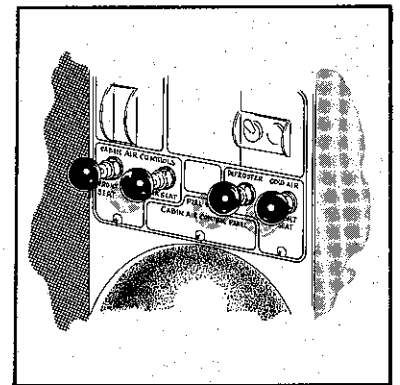
The left hand control regulates air flowing to the front seat through the heater system and the second knob from the left controls air flowing to the rear seat through this system.

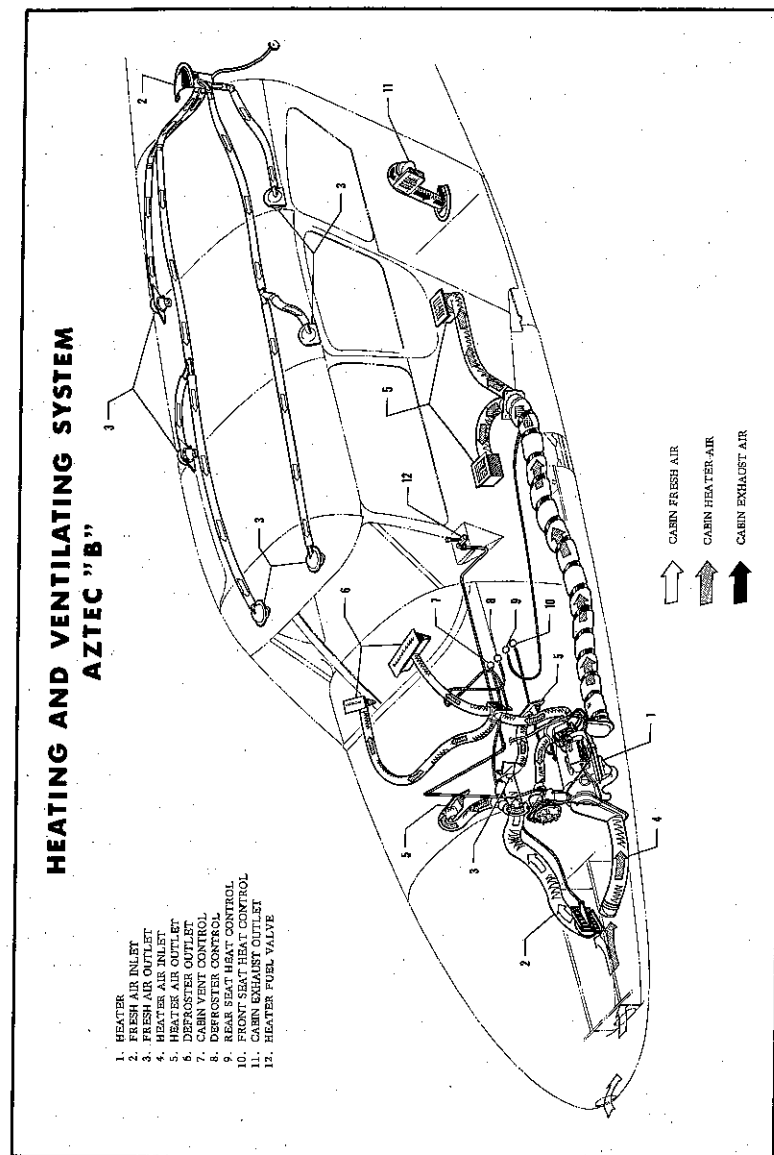
The second knob from the right is the defroster control and the right hand control supplies additional cold air to the front seat through a vent on the firewall.

Cabin air enters the heater system through an inlet below the landing light, and when heater is not in operation, the inlet can serve as a source for cool air by pulling out the heater controls. Air controlled by the right hand knob above is picked up by a scoop below the landing light. An additional scoop on the top of the airplane supplies the air for the overhead outlets.

A 27,500 B.T.U. Southwind heater installed in the nose section of the Aztec furnishes a source of hot air for cabin heating and windshield defrosting. Heater operation is controlled by an off-prime-low heat and high heat switch which is located on the right instrument panel above the glove compartment.

During ground operation when the landing gear is extended, the ventilating fan motor operates and provides hot air flow through the heater system. In flight, when the gear is retracted, a micro switch on the nose gear cuts off the heater fan, and the heater air is supplied by ram pressure through the nose inlet beside the landing light. This arrangement assures an adequate flow of air through the heater at all times.





To heat the cabin - (1) Turn the heater switch to high heat or low heat as desired, (2) adjust the left hand cabin air control to get the required heat to the front seat, (3) adjust the rear seat control to obtain the required flow to the rear seat area can also be regulated by opening or closing the shutters at the outlets in the floor. Low heat should be used to as low an outside temperature as possible, with the control valves fully opened if necessary; below this temperature, the high heat setting should be used.

Use of the high heat position on the ground may result in excessive exhaust smoke from the heater; therefore, high heat should only be used in flight and the low heat position be used for heating the cabin during ground operation.

The cabin heater uses gasoline from the left main fuel tank when the fuel crossfeed is off, and from both tanks when the crossfeed is on. Only about one quart of gasoline per hour is used by the heater at maximum output.

To turn the heater on, first ascertain that the heater fuel valve (on the fuel control panel) is on, then move the heater switch to "High" or "Low" heat. If the heater does not start promptly, return the heater switch to "Prime" position for 15 seconds to prime the heater; then upon moving the switch to "High" heat, the heater should start and continue to operate after 1 to 1-1/2 minutes of warm-up.

After the heater switch is turned to the "Off" position, combustion in the heater stops, but the combustion fan and the circulating air fan continues to operate for about two minutes, while the heater cools slowly and purges itself of hot air and fumes. To obtain best service life from the heater components, it is recommended that the heater switch be turned off about two minutes before stopping the engines and shutting off the master switch. This should normally be done during taxiing after landing.

The heater can be used to warm up the cabin before starting the engine by turning on the master switch, the left electrical fuel pump, and the heater switch. The operation of these units takes about 8 amps, and they should not be used in such a way as to run down the battery, making starting difficult.

There is a dump valve arrangement in the heater bonnet to exhaust excessive heat thereby making it possible to operate the heater with all controls in the closed position.

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SECTION III

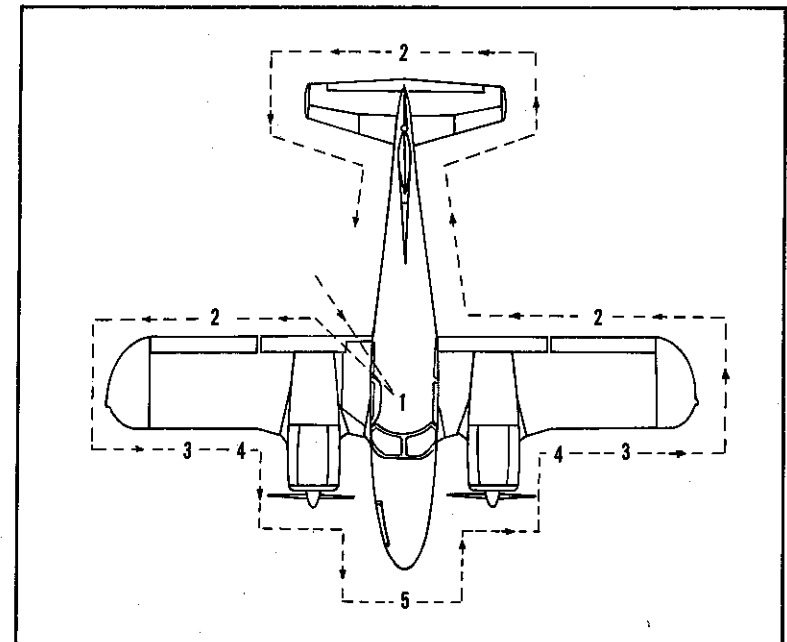
OPERATING INSTRUCTIONS

PREFLIGHT

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

Given below is an outline for preflighting the Aztec:

1. a. Ignition and battery switches "OFF".
2. a. There is no external damage or operational interference to the control surfaces, wings or fuselage.
b. There is no 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 tight seal).
- c. The fuel system vents are open.
- 4. a. The landing gear shock struts are properly inflated (approximately 3" piston exposed).
- b. The tires are satisfactorily inflated and not excessively worn.
- c. Drain the fuel strainers and lines.
- d. The cowlings and inspection covers are secured.
- e. The propellers are free of detrimental nicks.
- f. There are no obvious fuel or oil leaks.
- g. The engine oil is at the proper level.
- 5. a. The windshield is clean and free of defects.
- b. The tow-bar and control locks are detached and properly stowed. Check that baggage door is secured.
- 6. a. Upon entering the airplane, ascertain 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

Before starting the engine, the pilot should set the parking brake and turn on the master switch and the electric fuel pumps. Each set of pumps should be individually checked for operation. When the engine is cold, (under 40° F.) prime five to six strokes, making sure fuel valves are on, crossfeed off, fuel pressures normal and fuel quantity checked. Push mixture controls to full rich, carburetor heat off, and open throttles about one-quarter inch. If the engines are extremely cold, they should be pulled through by hand four to six times.

Next turn all ignition switches on and engage starter on left engine first. After engine starts, idle at 800 to 1400 RPM and start right engine. If battery is low, before starting right engine, run left engine over 1200 RPM to cut in the generator.

This will produce extra power for starting the right engine. If the engine does not start in the first few revolutions, open the throttle on that engine while the engine is turning over with the ignition on. When the engine starts, reduce the throttle.

If the above procedure does not start the engine, reprime and repeat the process. Continue to load cylinders by priming or unload by turning the engine over with the throttle open. If the engine still does not start, check for malfunctioning of ignition or fuel system.

Priming can be accomplished by pumping the throttle controls, however, excessive pumping may over-prime the engines, making starting difficult.

When the engines are warm, (over 40° F.) two to three strokes of the throttle as the engine is initially rotated by the starter is recommended. The engines should start after rotating through about four compression strokes.

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 engines start, the oil pressure should be checked. If no pressure is indicated within thirty seconds, stop the engine and determine the trouble. (If a very cold temperature exists (10° F. or below) a little longer period of time may be necessary.)

Warm-up the engines at 1000 to 1400 RPM for not more than two minutes in warm weather, four minutes in cold weather. Avoid prolonged idling at low RPM as this practice may result in fouled spark plugs. If electrical power is needed from the generator, the engines can be warmed at 2000 RPM at which point the generator is putting out full charge. The magnetos should be checked individually with the propeller at minimum blade angle (maximum RPM). Set throttle to produce 2200 RPM. The drop should not exceed 125 RPM. The difference in drop off between both magnetos should not exceed

50 RPM.

Operation on one magneto should not exceed 10 seconds.

The engines are warm enough for take-off when the throttle can be opened without the engines faltering.

Carburetor heat should be checked during the warm-up to make sure the heat control operation is satisfactory and to clear out the carburetor if any ice has formed. It should also be checked in flight occasionally when outside air temperatures are between 20 degrees and 70 degrees to see if icing is occurring in the carburetor. In most cases when an engine loses manifold pressure without apparent cause, the use of carburetor heat will correct the condition.

The propeller controls should be moved through their complete ranges during the warm-up to check for proper operation, then left in the full low pitch positions. Full feathering checks on the ground are not recommended, because of the excessive vibration caused in the power plant installations. However, feathering action can be checked by momentarily pulling the propeller controls into the feathering position and allowing the RPM to drop not lower than 1400 RPM, thence returning the controls to a normal operating position.

The electric fuel pumps should be turned off after starting or during warm-up to make sure that the engine driven pumps are operating. Prior to take-off the electric pumps should be turned on again to prevent loss of power during take-off due to fuel pump failure.

TAKE-OFF

Just before take-off the following should be checked:

- | | |
|-----------------------------|-----------------------------|
| 1. Seat belts fastened | 7. Electric fuel pumps "ON" |
| 2. Seats locked in position | 8. Flaps "UP" |
| 3. Controls free | 9. Tabs set |
| 4. Fuel "ON" | 10. Carburetor heat "OFF" |
| 5. Crossfeed "OFF" | 11. Mixtures "RICH" |
| 6. Primers locked | 12. Propellers set |

13. Engine gauges normal.

14. Door locked.

After the take-off has proceeded to the point where a landing can no longer be made wheels-down in event of power failure, the wheels should be retracted. When the wheels are up, the throttles should be brought back to climbing power, 24" MP, and the RPM reduced to 2400. Minimum single engine speed (80 MPH) should be attained before take-off.

CLIMB

The best rate of climb is obtained at 112 MPH, but to give a high forward speed as well as a good rate of climb, a cruising climb speed of 130 MPH is recommended.

STALLS

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

STALL SPEED TABLE	
Configuration	Power Off
Gear and Flaps Up	72 C.A.S.
Gear and Flaps Down (Full)	62 C.A.S.

These figures are at gross weight of 4800 lbs. in MPH.

CRUISING

The cruising speed of the Aztec is determined by many factors including power setting, altitude, temperature, load, and equipment installed on the airplane.

The normal recommended economy cruising power setting of the Aztec is at 65% power. At 10,000 feet this gives a

True Air Speed of 200 MPH. This power setting is obtained under standard conditions at 2400 RPM and 19.9" MP. Fuel consumption is about 12 gallons per hour, or 24 gallons per hour total.

The optimum cruising speed of the Aztec at 7000' is 205 MPH. (See Power and Performance charts for power settings and performance under various conditions.)

The Lycoming engines on the Aztec can be cruised at any percent of power from 75% down. 2400 RPM is recommended for maximum cruise performance and lower RPM's, down to 1800, for more economical cruising conditions. Ordinarily an RPM setting should be selected which will give maximum smoothness. To avoid undesirable stresses on the propeller and the possibility of detonation in the engine, no Manifold Pressure settings over 25" should be used with an RPM of less than 2000.

Use of the mixture control in cruising flight reduces fuel consumption at least 10% according to altitude. The fuel consumption data in this manual is for cruising with the mixture leaned.

There is no problem in overheating the engine cylinders on the Aztec by excessive leaning, provided leaning is done only at cruise power (75% or less) or at higher powers above 5000'. For this reason no cylinder head temperature gauge is provided. The engines run very rich at the full rich mixture position, and leaning is essential to achieve satisfactory economy of operation.

To lean, pull back the mixture controls to the farthest aft point at which a rapid forward movement of the control does not produce a momentary surge in RPM, indicating that the mixture has been too lean for maximum power. To get optimum leaning, the control must be within 1/8" forward of this point, which may be established by using a thumbnail as a temporary marker, or adding a pencil reference line on the quadrant placard.

The carburetor air heater on the Aztec is of extremely high capacity, and is designed to provide enough heat to remove carburetor icing and related induction system phenomena under

the most severe conditions. A heat rise of approximately 185° F. can be obtained with the application of full heat. This creates a power loss of about 18% with very little indication on the Manifold Pressure gauge, which has a maximum drop of about 1" MP. The power loss will show up in the performance of the airplane, and should be held to a minimum by applying only that amount of heat required to keep the carburetor or induction system free of ice.

Locking controls on the carburetor air heaters and carburetor air temperature controls are provided to facilitate setting and maintaining the carburetor air temperatures at the proper level for positive de-icing without excessive power loss. Due to the two stage action of the carburetor heat box control, a slight retarding action will be noticed when pulling the carburetor heat control on at about the three quarter open position; however, a slight pull will allow the control to continue to full carburetor heat.

The application of carburetor heat enriches the mixture, therefore the mixture should be leaned after heat has been applied, for smooth and economical engine operation.

APPROACH AND LANDING

During the approach, the gear can be lowered at speeds under 150 MPH, preferably on the downwind leg. Flaps should be lowered in final approach at an airspeed under 125 MPH, and the airplane trimmed to a gliding speed of 95 MPH. Normally about 12" MP should be maintained to give a reasonable approach angle. RPM should be left at high cruising RPM or approximately 2400. This propeller setting gives ample power for an emergency go-around and will prevent over-speeding of the engines if the throttles are advanced sharply. The mixture control should be kept in full rich position to insure maximum acceleration if it should be necessary to open throttle again.

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

sistent 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 half or no flaps.

Landing check list:

1. Mixtures "RICH".
2. Propellers at high cruising RPM.
3. Carburetor heat "OFF" (unless icing conditions exist).
4. Electric fuel pumps "ON".
5. Fuel selectors on proper tanks.
6. Landing gear "DOWN" (under 150 MPH), check green indicator lights on, landing gear warning horn off, and flashing red light in gear handle off.
7. Flaps full down or as desired (under 125 MPH).

If, for any reason, it becomes necessary to "go around" apply full power, retract the landing gear, and put the flaps up as quickly as possible.

STOPPING THE ENGINES

During the landing roll, the flaps should be raised, the heater turned off, and the electric fuel pumps off. After parking, the radios should be turned off, and the engines stopped by pulling the mixture controls aft to idle cut-off. The throttles should be left full aft to avoid engine vibration while stopping. Then the ignition and master switches must be turned off, and the parking brakes set.

EMERGENCY PROCEDURES

1. Engine Failure:

An engine failure on the Aztec during cruising flight presents very minor operational problems. As the engine loses power, a slight yaw in the direction of the dead engine will occur, which can be corrected easily with the rudder or the

rudder trim tab. While the plane is slowing down to the single engine cruising speed of about 135 MPH at low altitudes and at moderate power settings, the propeller on the dead engine should be feathered by pulling the throttle to idling position, and the prop pitch control back fully; then the mixture should be set at idle cut-off, and the ignition off. Best single engine performance will be obtained with the dead engine wing held up about 3 degrees higher than level to help counteract the tendency to turn in that direction.

CAUTION

If the left engine has failed, the hydraulic pump will not be functioning. If it is necessary to lower the landing gear or flaps with the left engine dead, the hydraulic hand pump located in the pedestal is used. (See 5, this section.)

2. Feathering:

The Hartzell feathering propellers can only be feathered while the failed engine is rotating, and not if the engine stops completely, because the centrifugal force due to rotation is necessary to hold out a stop-pin which keeps the propeller from feathering each time the engine is stopped on the ground. Therefore, if an engine freezes up, it will not be possible to feather its propeller. In that case, single engine flight can be maintained with the dead engine propeller unfeathered, although a noticeable decrease in single engine performance will take place.

If an engine failure occurs during take-off run, the power on the good engine should be cut and the airplane stopped straight ahead. If it occurs after leaving the ground, but with sufficient landing area still ahead, a landing should be effected immediately. If no landing can be made directly after the failure, the following steps should be followed:

- a. Apply full power to good engine.
- b. Feather dead engine.
- c. Retract landing gear and flaps, if extended (using hand

pump if left engine is out). If enough altitude has been reached before the failure occurred, or if performance is satisfactory for reaching the airport with the gear extended, leave the landing gear in the down position.

d. Maintain a best climb airspeed of 110 MPH.

e. Trim directionally with rudder trim.

f. As the airport is reapproached for landing, reduce power on the good engine and gradually retrim with the rudder tab. When it is obvious that the airport can be reached easily, lower the landing gear and check the indicators to make sure it is down and locked. Maintain a little extra altitude and speed during the approach, keeping in mind that the landing should be made right the first time, and that either undershooting or overshooting may require the use of full power on the good engine, making control more difficult. Lower the flaps at the last moment if desired.

3. Unfeathering:

It is not recommended that propeller feathering and unfeathering be practiced on the ground because of the excessive vibration that occurs in the engine installation. In flight, feathering should be practiced only to familiarize the pilot with the proper procedures. To unfeather a propeller in flight, the following technique is recommended:

a. Ignition switches "ON".

b. Mixture "RICH".

c. Pump throttle several times, then close.

d. Prop control at cruise setting.

e. Engage starter until engine starts and reaches 500 RPM.

f. Allow engine to idle at 1000 to 1500 RPM with carburetor heat "ON" until oil temperature begins to rise. Adjust to cruising power when engine is warm.

The Standard Aztec, operating at gross weight under optimum conditions of turbulence and pilot technique, and under standard conditions of temperature and altitude, has a single engine absolute ceiling of 8800 feet at 4800 lbs. and maximum obtainable power.

Under ideal conditions, the Aztec can be expected to maintain approximately the stated maximum altitudes. When adverse conditions of turbulence, temperature, altitude, pilot technique, or aircraft condition or equipment are encountered, the absolute ceiling altitude will be reduced. These factors must be taken into consideration in the single engine operation of any twin engine aircraft.

Pilots of this airplane should remain reasonably proficient in single engine flight. In many cases, "simulated" single engine operation (zero thrust condition, approximately 10" MP and 2200 RPM) will be preferable, but actual single engine operation should be practiced occasionally. The following precautions should be exercised in actual single engine flight:

a. Do not feather a propeller if you have reason to suspect that the starting characteristics of the engine are not normal and that restarting in the air may be difficult or impossible.

b. Do not feather a propeller in conditions of temperature, altitude, weight or turbulence which may prevent single engine flight at altitudes well above the local ground elevation.

c. Do not feather a propeller at any time when conditions of terrain or other conditions may prevent the aircraft from reaching an airport easily, in case the dead engine cannot be restarted.

d. Single engine operation must be practiced only with a well qualified twin engine rated pilot, familiar with Aztec characteristics and procedures, in one of the pilots' seats.

4. Emergency Landings:

The Aztec is designed to take gear-up emergency landings without extensive damage to the structure of the airplane. All three wheels protrude about one-third of their diameter when retracted, and structure is provided to take minor loads in this condition. On a wheels-up landing, since the main wheels are forward of their down position, the airplane will tend to settle down at the rear when the landing speed is decreasing, and full forward control wheel pressure should be used to hold the tail up as long as possible. The flaps should not be ex-

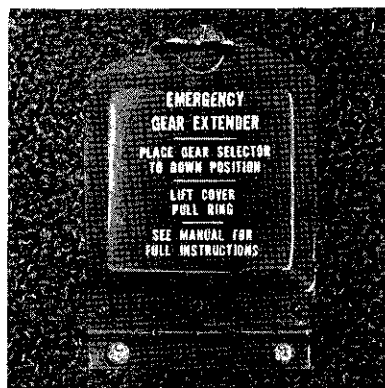
tended because they will contact the ground first, causing damage to the flap and the wing. The propellers should be feathered and stopped in a horizontal position. Fuel valves and electrical switches should be turned to off position.

A wheels-up landing should only be made during an emergency when the surface is too soft or too rough to permit a gear-down landing, or when an emergency water landing is necessary.

5. Emergency Landing Gear Extension:

If the engine driven hydraulic pump fails, or the left engine driving the pump, extension of the landing gear or flaps is accomplished by supplying hydraulic pressure with the manual hydraulic pump. With the gear or flap control in the desired position, 30-40 strokes of the pump handle will raise or lower the landing gear, and 12 strokes will raise or extend the flaps.

In the event of hydraulic system failure caused by a line breaking or the selector valve malfunctioning, the landing gear can be lowered by using the Emergency Gear Extender. The control for the extender is located beneath a small cover plate under the pilot's seat. When this control is pulled, CO₂ flows from a cylinder under the floorboards through separate lines to shuttle valves adjacent to the gear extension cylinders. The gas pressure opens the shuttle valves, allowing CO₂ to enter the gear cylinders, extending the gears.



WARNING

The landing gear control on the selector valve must be in the "down" position when the gear extender control is pulled, in order to allow the gear to be extended properly.

The Emergency Gear

Extender should only be used when all other means of lowering the landing gear have failed, and only when the gear can be left down for landing.

CAUTION

When the Extender has been used, the landing gear or flaps must not be actuated hydraulically in any way until the extension system has been returned to its normal condition.

6. In-Flight Cabin Door Closing Procedure:

In the event the cabin door is inadvertently unlocked in flight or should the handle not be pushed forward and locked before take-off and becomes dislodged from its latching mechanism, the following procedure has been determined to be practicable for closing the cabin door while in flight, assuming adequate altitude has been attained.

- a. Retard throttles.
- b. Reduce airspeed to 90 MPH or less.
- c. Open storm window (left of pilot).
- d. Close door.
- e. Recover power and airspeed.

Other conditions, take-off, landing approach, and general low altitude flight, will require action at the discretion of the pilot.

7. Emergency Exit Window:

Provided in the left side of the fuselage adjacent to the left center seat is an emergency exit window. The window is sealed when installed and should be removed only in case of emergency.

To remove window:

- a. Remove plastic placard.
- b. Turn handle.
- c. Push out.

GROUND HANDLING AND MOORING

The Aztec should be moved on the ground with the aid of the nose wheel steering bar provided with each plane and installed in the baggage compartment.

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

The aileron and stabilator controls should be secured by means of a safety belt or control locks 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.

WEIGHT AND BALANCE

For weight and balance data, see the Weight and Balance Form, which gives the exact weight of the airplane and permissible center of gravity conditions.

OPERATION TIPS

In the operation of the Aztec, 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 in the operation of the Aztec:

1. Learn to trim the airplane for take-off so that only a very light back pressure on the wheel is required to lift the ship off the ground.
2. Due to the very rapid feathering action of the propeller on the Aztec, it will be necessary when feathering during ground check to move the propeller control in and out of feather position very quickly in order to prevent the RPM from dropping below 1400 RPM and causing excessive manifold pressure.
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 80 MPH under

normal conditions. Trying to pull the airplane off the ground at too low an airspeed decreases the controllability of the airplane in event of engine failure. (Minimum controllable single engine airspeed is 80 MPH).

5. In high density areas where high traffic pattern speeds are necessary or when it is advantageous to extend the gear, it is permissible to extend the landing gear at speeds up to 150 MPH; however, it is recommended the landing gear should normally be extended at speeds below 150 MPH.

6. The flaps may be lowered at airspeeds up to 125 MPH. To reduce flap operating loads, however, it is desirable to have the airplane at a slower speed before extending the flaps.

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

8. Always ascertain position of landing gear by checking the gear position light.

9. For convenience and to obtain best service life from the heater components, it is recommended that the heater switch be turned off about two minutes before stopping the engines and shutting off the master switch. This should normally be done during taxiing after landing.

10. Remember that when the navigation lights are on the gear position lights are very dim.

11. Before starting the engines ascertain that all radio switches, light switches, and the pitot heat switch are in the off position so as not to create an overloaded condition when the starter is engaged.

12. The trim tab on the Aztec is very responsive and a small adjustment in trim control gives a rapid trim change attitude.

13. The Lycoming engines on the Aztec run very rich at the full rich position of the mixture control, and must be leaned under all cruise conditions to achieve satisfactory economy.

RADIO OPERATION

Communication and navigational equipment controls are

located in the center of the instrument panel. Associated auxiliary switches are located on a separate panel to the left of the control quadrant in the center of the instrument panel. Circuit breakers are located directly below the radio stack.

All sets may be turned "ON" by the switch located on the control head of each particular unit, with the exception of the marker beacon which has its switch located on the Audio Selector Switch Panel.

After power is supplied, the pilot may wish to operate one of the two transmitters by moving the transmitter selector switch to the proper position. The switch is located on the selector switch panel.

A separate three position audio selector switch is provided for each receiver. Each receiver audio output may be connected to either the speaker or the headset. In addition they may be placed in the "OFF" or standby position.

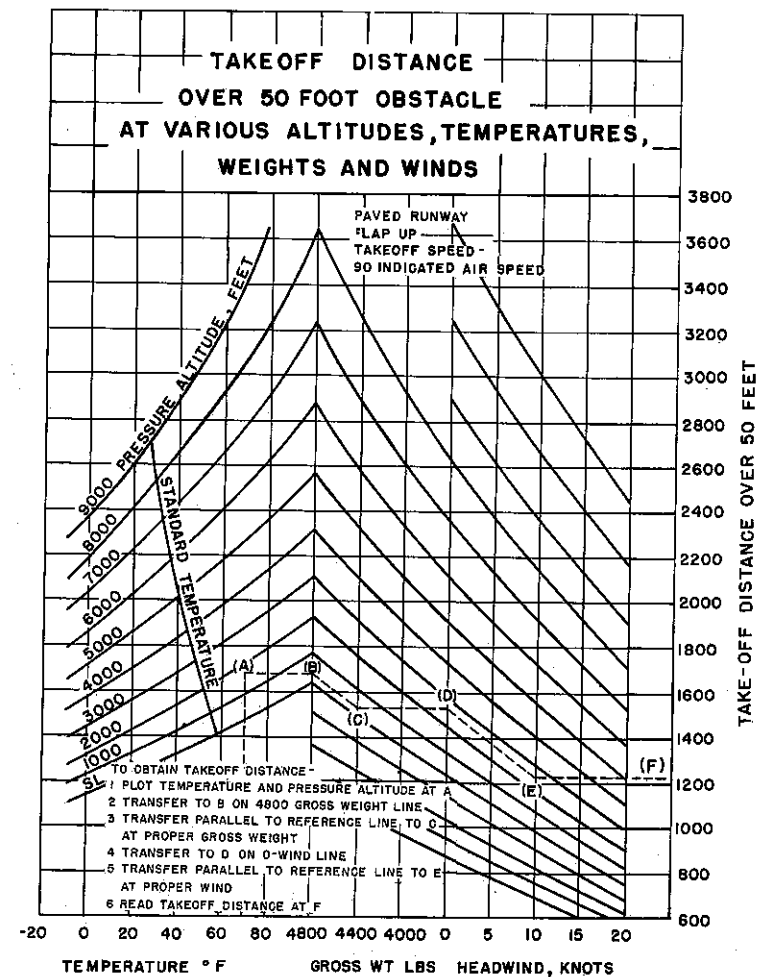
Two or more sets may be simultaneously connected to either the headset or speaker position by placing the selector switches in the desired combination. For example, the A.D.F. and the Nav. 1 may be selected to operate on the speaker and Nav. 2 may be selected for headset operation. If desired the pilot may listen to the speaker and the co-pilot the headset.

SECTION IV

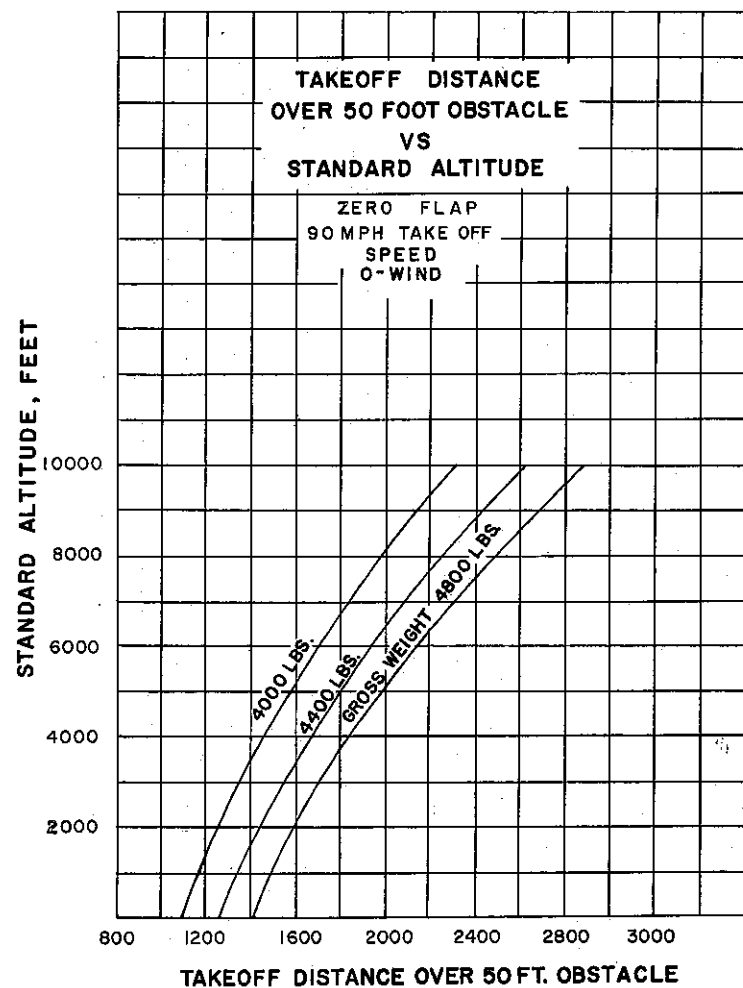
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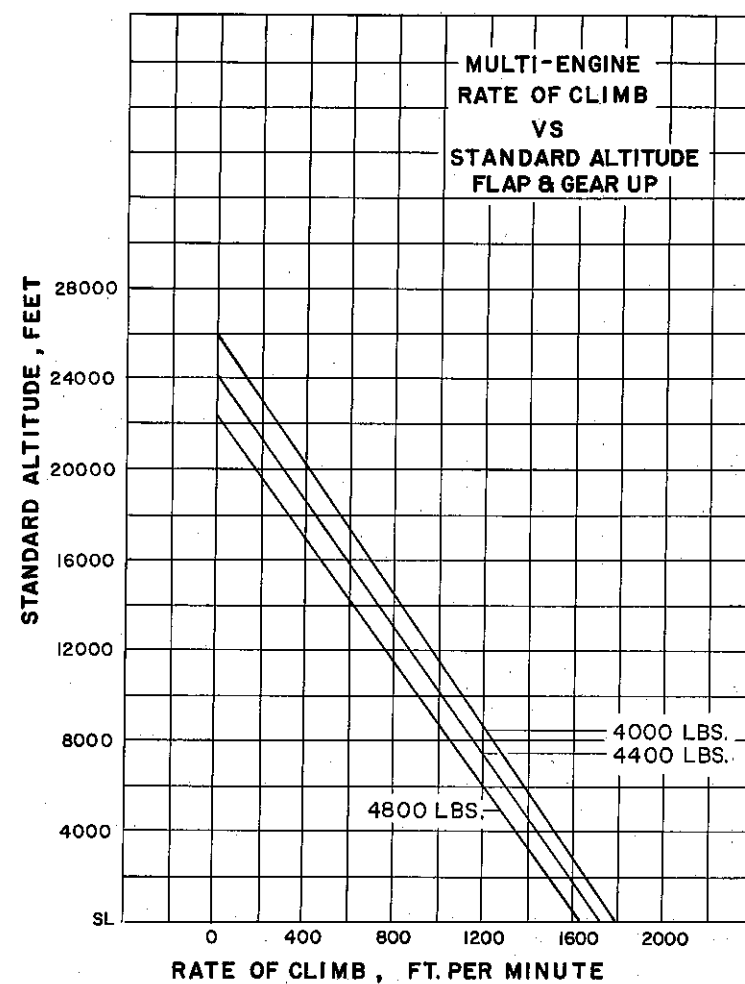
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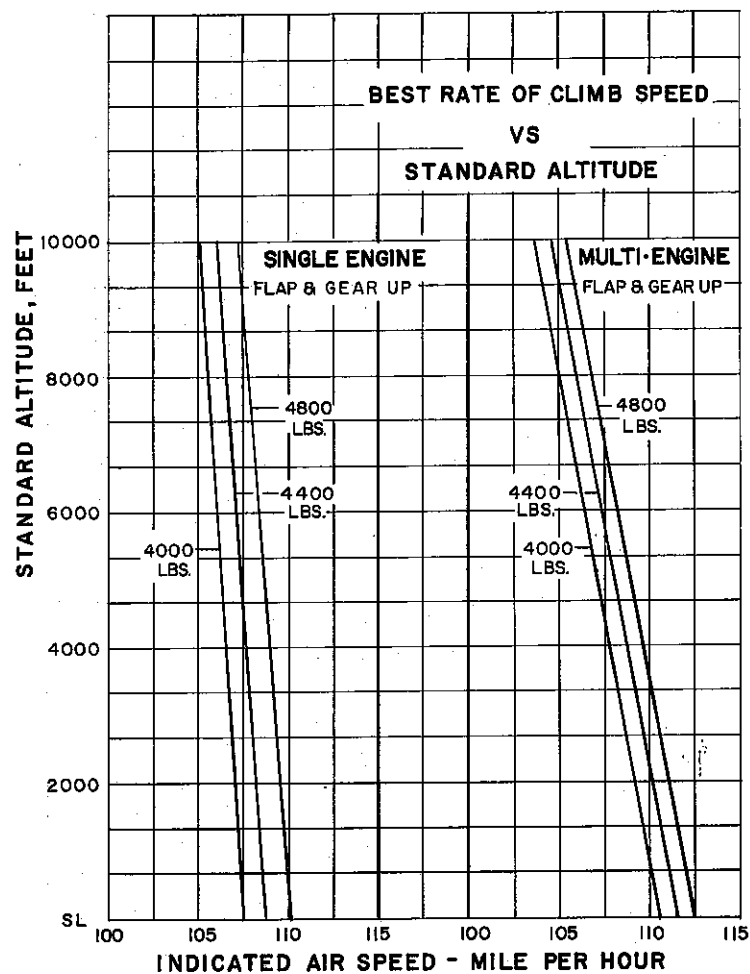
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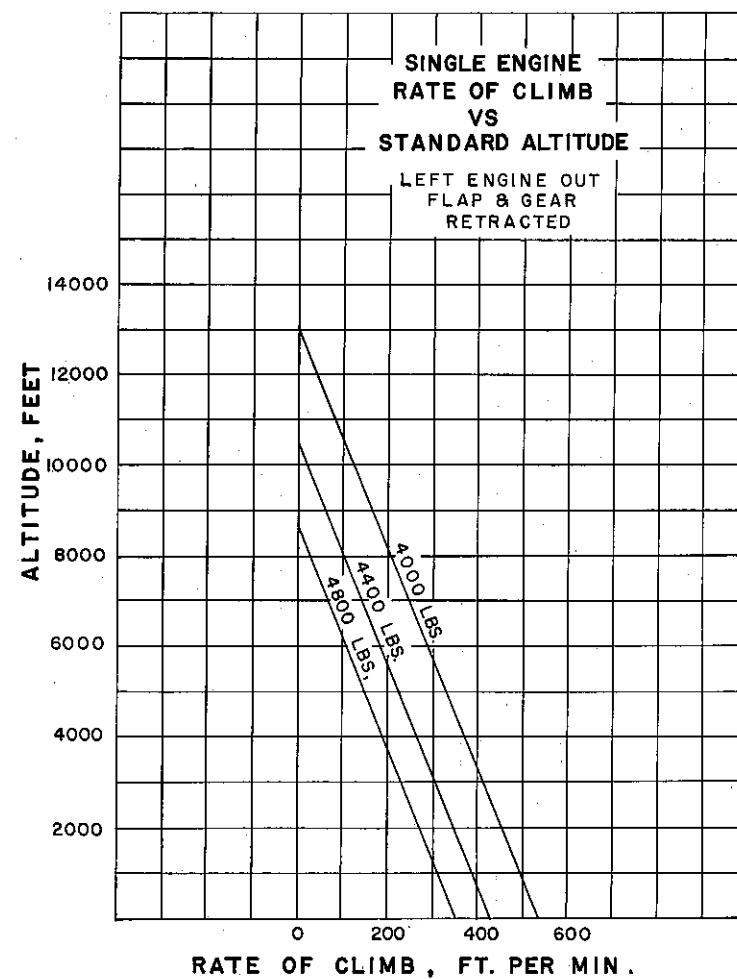
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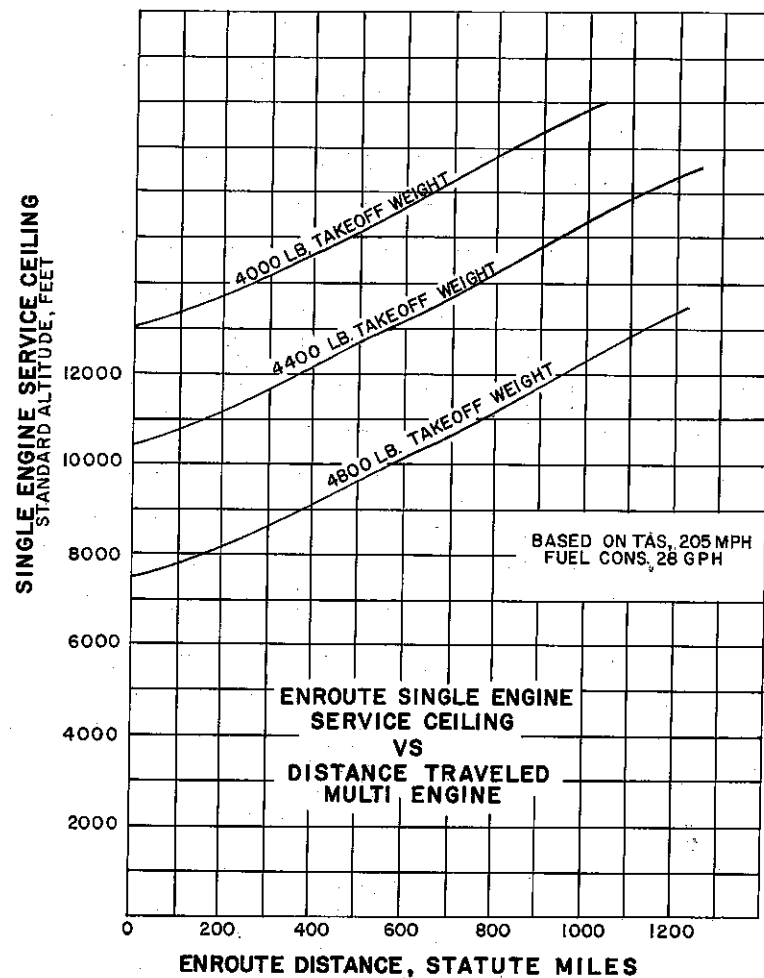
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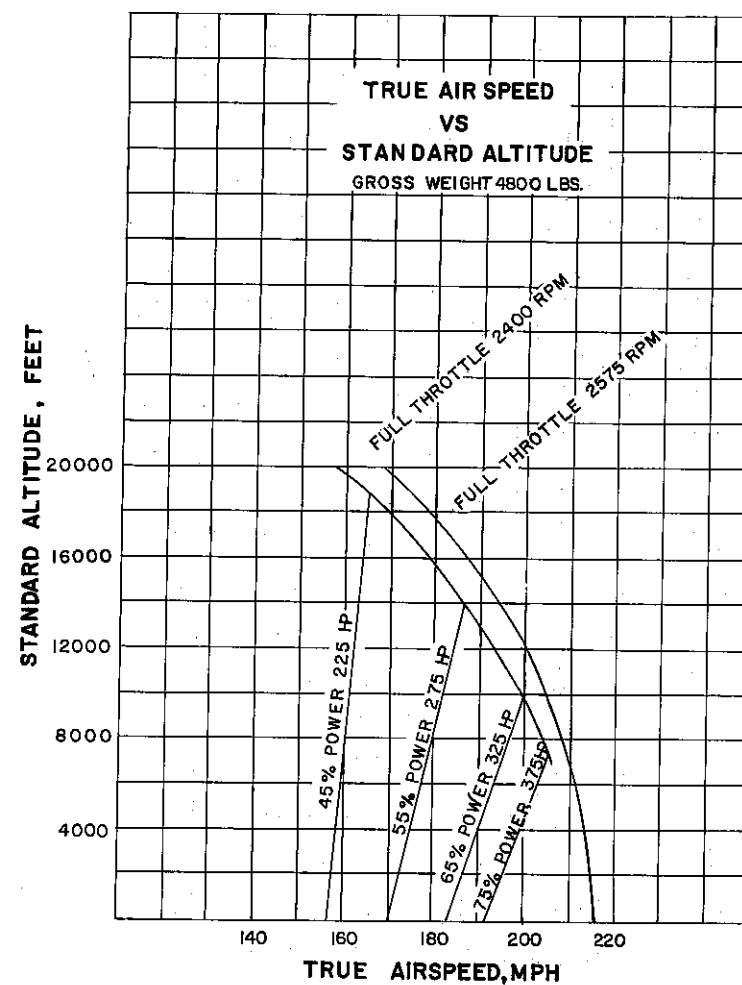
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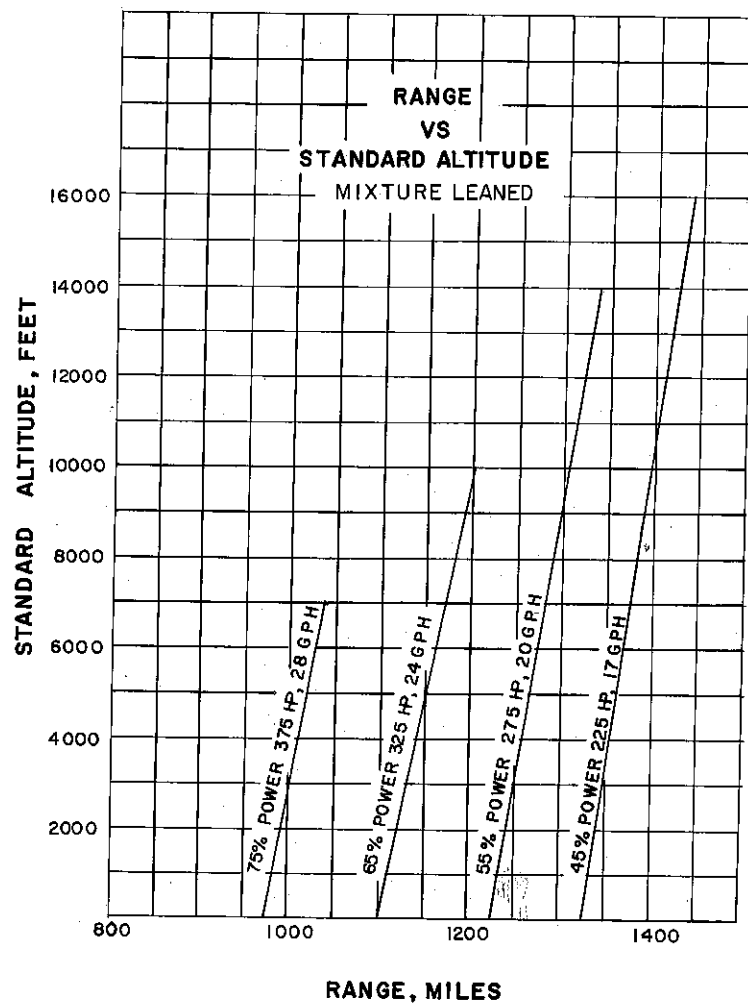
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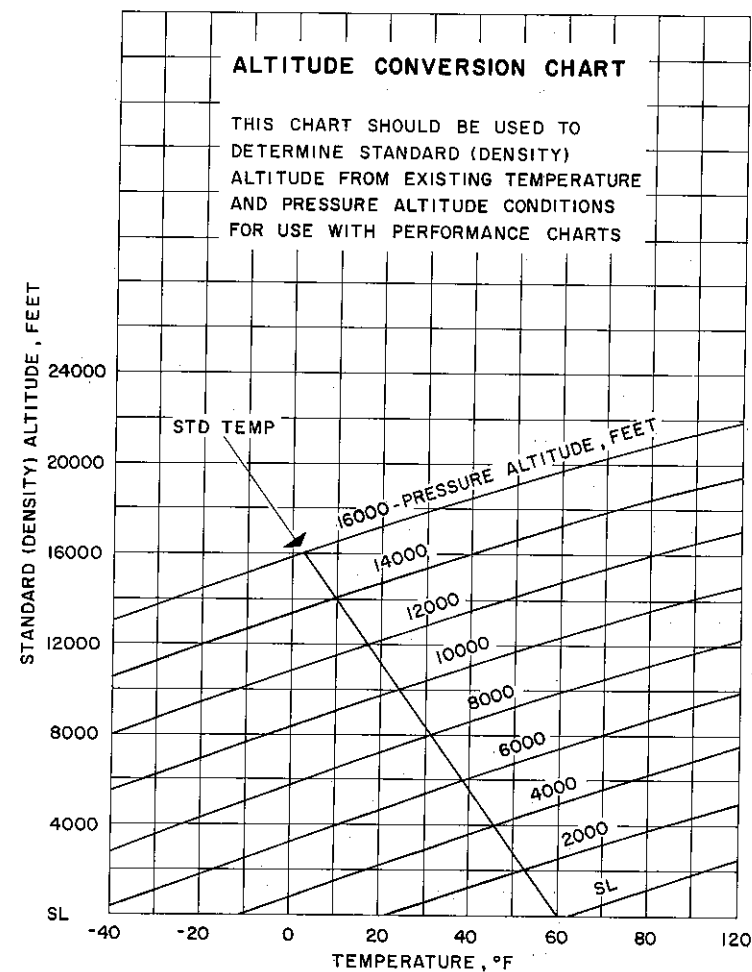
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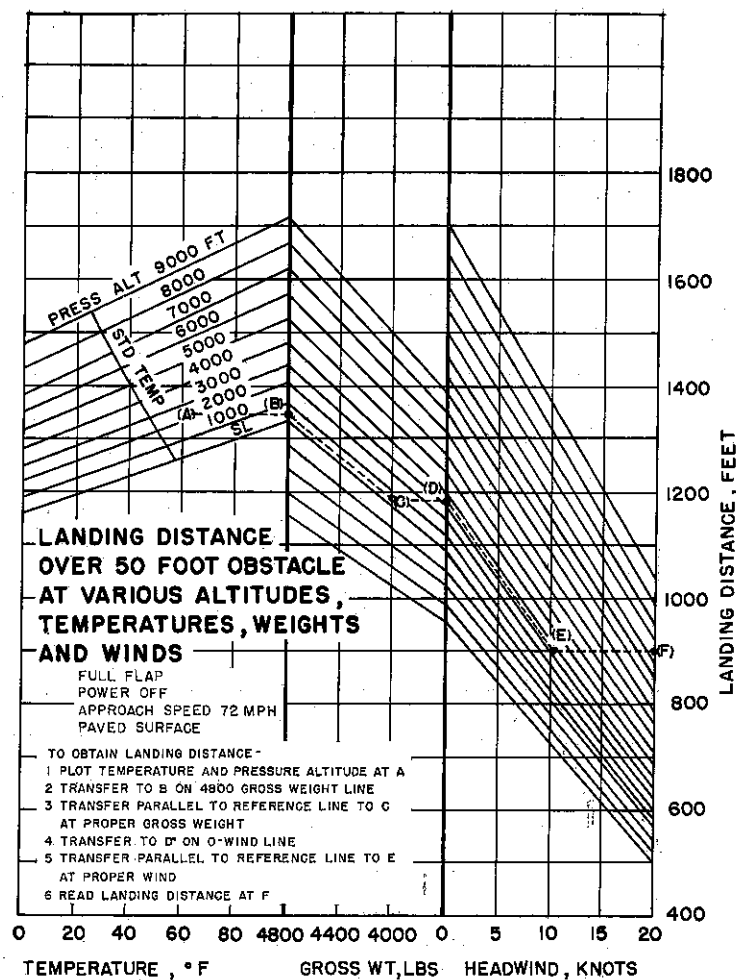
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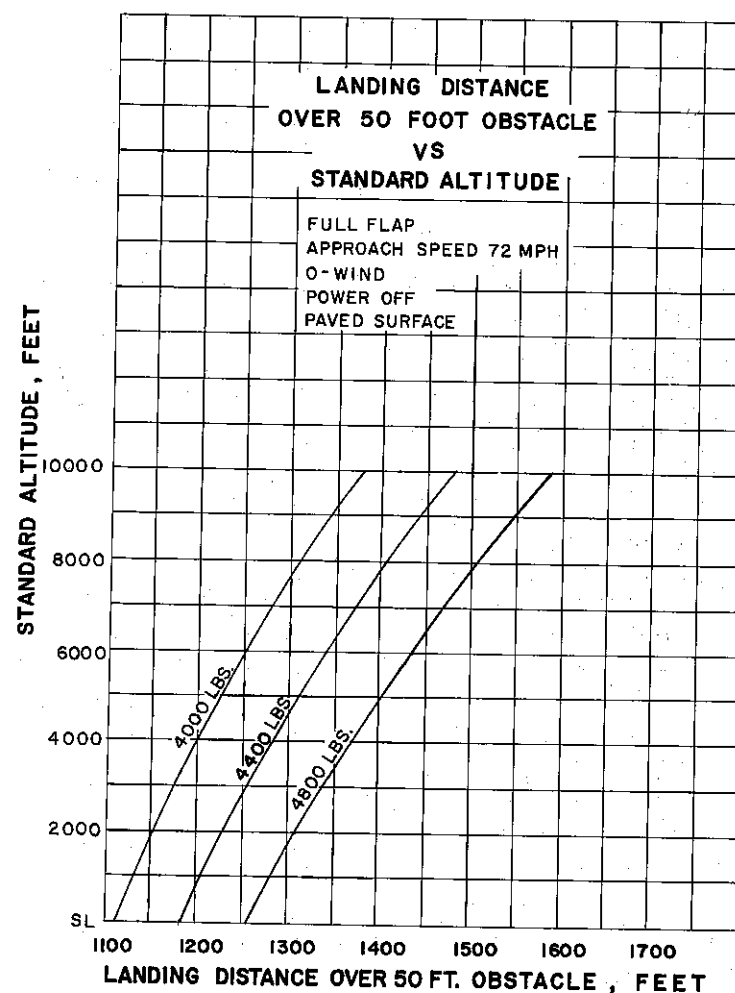
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SECTION V

GENERAL MAINTENANCE

TIRE INFLATION

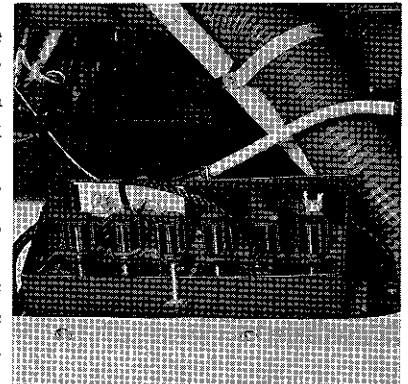
For maximum service from the tires, keep the Aztec main tire inflated to 42 lbs. and the nose tire to 27 lbs. Reverse the tires on the wheels, if necessary, to produce even wear. All Aztec wheels and tires are balanced before original installation, and the relationship of tire, tube and wheel should be maintained upon reinstallation. Out-of-balance wheels can cause extreme vibration in the landing gear during take-off and landing. 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, 33-ampere hour battery is obtained by removing a quickly detachable access plate on the right side of the nose section. The battery is installed in a sealed stainless steel box, opened by removing wing nuts. The box has a plastic drain tube which is normally closed off with a clamp and which should be opened occasionally to drain off any accumulation of liquid.

The battery should be checked frequently for proper fluid level, but must be clean and tight. The battery and box should be flushed with soda and water in the event of any seepage from the battery.

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-O-5606 (petroleum base red) hydraulic brake fluid. This should be checked at every 100 hours inspection and replenished when necessary.

Do not use vegetable base brake fluids (blue) when refilling the system. When it is necessary to add fluid, open the left nose access panel, exposing the brake reservoir. Then add fluid to the reservoir, bringing the fluid to the indicated level.

If it is necessary to bleed the brake system to get air out of the lines, fluid should be added under pressure at the bleeder attachment on the brake unit.

No adjustment of brake clearances is necessary on the Aztec brakes. If after extended service, braking action requires too much movement of the toe pedal, new brake linings can easily be installed by removing the four bolts which attach the brake units, then replacing the brake linings held in place by brass rivets.

Main wheels are quickly removed by first cutting the safety wire and removing eight bolts to drop the brake lining. Remove the dust cover, cotter pin and axle nut. The wheel will slip off the axle. The nose wheel is removed by taking off the hub nut and withdrawing the axle bolt, the axle retainer cups, and the axle from the nose wheel fork.

Tires are dismounted from the wheels by deflating the tube, then removing the wheel through-bolts, allowing the wheel halves to be separated. In reassembling the wheels, care should be taken to torque the bolts properly, according to instruction on the wheels.

LANDING GEAR SERVICE

In jacking the Aztec up for landing gear and other service, the Jack Kit (available through the Piper Distributor Service Department) should be used. This kit includes two hydraulic jacks and a tail support; the jacks are placed under the jack pads on the front wing spar, and the tail support attached to the tail skid.

Approximately 250 lbs. of ballast should be placed on the base of the tail support to hold the tail down. Then the jacks should be raised until all three wheels are clear of the floor.

The right and left landing gear units on the Aztec are completely interchangeable by reversing the nutcracker units on the gears. The oleo unit on the nose wheel gear contains parts that are also entirely interchangeable with the oleo parts on the main gears, although the oleo housing forging and the fork and axle are different on the nose wheel unit. The nutcracker parts and all inside components are identical on both nose and main gears.

The operation of the landing gear oleos is standard for the air-oil type; hydraulic fluid passing through an orifice serves as the major shock absorber while air compressed statically acts as a taxiing spring. The piston tube has a total travel of 8", and about 3" of tube should be exposed under normal static loads.

All of the oleos are inflated through readily accessible valves on the top of the unit, at the front. The nose wheel unit is steerable through the rudder pedals, and incorporates a shimmy dampening device at the bottom of the outer housing. All major attachment and actuation bearings are equipped with grease fittings for lubrication of the bearing surfaces, and should be lubricated periodically with medium lubricating grease.

To add air to the oleo struts, a strut pump is attached at the air valve and the oleo pumped up until 3" of piston tube is exposed with normal static weight on the gears. To add oil, first release all the air through the valves, allowing the oleo to compress fully. Next remove the air valve core and fill the unit through this opening, extending the strut by rocking the

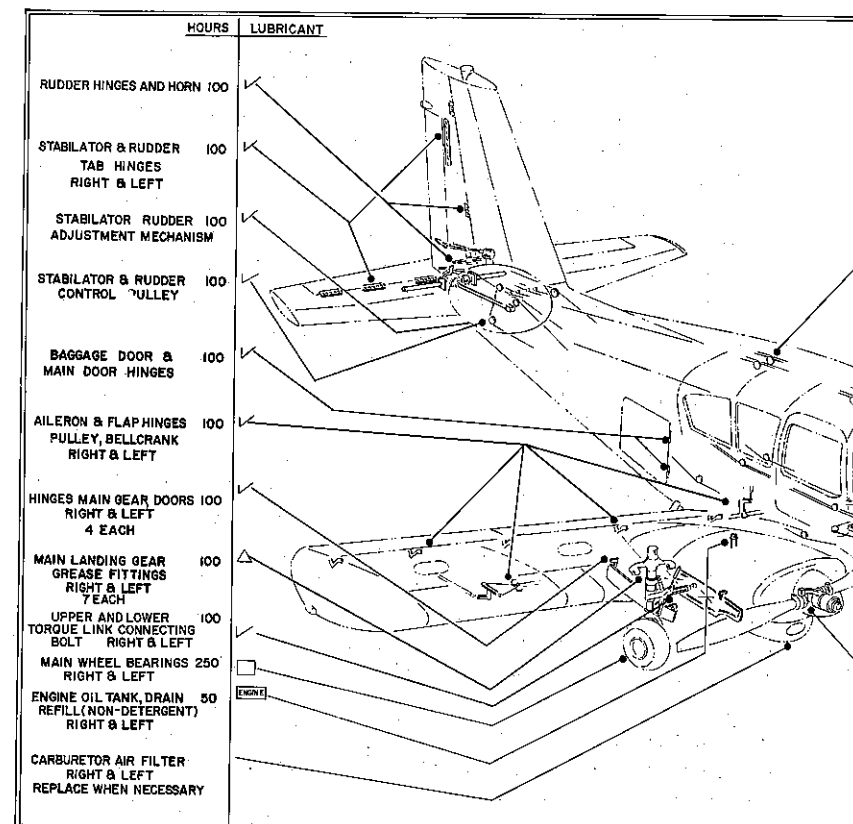
airplane while adding fluid. Compress the oleo again to within 1/4" of full compression, allowing excess oil to overflow and working out any trapped air. Then reinsert the valve core and pump up the strut.

If a landing gear oleo has been completely emptied of oil during servicing, the following procedure should be used to refill it, to make sure that no air remains trapped in the unit. First, a clear plastic tube should be attached to the valve stem, from which the core has been removed. The other end of the tube should be placed in a container of hydraulic fluid. When the oleo is extended, fluid will be sucked into the oleo cylinder. The oleo should be compressed and extended until it is full of fluid and no more air bubbles appear in the plastic tube. About one pint of fluid is required to fill the oleo.

To check shimmy of the nose wheel, if it should develop, tighten the bolt on the dampening device at the base of the nose wheel forging. The bolt should be tightened just enough to keep the nose wheel from moving freely, but not enough to require excessive pressure to move the wheel by hand. It may be necessary to remove shims from the shimmy dampening collar to permit tightening of the device.

The steering arms from the rudder pedals to the nose wheel steering torque shaft arm are adjusted at the rudder pedals or at the torque shaft rollers by turning in or out the threaded rod end bearings. 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 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. The turning arc of the nose wheel is 15 degrees in either direction and is factory adjusted at stops on the bottom of the forging. The turning radius is twenty-eight feet.

In adjusting the steering arm stops, care should be taken to see that the nose wheel reaches its full travel just after the rudder hits its stops. This guarantees that the rudder will be allowed to move through its full travel.



NOTES

1. FUEL SYSTEM THE FOLLOWING POINTS REQUIRE SERVICING-FINGER STRAINER FINGER STRAINER LOCATED IN WING CELL OUTLET-FILTER BOWL- QUICK DRAIN UNITS-CROSSFEED DRAIN.
2. HEATER SYSTEM CLEAN FILTER BOWL AT LEAST ONCE PER YEAR.
3. LANDING GEAR STRUTS FOLLOW INSTRUCTION PLACARD ON AIR OIL STRUT.
4. MISCELLANEOUS DURING ROUTINE MAINTENANCE CHECKS APPLY LUBRICATION TO MISCELLANEOUS LINKAGES.
5. BATTERY CHECK BATTERY FLUID LEVEL & BATTERY CONDITION EVERY 25 HRS.

✓	MIL-L-7870	OIL- GENERAL PURPOSE LOW TEMP. LUBRICANT
△	MIL-L-7711	GREASE- LUBRICATION GENERAL PURPOSE AIR
□	MIL-L-3545	GREASE- LUBRICATION HIGH TEMPERATURE
*	MIL-G-3278	GREASE AIRCRAFT & INSTRUMENTS
○	MIL-H-5606	HYDRAULIC FLUID
SAE 50 ABOVE 60° AIR TEMP		
SAE 40 BETWEEN 30°F AND 90°F AIR		
SAE 30 BETWEEN 0°F AND 70°F AIR		
SAE 20 BELOW 0°F AIR TEMP		

HOURS	LUBRICANT	LUBRICANT	HOURS
RUDDER HINGES AND HORN 100			250 STABILATOR & RUDDER TRIM PULLEYS (SEE CAUTION)
STABILATOR & RUDDER TAB HINGES RIGHT & LEFT 100			50 HYDRAULIC FLUID LEVEL MAINTAIN LEVEL TO FILLER NOZZLE
STABILATOR RUDDER ADJUSTMENT MECHANISM 100			100 FILTER (AN6234) HYDRAULIC SYSTEM - REPLACE ELEMENT
STABILATOR & RUDDER CONTROL PULLEY 100			100 CONTROL COLUMN
BAGGAGE DOOR & MAIN DOOR HINGES 100			50 BRAKE RESERVOIR MAINTAIN FLUID LEVEL INDICATED ON THE SIDE OF RESERVOIR
AILERON & FLAP HINGES PULLEY, BELL CRANK RIGHT & LEFT 100			100 NOSE WHEEL STEERING
HINGES MAIN GEAR DOORS RIGHT & LEFT 4 EACH 100			100 BAGGAGE DOOR & MAIN DOOR HINGES
MAIN LANDING GEAR GREASE FITTINGS RIGHT & LEFT 100			100 NOSE WHEEL GREASE FITTINGS
UPPER AND LOWER TORQUE LINK CONNECTING BOLT RIGHT & LEFT 100			100 UPPER AND LOWER TORQUE LINK CONNECTING BOLT
MAIN WHEEL BEARINGS 250 RIGHT & LEFT			250 NOSE WHEEL BEARING
ENGINE OIL TANK DRAIN 50 REFILL (NON-DETERGENT) RIGHT & LEFT			100 HINGES NOSE WHEEL DOOR 4 TOTAL
CARBURETOR AIR FILTER RIGHT & LEFT REPLACE WHEN NECESSARY			100 SEAT ADJUSTMENTS RIGHT & LEFT
			100 PROPELLER GREASE FITTINGS 4 EACH

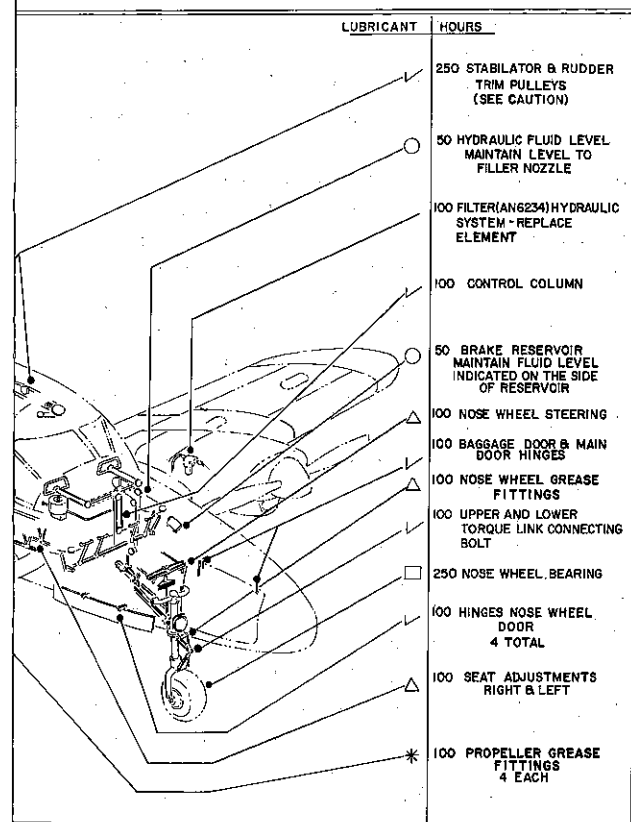
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*	MIL-G-3278	GREASE AIRCRAFT & INSTRUMENTS
○	MIL-H-5606	HYDRAULIC FLUID
SAE	SAE 50 ABOVE 60°F AIR TEMP SAE 40 BETWEEN 30°F AND 50°F AIR TEMP SAE 30 BETWEEN 0°F AND 70°F AIR TEMP SAE 20 BELOW 10°F AIR TEMP	

CAUTIONS

1. DO NOT USE A HYDRAULIC FLUID WITH A CASTOR OIL OR ESTER BASE.
2. DO NOT OVER-LUBRICATE PEDESTAL CONTROLS.
3. DO NOT APPLY LUBRICANT TO RUBBER PARTS.
4. UNDER NO CIRCUMSTANCES SHOULD THE CABLES FROM THE COCKPIT TO THE REAR OF THE FUSELAGE BE LUBRICATED AS THIS MAY CAUSE SLIPPAGE.



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Adjustable rod end bearings are present on each of the hydraulic cylinders that actuate the landing gear legs. These rod ends should be set so that the cylinders move the landing gear retracting links just far enough to engage the spring loaded down locks and make contact at the stops. Too much extension of the adjusting screws will overload the links, and too little extension will prevent the links from giving to the required past-center position.

Installed on each gear assembly are micro-switches which close after full movement of the gear in each direction. The down switches are connected individually to green indicator lights on the pedestal, and the up switches are in series so that all three contacts must be made before the amber "gear up" light on the pedestal lights up. The micro-switches must be adjusted carefully so that contact is made just as the gear reaches the required position of extension or retraction.

Located in the control pedestal below the throttles are three micro-switches. These switches operate the warning horn (located in the pedestal) and the red light in the gear handle. When one throttle is retarded and the gear is up, the red light in the gear handle will flash. When both throttles are retarded, and gear is up the warning light and horn will operate.

The main landing gear legs are dismantled from the airplane by (1) removing the top engine nacelles, (2) detaching the lower end of the lever retracting link from the gear leg, (3) detaching the brake line at the lower end of the flexible line, and (4) withdrawing the half-inch landing gear attachment bolts.

The nose gear unit is dismantled by (1) removing the nose access panels and the canvas boot covering the top of the nose gear, (2) detaching the lower retracting link, and (3) extracting the landing gear bolts.

Disassembling of the landing gear oleos is done as follows:

1. Release air from air valve at top of unit and remove core.
2. Detach lower end of oleo torque link assembly (nut-cracker) from fork.
3. Remove snap ring, located inside and at bottom of

forging, with small-nosed pliers.

4. Slide piston tube and bearing assemblies out of forging. Oleo fluid will flow from the forging and much of it can be caught in a container and if clean reused.

5. Remove the upper bearing retainer pins and slide both upper and lower bearings from the strut. The "O" rings and wiper strips are then exposed for inspection.

To reassemble the oleo unit, reverse the above procedure, being very careful to see that the snap ring and the upper bearing retainer pins are properly reinstalled.

In the event that the oleo strut slowly loses pressure and extension, the most probable source of trouble is the air valve attachment to the leg, or the core of the air valve. These parts should be checked first to determine whether or not air leaks are occurring. If hydraulic fluid is evident on the exposed chrome-plated oleo strut, the "O" rings on the piston tube bearing units may need to be replaced.

HYDRAULIC SYSTEM SERVICE

The hydraulic system is filled through a filler tube located inside the left nose access panel. Only petroleum base hydraulic fluid, MIL-O-5606, should be used.

To add fluid to the system, remove the cap from the filler neck and fill the system completely while holding the filler tube extension level. Then turn the elbow on the filler tube down until the excess oil has drained out. (See separate instructions for filling and cleaning the complete hydraulic system.)

FUEL AND OIL REQUIREMENTS

Aviation grade 91/96 (minimum) octane should be used in the Aztec. The use of lower grades of fuel can cause serious engine damage in a very short period of time, and is considered of such importance that the engine warranty is invalidated by such use.

The oil capacity of the Lycoming O-540 engine is 12 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 3 quarts. The following grades are required for the specified temperatures:

Temperatures above 40° F (4° C)	S.A.E. 50 MIL-L-6082
Temperatures from 10° F (-12° C) to 40° F (4° C)	Grade 1100
Temperatures below 10° F (-12° C)	S.A.E. 30 MIL-L-6082
	Grade 1065
	S.A.E. 20

CARE OF AIR FILTER

The carburetor air filters 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 rapid replacement.

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

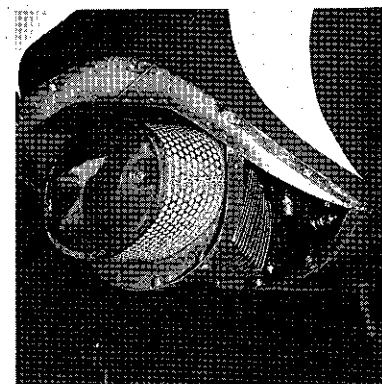
1. Remove filter, inspect, and clean by tapping it against a hard surface to remove grit, sand and dirt. (Do not blow out with an air hose, soak in oil, or cleaning fluid).

2. If the filter is found to be in good condition and is not obstructed after being properly cleaned, reinstall filter.

CARE OF WINDSHIELD AND WINDOWS

The windshield and windows are made of plexiglas 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.

NOTE

Do not use gasoline, alcohol, benzene, carbon tetrachloride, lacque thinner, or window cleaning sprays.

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 jewelers rouge to rub out scratch, smooth on both sides and apply wax.

SERIAL NUMBER PLATE

The serial number plate on the Aztec is located on the top of the tail stinger, underneath the rudder. The serial number of the plane should always be used in referring to the airplane in service or warranty matters.

LEVELING AND RIGGING

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

1. Partially withdraw the two machine screws located on the side of the fuselage just forward of the right stabilator. These screws are leveling points, and the airplane is longitudinally level when indicated by the leveling instrument placed on the screws.

2. Put the airplane on jacks to obtain the longitudinally level position.

3. To level the airplane laterally, place a bubble-protractor on a straight-edge held along the front spar on the

under surface of the wing. Raise or lower the wing by pushing up or down on the tip until five degrees of dihedral is indicated on the protractor. The smooth, easy action of the landing gear oleo units makes it possible to position the wing laterally with very little effort. After checking the first wing at five degrees dihedral, the opposite wing should also be checked to make sure it has equal dihedral.

Rigging Instructions:

Although the fixed flight surfaces on the Aztec obviously cannot be adjusted in position for rigging purposes, it may be necessary on occasion to check the positions of these surfaces. The movable control surfaces, with the exception of the flaps, all have adjustable stops, as well as adjustments on 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, washout 1° in 70" of distance along the front spar. (Total washout approximately 2°).

2. Stabilator: No dihedral. Incidence is 0° in relation to horizontal. (Neutral position).

3. Fin: Should be vertical and in line with centerline of fuselage.

4. Ailerons: Travel - 30° up, 15° down.

5. Flaps: Travel - 50° down.

6. Stabilator: 9° up, 9° down.

7. Rudder: Travel - 30° left and 35° right.

For the purpose of adjusting the lateral trim on the Aztec, aileron tabs are incorporated on both ailerons. These tabs can be bent to position the aileron in flight, changing the lateral trim as desired.

THE PIPER AZTEC "B"

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