Beechcraft®

Travel Air

MODEL **B95**

OWNER'S MANUAL

Beech Aircraft Corporation Wichita, Kansas

IMPORTANT

(Please attach this Owner's Manual Supplement to the inside cover of the Owner's Manual or other suitable location which is readily available to the pilot.)

OWNER'S MANUAL

SUPPLEMENT

for

55, A55, B55, B55A, B55B, C55, C55A, D55, D55A, E55, E55A, 95, B95, B95A, D95A, E95.

The following information supersedes the information contained in the Owner's Manuals for the above listed airplanes.

1. Maximum usable fuel of each 25 gallon main tank is 22 gallons.

2. Maximum usable fuel of each 39 or 40 gallon main tank is 37 gallons.

3. Approximate reduction in range with full fuel due to change in usable fuel is:

   a. 6% with the 142 gal. fuel system (all 55).

   b. 7% with the 112 gal. fuel system (all 55's, and 95's).

   c. 10% with the 78, 80 or 84 gal. fuel systems (all 95's).

4. On Models 95 and B95 Owners Manuals, reduce range by an additional 135 statute miles to account for climb and 45 minutes reserve at 45% maximum continuous power.

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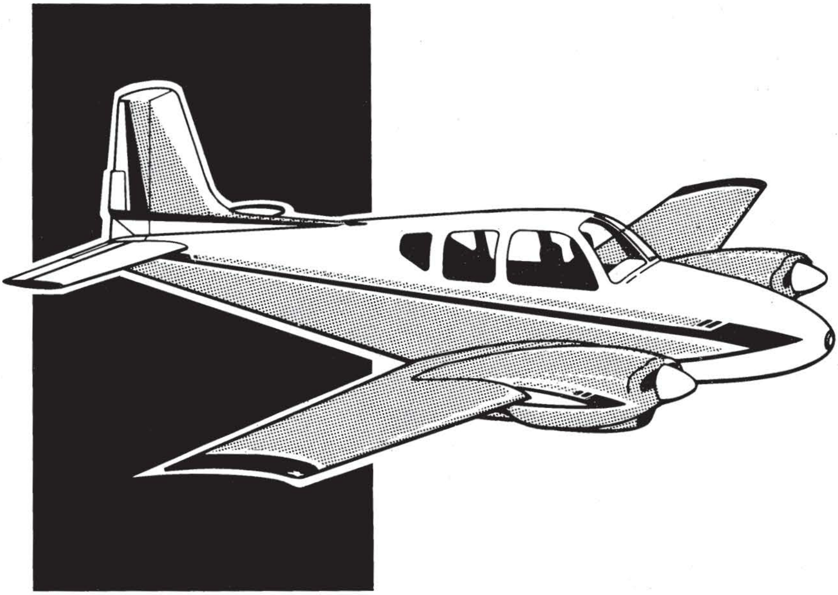
Beechcraft



B-95 *Travel Air*

OWNER'S MANUAL

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THANK YOU . . .

for displaying your confidence in us by selecting a BEECHCRAFT airplane. Our design engineers, assemblers and inspectors have utilized their skills and years of experience to ensure that your new BEECHCRAFT Travel Air B95 meets the high standards of quality and performance for which BEECHCRAFT airplanes have become famous throughout the world.

IMPORTANT NOTICE

This manual should be read carefully in order that you may become familiar with the operation of your Travel Air B95. Suggestions and recommendations have been made within it to help you obtain maximum performance without sacrificing economy. Furthermore, you should also be familiar with and operate your new BEECHCRAFT in accordance with the Federal Aviation Administration Approved Flight Manual and/or the FAA Approved Placards which are located in your BEECHCRAFT.

As a further reminder, you should also be familiar with the applicable Federal Aviation Regulations concerning operation and maintenance of the airplane and FAR Part 91 General Operating and Flight Rules. Likewise your aircraft must be operated and maintained in accordance with FAA Airworthiness Directives which may be issued against your BEECHCRAFT.

The operation, care, and maintenance of your airplane after it is delivered to you is your responsibility. However, your authorized BEECHCRAFT Sales and Service Outlets will have all recommended modification, service, and operating procedures issued by both FAA and Beech, designed to get maximum utility and safety from your airplane.

In an effort to provide you with as complete coverage as possible, applicable to any configuration of the Travel Air B95 optional equipment has been included in the scope of this manual. Because of the versatility of the appointments and arrangements of the aircraft, the equipment described or depicted herein may not be designated as optional equipment in every case.

General Specifications

ENGINES

Two Lycoming, 4 cylinder, O-360-A1A, rated at 180 hp @ 2700 rpm for all operations.

PERFORMANCE — TRUE AIRSPEED, STANDARD ALTITUDE

MAXIMUM CRUISING SPEED:
(a) at 75% power (2450 rpm) .... 200 mph at 7500 ft.
(b) at 65% power (2300 rpm) .... 195 mph at 10,500 ft.

HIGH SPEED AT SEA LEVEL
(2700 rpm, full throttle) .... 210 mph

RATE OF CLIMB AT SEA LEVEL (rated power)
Two engines .... 1300 fpm
One engine .... 191 fpm

SERVICE CEILING (rated power) @ 4100 pounds
Two engines (100 fpm) .... 18,700 ft.
One engine (50 fpm) .... 5,050 ft.

ABSOLUTE CEILING @ 4100 POUNDS
Two engines .... 20,300 ft.
Single engine (descending to level out at) .... 6,900 ft.

STALLING SPEED (Zero Thrust), Flaps 28°, Gear Down ...... 70 mph

MAXIMUM RANGE @ 165 mph .... 1410 miles on 112 gal.

ENDURANCE .... 8.75 hours

TAKE-OFF DISTANCE — (20° flap) Ground Run .... 1,000 ft.*
Total Distance over 50 ft. .... 1,280 ft.*

LANDING DISTANCE — (28° flap) Ground Run .... 980 ft.*
Total Distance over 50 ft. .... 1,590 ft.*

The above performance figures are the results of flight tests of the Travel Air conducted by Beech Aircraft Corporation under factory-controlled conditions and will vary with individual aircraft and numerous factors affecting flight performance.

*Take-off and landing performance based on Sea Level Standard Conditions.

TYPE

Four-place, high performance, all-metal, low-wing, twin-engine cantilever monoplane, with fully retractable tricycle landing gear, solid cabin top, and full complement of engine and flight instruments standard.

BAGGAGE

Maximum 270 pounds — rear
270 pounds less equipment — front

WEIGHTS

Gross Weight .... 4100 pounds
Empty Weight .... 2635 pounds
(Empty weight includes complete set of flight instruments; cabin heating and venti-

lating system, with windshield deicers; sound proofing; navigation, cabin, instrument and landing lights; unusable fuel and oil.)

Useful Load	1465 pounds
Available weight for people and baggage with full tanks, (standard fuel)	948 pounds

WING AREA AND LOADINGS

Wing Area	199.2 sq. ft.
Wing Loading, at gross weight	20.6 lbs./sq. ft.
Power Loading, at gross weight	11.4 lbs./hp

DIMENSIONS

Wing Span	37 ft. 10 in.
Length	25 ft. 4 in.
Height	9 ft. 6 in.

CABIN DIMENSIONS

Cabin Length	8 ft. 6 in.
Cabin Width	3 ft. 6 in.
Cabin Height	4 ft. 2 in.
Passenger Door, size	36 in. x 37 in.
Baggage Door, size	24 in. x 22 in.
Baggage Compartments, size rear	33.5 cubic ft.
Baggage Compartment, size front	13 cubic ft.

PROPELLER AND EQUIPMENT

Propeller — Hartzell, hydraulically controlled continuously variable pitch, diameter 72″, with Woodard hydraulic governor, full feathering.

ENGINE EQUIPMENT (Per Engine)

Starter
Generator
Voltage Regulator
Engine Primer
Fuel Booster Pump
Carburetor Air Filter
Mufflers and Carburetor Heaters (stainless steel)
Exhaust Manifolds (stainless steel)
Vacuum Pump

FUEL AND OIL CAPACITY

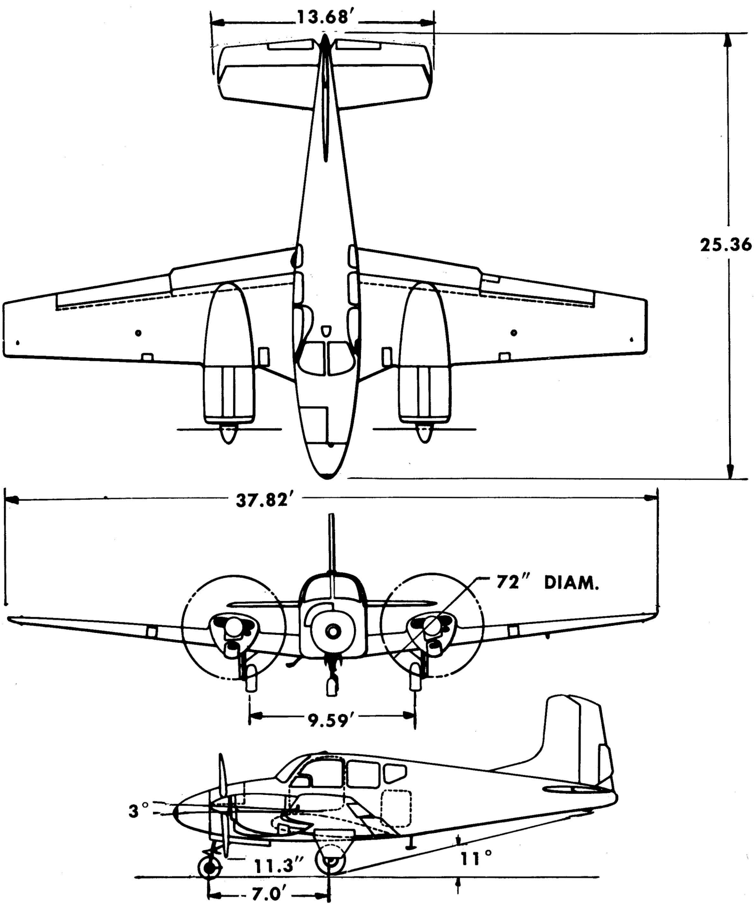
Fuel Capacity in standard wing tanks	86 gal. (84 usable)
Fuel Capacity with optional auxiliary wing tanks	113 gal. (112 usable)
Oil Capacity	16 quarts

LANDING GEAR

Tricycle type with swiveling steerable nose wheel equipped with shimmy dampener. Beech air-oil struts on all wheels designed for smooth taxiing and to withstand the shock created by landing with a vertical descent component of over 600 feet per minute. Main tires 6.50″ x 8″ size; nose wheel tire 5.00″ x 5″ size. Wheels — Goodyear with single disc hydraulic brakes.

ELECTRICAL EQUIPMENT (24 Volt System)

Battery — 17 ampere-hour or 24 ampere-hour
Electric motors for operating flaps and landing gear
Electrically Operated Cowl Flaps
Two 15-Amp. Generators or two 25-Amp. Generators


13.68′
25.36′
37.82′
72″ DIAM.
9.59′
3°
11.3″
11°
7.0′

SECTION I

Descriptive Information

Your new BEECHCRAFT is a four-place, low wing monoplane. The all-metal, semi-monocoque airframe structure is of aluminum, magnesium and alloy steel, riveted and spotwelded for maximum strength. Careful workmanship and inspection make certain that structural components will withstand flight loads in excess of the FAA requirements for a "Normal" category, under which the Model 95 is licensed.

To develop a good flying technique, you must first have a general working knowledge of the several systems and accessories of your aircraft. Although they are closely interdependent in fact, these systems have been broken down arbitrarily in this section for ease of presentation.

FLIGHT CONTROLS

Primary movable control surfaces of the Travel Air are operated through push-pull rods and conventional closed-circuit cable systems terminating in bell cranks. The pre-formed, extra-flexible steel cables run over phenolic pulleys with sealed ball bearings which ordinarily require no lubrication and insure smooth, free action and long cable life. Standard equipment provides a throw-over type control-wheel arm for elevator and aileron control which may be locked in two positions on either the pilot or co-pilot side and dual rudder pedals adjustable fore and aft to fit individual pilot requirements. The right hand rudder pedals may be laid flat against the floorboards when not in use. Trim tabs on all flight control surfaces are adjustable from the control console through closed-circuit cable systems which drive jackscrew type actuators. Position indicators for each of the trim tabs are located near their respective controls. The left aileron tab incorporates servo action, in addition to its trimming function. As the aileron deflects from neutral, its tab moves in the opposite direction. This action is independent of the tab's trim function and occurs without disturbing the trim setting.

Single, slot-type wing flaps are operated through a system of flexible shafts and jackscrew actuators driven by a reversible electric motor located under the front seat. The flap position lights on the left side of the control console show green for the up position and red for the full down (33°) landing position. Intermediate flap positions of 10° and 20°, as marked on the leading edge of the left flap, may be selected by moving the three position control switch, on the left side of the console, to "OFF" when the desired flap setting mark lines up with the wing trailing edge. Limit switches automatically shut off the flap motor when the full up or down position is reached.

LANDING GEAR

The Travel Air's extra-strong, electrically-operated landing gear incorporates the advantages obtainable only with tricycle type gear. The ease of ground operation is assisted by the increased visibility, more positive directional control for parking or operation under high surface wind conditions; decreased stopping distance and longer brake and tire life; these are but a few of the advantages.

The gear is operated through push-pull tubes by a reversible electric motor and actuator gear box under the front seat. The motor is controlled by a two-position landing gear switch located on the instrument panel. Limit switches and a dynamic braking system automatically stop the retract mechanism when the gear reaches its full up or full down position.

With the landing gear in the up position, the wheels are completely enclosed by fairing doors which are operated mechanically by the retraction and extension of the gear. After the gear is lowered, the main gear inboard fairing doors automatically close, producing extra lift and reduced drag for take-off and landing. Individual up-locks actuated by the retraction system lock the main gear positively in the up position. No down locks are necessary since the over-center pivot of the linkage forms a geometric positive lock when the gear is fully extended. The linkage is also spring loaded to the over-center position.

Landing gear position lights, located beside the landing gear switch, indicate the position of the gear, either up or down; coming on only when the gear reaches its fully extended or retracted position. In addition a mechanical indicator beneath the control console shows the position of the nose gear at all times.

To prevent accidental gear retraction on the ground a safety switch, on the left main strut, breaks the control circuit whenever the strut is compressed by the weight of the airplane and completes it, so the gear may be retracted, when the strut extends. ***Never rely on the safety switch to keep the gear down while taxiing or on take-off or landing roll. Always check the position of the switch handle.***

When either, or both throttles are retarded below an engine setting sufficient to sustain flight, with the gear retracted, a warning horn will sound an intermittent note. During single engine operation the horn may be silenced by advancing the throttle of the inoperative engine enough to actuate the warning horn's throttle switch.

The nose wheel assembly is made steerable through spring loaded linkage, connected to the rudder pedals for greater maneuverability during taxi operation. The retraction of the gear relieves the rudder pedals of their nose steering load and centers the wheel, by a roller and slot arrangement, to insure proper retraction into the wheel-well. A hydraulic dampener on the nose wheel strut compensates for the inherent shimmy tendency of a pivoted nose wheel.

Wheels are carried by heat-treated tubular steel trusses and use Beech air-oil type shock struts. Since the shock struts are filled with both compressed air and hydraulic fluid their correct inflation should be checked prior to each flight. Even brief taxiing with a deflated strut can cause severe damage.

For manual EMERGENCY operation of the landing gear (lowering only) a hand-crank is located behind the front seat. The crank, when engaged, drives the normal gear actuation system.

Main landing gear wheels are equipped with Goodyear single-disc, self-adjusting hydraulic brakes actuated by individual master cylinders connected to the rudder pedals and operated as toe brakes. The hydraulic brake fluid reservoir is accessible from the forward baggage compartment and should be checked occasionally for specified fluid level. The parking brake is set by a push-pull control with a center-button lock and is located just to the right and slightly below the control console. Setting the control does not pressurize the brake system, but simply closes a valve in the lines so that pressure built up by pumping the toe pedals is retained and the brakes remain set. Pushing the control in opens the valve and releases the brakes.

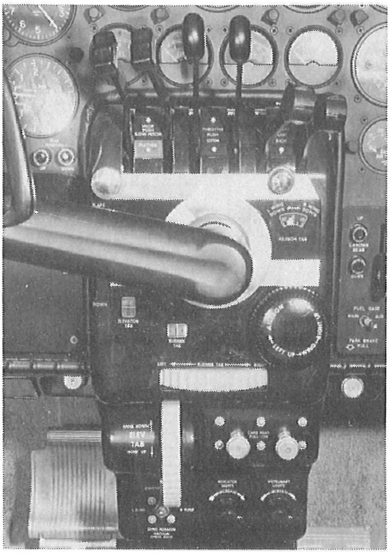
POWER PLANTS

Your BEECHCRAFT is powered by two Lycoming O-360-A1A engines rated at 180 horsepower each, at 2700 rpm, for both take-off and maximum continuous operation. They are four-cylinder opposed, air cooled engines with direct propeller drives and have a compression ratio of 8.5:1. They are fitted with a pressure-type cowling; cooling is controlled by opening and closing electrically-operated gill-type flaps on the trailing edge of the cowling. Float-type carburetors are used, with the carburetor air intake through a filtered airscoop at the lower front of each engine. Alternate air is heated to prevent carburetor ice, by heater muffs around the exhaust stacks; spring-loaded doors in the carburetor intake open automatically if the airscoops or filters are blocked by impact ice or dirt. Full dual ignition systems are used, with an impulse-coupling on the left magneto of each engine for easier starting. The electrical system uses Delco-Remy starters, generators and voltage regulators. Diaphragm fuel pump, vacuum pump and constant-speed propeller governor are standard equipment. Other engine features include sodium-cooled rotator-type valves, chrome piston rings and a nitrided crankshaft.

Hartzell constant-speed, two bladed, hydraulic, full feathering propellers use pressure from a feathering spring and centrifugal force from the blade shank counter-weights to increase pitch. Engine oil under governor-boosted pressure decreases pitch.

Propeller feathering is accomplished by pulling the propeller control back past the detent to the limit of travel. To unfeather, return the propeller control to the governing range (full forward) and start the engine with the starter. On airplanes with the optional unfeathering accumulator, start the engine by moving the propeller control full forward, move mixture control to full rich, and as engine starts, reduce rpm immediately to prevent propeller overspeeding. With the engine operating, governor oil pressure returns the propeller blades to low pitch (high rpm).

Power Plant Controls



Throttle, propeller and mixture control levers, grouped along the upper face of the control console, are within easy reach of the pilot. Their knobs are shaped to government standard configuration so they may be identified by feel.

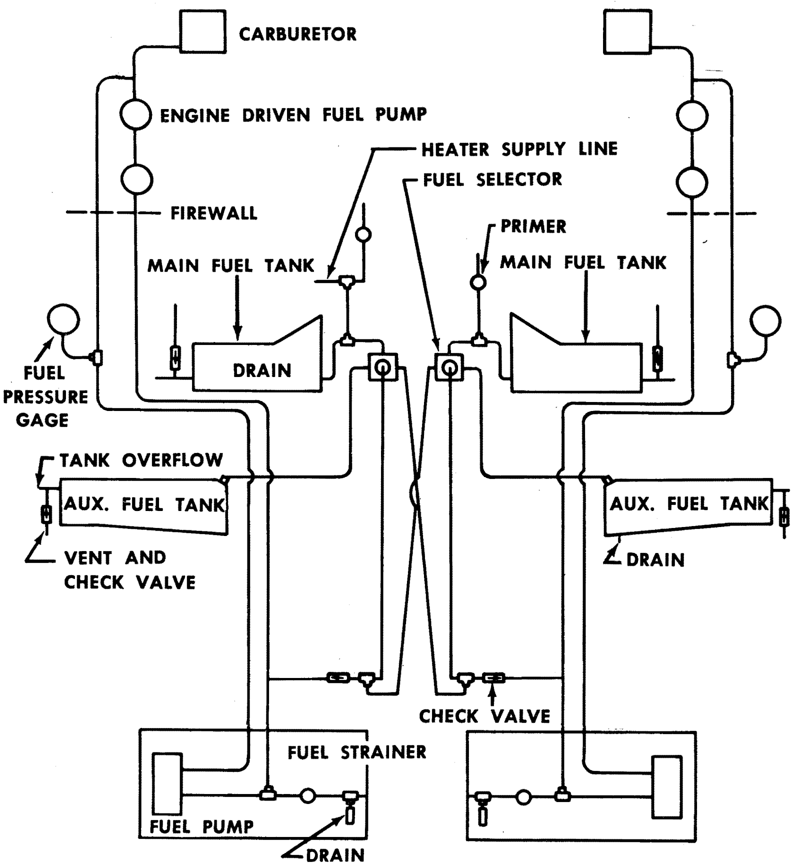
The levers are connected to their respective units by flexible control cables routed through the leading edge of each wing stub. A controllable friction lock on their support shaft may be tightened once power settings are established to prevent creeping. Controls for the carburetor heat are push-pull type with center button locks, and are mounted on the lower face of the control console.

Direct-cranking electric starters are relay-controlled and have push button-type starter switches located on the ignition panel with the individual magneto switches. The two-position toggle-type switches for the electrically operated cowl flaps are mounted to the right of the control console on the instrument sub-panel. An indicator light, adjacent to the switches comes on when the cowl flaps are in the full open position.

Fuel System

The Travel Air's fuel system consists of a separate, identical supply for each engine, interconnected by crossfeed lines for emergency use. During normal operation each engine uses its own fuel pumps to

FUEL SYSTEM SCHEMATIC



draw fuel from its respective fuel cell arrangement. However, on crossfeed operations the entire fuel supply of any or all cells may be consumed by either engine. A fuel selector valve for each engine controls the cells from which fuel is used.

Standard fuel cell installation includes two 25-gallon main cells in each wing stub and two 17-gallon auxiliary cells in the wing panels outboard of each nacelle. Total capacity for the system, with auxiliary cells, is 84 gallons of usable fuel. With the optional 31-gallon auxiliary cells, which replace the standard 17 gallon cells, the total capacity is raised to 112 gallons of usable fuel. Fuel cannot transfer from one cell to another during flight.

Fuel quantity is measured by a float-type transmitter unit in each cell, which transmits a signal to the fuel gages on the instrument panel. A two-position selector switch, controlled by the pilot, determines the cell, main or auxiliary, to which each gage is connected. Each cell is filled through its own filler neck with openings in the upper wing surface which are covered by flush-type filler caps.

Individual electric boost pumps for each engine furnish fuel pressure for starting and provide adequate fuel for full-throttle operation should the engine-driven pump fail. Due to the in-line location of the boost pumps, between the cells and the carburetor, fuel may be drawn from any cell within the system by the boost pump for the operating engine. A manually-operated primer for each engine, mounted on the fuel selector panel, supplies fuel taken from the main cell supply line directly to cylinders 1, 2 and 4. The fuel system is drained at eight different locations as shown in the fuel system schematic and servicing diagram.

Check valves prevent the suction of the operating engine's fuel pumps from pulling air into the system through the inoperative engine, during single engine operation on crossfeed.

Fuel pressure for normal operation is indicated by the engine gage in the instrument panel. The instrument always reads the electric boost pump pressure when it is in use. Engine-driven fuel pump pressure is indicated only with the boost pump off and the engine operating.

Oil System

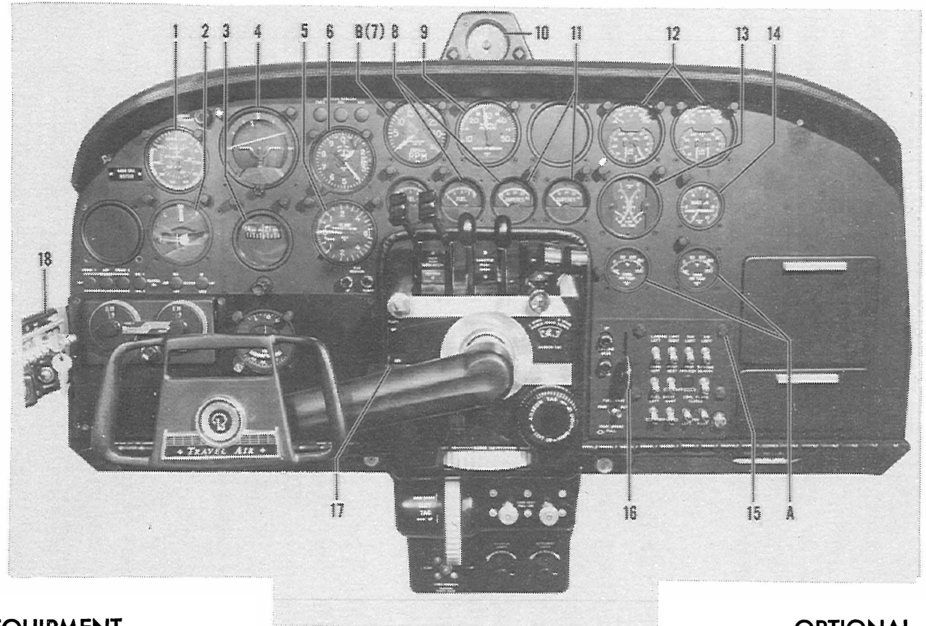
The engine oil system is of the full-pressure, wet-sump type and has an 8 quart capacity. For safe engine operation, the absolute minimum amount of oil required in the sump is 2 quarts. Oil operating temperatures are controlled by an automatic thermostat by-pass control incorporated in the engine oil passage of each system. The automatic by-pass control will prevent oil flow through the cooler when operating temperatures are below normal. It also will bypass if the radiator is blocked. System servicing and draining points are shown on the servicing diagram. The determining factor for choosing the correct grade of oil is the oil inlet temperature which is observed during flight; inlet temperatures consistently near the maximum allowable would indicate a heavier oil is needed. Only straight petroleum base, aviation grade, nondetergent oil of the lightest weight that will give adequate cooling should be used. Avoid any additive to the basic lubricant. Consult the Consumable Materials Chart, Section VII. Condensed moisture in the oil sump may be drained by occasionally opening the oil drain valve and allowing a small amount of oil to escape; ideally, this draining should be done when the engines have been stopped overnight or approximately 12 hours. This procedure should be followed more closely during cold weather or when a series of short flights of less than 30 minutes duration have been made and the engines allowed to cool completely between such flights.

INSTRUMENTS

All flight and engine instruments are mounted on the floating instrument panel in such a manner that the more important instruments are seen first. Instrument markings have a fluorescent coating for night operation and where practicable the normal operating limits are indicated.

Standard flight instrumentation includes attitude and directional gyros, airspeed, altimeter, rate-of-climb, electric turn and bank, magnetic compass and a clock. The airspeed indicator is marked with a special blue line range for single-engine operation. An outside air temperature thermometer and magnetic compass are mounted in the windshield divider.

Engine instruments, which include cylinder head temperature gage, suction gage, engine gage units, tachometers and manifold pressure



STANDARD EQUIPMENT

1. Airspeed Indicator
2. Turn-and-Bank
3. Directional Gyro
4. Attitude Gyro
5. Vertical Speed Indicator
6. Altimeter
7. Tachometer
8. Fuel Gages
9. Dual Manifold Pressure Gages
10. Clock
11. Ammeters
12. Engine Gage Units
13. Dual Cylinder Head Temperature Gage
14. Suction Gage
15. Lighting Switch Panel
16. Landing Gear Position Switch
17. Flap Position Switch
18. Ignition Panel

OPTIONAL EQUIPMENT

A. Carburetor Air Temperature Gage
B. Dual Tachometer

gage, are grouped at the top center of the instrument panel. The engine gage units indicate fuel and oil pressure and oil temperature for their respective engines. The fuel quantity indication is shown by two separate gages, each gage serving both fuel tanks in each wing. The gages are mounted with the ammeters just above the control console.

Impact air pressure and atmospheric air pressure for the airspeed indicator, altimeter and vertical speed indicator are supplied by the pitot and static air systems. Since the accuracy of these instruments depends on accurate pickup of the two pressures, the systems have been developed carefully and tested in flight with highly-accurate special equipment. To insure the proper operation of these instruments, drain the systems regularly and keep the static ports clear of obstructions.

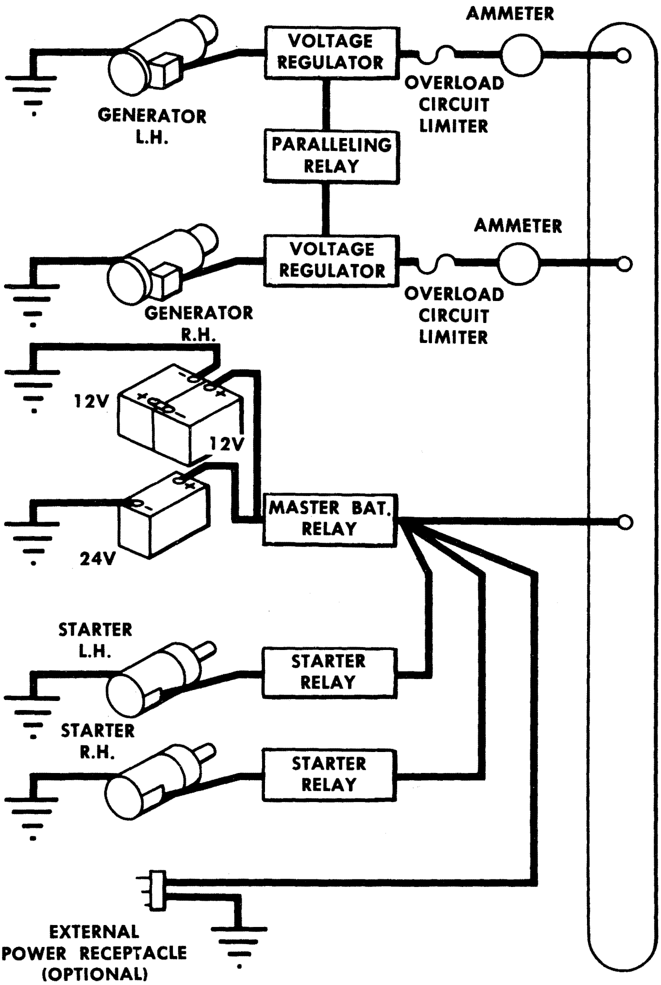
ELECTRICAL SYSTEM

The Travel Air's direct-current 24-volt electrical system consists of one 17-ampere-hour, 24-volt battery mounted in the upper portion of the nose section, and two 15-ampere, 24-volt, belt-driven generators connected in parallel. The generator-to-bus connections are through the voltage regulators and ammeters. Each generator's output is automatically controlled by its voltage regulator and the system paralleling relay which adjusts the generator output so both are equal.

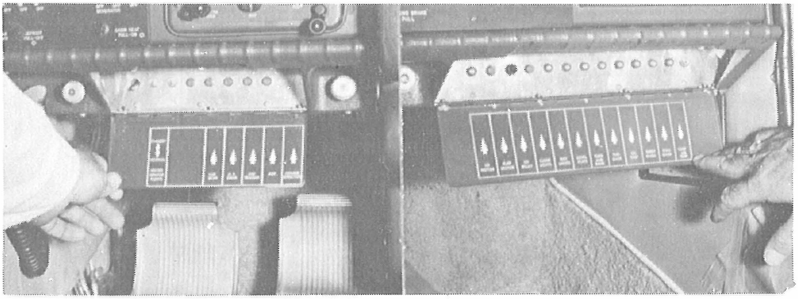
The ammeters in the Travel Air, although of the conventional charge-discharge type, are connected only to the generator output leads and function as loadmeters. With the system working properly, the ammeters will give a positive indication, increasing or decreasing directly with the load applied. Since the generator load also includes battery charging, battery condition may be estimated from the ammeter reading when the battery is momentarily switched off. Normally, the ammeters should show a negative reading only for a moment before the reverse-current relay opens, when an engine slows below generator cut-in speed.

The battery key switch, generator switches, ignition switches and starter switches are located on the ignition panel on the left side of the cabin. Individual circuit breakers, located along the bottom of the right instrument subpanel, are placarded with their circuit functions.

ELECTRIC POWER DISTRIBUTION



The automotive-type starters are relay-controlled which minimizes the length of heavy cable required to carry the high amperage of the starter circuit. A drive unit actuated by centrifugal force from the operating starter motor engages and rotates the external ring-gear at the front of the engine crankcase. When the starter motor is de-energized the drive disengages from the ring gear pinion.



Cabin and instrument illumination are provided by a lighting system in the cabin overhead panel. The cabin light is controlled by an "ON-OFF" switch beside the light, and a rheostat switch beneath the control console adjusts the intensity of the instrument lights.

Lighting for the trim tab and mechanical landing gear position indicators is controlled by a rheostat switch slightly below the control console.

HEATING AND VENTILATING SYSTEM

Fresh air heating and ventilation in your BEECHCRAFT provides an ample supply of heated or cold air to the cabin both in flight and on the ground. Manually operated controls regulate the heater and air supply to suit individual preferences. The system consists of a 35,000 BTU combustion heater, a heater igniter unit, a ventilation air blower, two fuel pumps, a fuel-filter, shut-off valves and temperature limiting thermostats.

For flight operation, ram air pressure forces fresh air through the system. The ventilation air blower maintains air flow through the system during ground operation. The blower is controlled by a switch connected to the landing gear actuation linkage, so that the blower operates when the landing gear is down, the "Cabin Vent" switch "ON" and the "Cabin Air" control in. The blower is shut off automatically when the gear is retracted, and may be shut off manually with the "Cabin Vent" switch or by pulling the "Cabin Air" control out approximately half way which partially closes the iris valve and opens a blower switch connected to the control linkage. This switch also turns off the heater since with the iris valve only slightly open, the intake air is insufficient for proper heater operation.

Heater operation is controlled by a ductstat in the distribution plenum, which acts as a cycling thermostat to maintain the temperature selected with the "Cabin Temperature" control on the left sub-panel. The ductstat upper limit is set at 180°F, to prevent uncomfortably-hot air from entering the cabin. To obtain more cabin heat during flight in low outside air temperatures, pull the "Cabin Air" control out as far as possible without shutting off the heater. This reduces the volume of incoming cold air and allows the heater to raise the temperature of the air to a comfortable level.

A normally-open thermostat in the heater discharge plenum acts as a safety device, to render the heater system, except the blower, inoperative if a malfunction should occur which results in dangerously-high temperatures. This thermostat is set to close at 300°F, grounding a fuse in the heater power circuit. The fuse is located on the upper right-hand segment of the bulkhead behind the instrument panel. This location was chosen deliberately for inaccessibility in flight, to make certain any malfunction causing the overheat fuse to blow is corrected before the heater is operated again.

Fuel for the heater is drawn from the left main wing tank, by two electric fuel pumps, while in flight. During ground operation of the heater only one of the fuel pumps operates. This is accomplished by a switch operated by the landing gear linkage. The heater fuel line is equipped with a strainer. A spring-loaded, electrically operated, solenoid valve, which closes whenever the heater is off, prevents seepage of fuel into the inoperative heater.

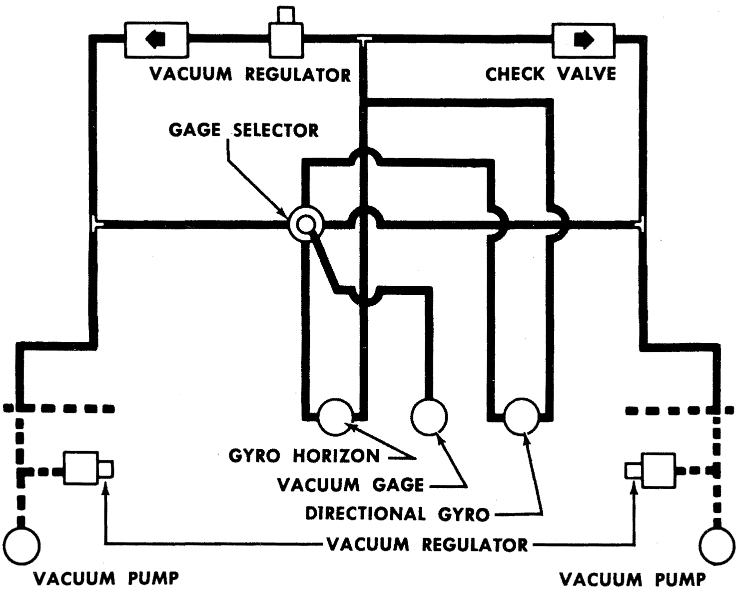
The heater ignition unit, mounted in the nose cap, uses a vibrator to provide interrupted current for its high-voltage coil. The unit is equipped with two sets of points; a toggle-type switch, located beneath the left sub-panel, will place the alternate set in service. When the alternate points are used, the points should be replaced as soon as practicable.

VACUUM SYSTEM

Suction for the vacuum-operated gyroscopic flight instruments is supplied by two engine-driven vacuum pumps, interconnected to form a single system. Either vacuum pump has sufficient capacity to maintain the complete aircraft gyro instrumentation.

A vacuum gage selector valve, on the lower control pedestal, permits a check of the vacuum at four points in the system. The valve has four positions: directional gyro, gyro horizon, left pump and right pump. The suction in inches of mercury at any of the points selected is indicated on the instrument panel suction gage. During normal operation the valve should be positioned in either "Directional Gyro"

VACUUM SYSTEM SCHEMATIC



or "Gyro Horizon." Air entering the system is taken in through the using instruments themselves. To eliminate dust and grit, which might injure the instruments, each of the instrument air intakes is fitted with a filter. Sluggish or erratic operation of one or more of the vacuum driven instruments, with a normal suction gage reading, indicates that clogged filter is reducing the volume of intake air to less than the instruments require. Suction in the system is controlled by adjustable, spring-loaded valves. One in the instrument line just ahead of the instrument panel acts as a system regulation valve and one in each engine's nacelle acts as a relief valve. All three valves are set to bleed air into the system as required to maintain the correct suction supply.

FOR YOUR COMFORT, CONVENIENCE AND SAFETY

Your BEECHCRAFT, built to standards in excess of actual requirements, offers you safety, as well as comfort and convenience items, unexcelled by any airplane in its class. Other items of this nature which are offered as optional equipment and may be installed either at the factory or by your distributor, dealer or Certified Service Station, are listed in the latter portion of this section.

Good Visibility

With increasing congestion around airports, the ability to see about you is vital to safe take-offs and landings. All occupants of the aircraft have excellent visibility through the large tinted, ultraviolet-proof windshield and side windows. There is no need to S-turn for adequate forward vision as the nearly-level ground attitude afforded by the tricycle landing gear gives excellent forward visibility to the pilot. Both rear windows open for ground ventilation and have positive locks to prevent opening in flight. Release pins permit the windows to be used as emergency exits.

Landing Gear and Flap Indicators

Both direct visual indication and signal lights on the instrument panel tell the pilot the position of his landing gear and flaps. The flaps are visible through the windows and an illuminated mechanical pointer indicates the position of the nose gear. Landing gear and wing flap switches are designed to be pulled back out of a detent before they can be repositioned, to avoid accidental tripping.

Landing Lights

Sealed-beam landing lights in the leading edge of each outboard wing panel are shielded by clear plastic lenses with a specially-designed shaded area to produce maximum effectiveness. Either light is operated independently by separate switches; prolonged operation during ground maneuvering or operation in the air should be avoided. Conventional position lights on the wing tips and tail cone are operated through a flasher unit, designed to give steady lights if a malfunction occurs, and are controlled by a two position switch on the right sub-panel.

Stall Warning Indicator

As an impending stall is approached a stall warning indicator sounds a warning horn and flashes a red light on the instrument panel while there is still ample time for the pilot to correct his attitude. The stall warning indicator, triggered by a sensing vane on the leading edge of the left wing, is equally effective in all flight attitudes and at all weights and airspeeds. Irregular and intermittent at first, the warning signal will become steady as the aircraft approaches a complete stall.

Safety Belts

The Beech designed high-strength safety belts on your Travel Air, if properly worn, will keep its occupants snugly in their seats in rough air or under rapid deceleration. The safety belts are mechanically simple and comfortable and wearing them, you have sufficient freedom of movement to easily operate all the controls. The nylon strap material, in colors complementing the upholstery, is soil resistant and easily cleaned. The airline-type harness buckles may be fastened or released quickly and are easily adjusted.

Instrument Cowl Pad

The attractive instrument cowl pad, made of foam rubber encased in dull-finish leather, is shaped to cover the contour above and between the instrument panel and the windshield. This pad, extending aft over the instrument panel in an eyebrow effect, gives the front seat occupants more protection during sudden stop or rapid deceleration.

Cabin Interior

Your BEECHCRAFT offers truly "hushed" air travel through its acoustically engineered and soundproofed cabin. Pilot and passenger fatigue factors have been taken into consideration wherever they are pertinent in designing the airplane. These primary design considerations assure relaxed, comfortable, speedy travel. The travel-designed interiors include cabin loudspeakers, attractive upholstery and wall to wall carpet.

Ample baggage space is provided in the nose compartment and behind the rear seats. The aft baggage compartment is readily accessible in flight from the rear seats. A large door on the right side of the fuselage facilitates loading and unloading while on the ground. The compartment door has a key type lock for security of items stored in the baggage compartment when the aircraft is parked.

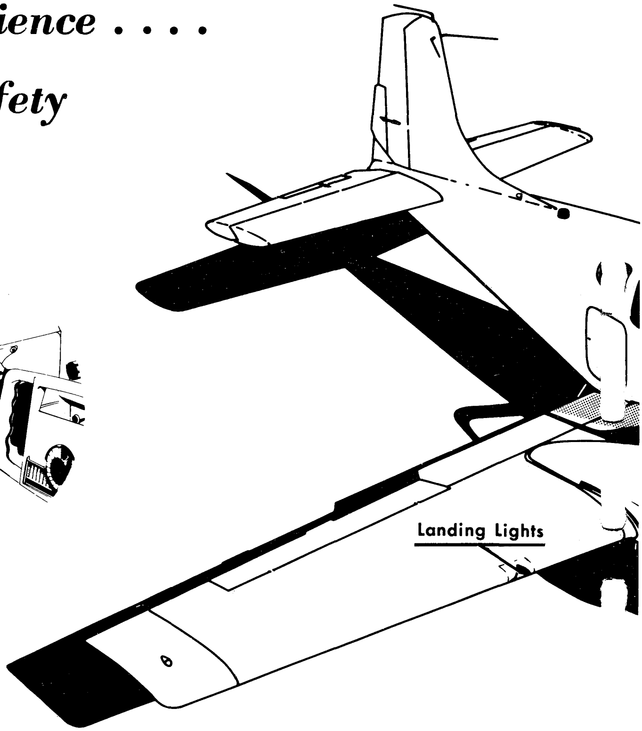
Since people come in different shapes and sizes, the Travel Air's seats may be adjusted to fit the individual comfort requirements of their occupants. All seats are adjustable fore-and-aft, the front seats by pulling up on the small lever just to the right of each seat cushion and the rear seats by pulling up on the cross bar handle just below the front of each seat cushion. Seat backs, except the pilot's seat, are also adjustable from the vertical to the fully reclined position. Armrests for the front seat are built into the cabin sidewalls with a generously-proportioned armrest between the seats which may be raised into position on a pedestal or lowered flush with the seat cushions. The rear seats have individual armrests incorporated in their design.

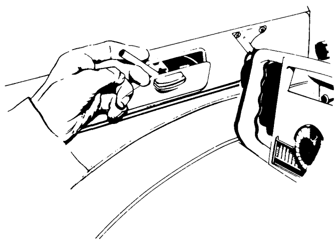
Except when the aircraft is to be operated from the right side, the right hand set of rudder pedals may be laid forward against the floorboards, for maximum leg room.

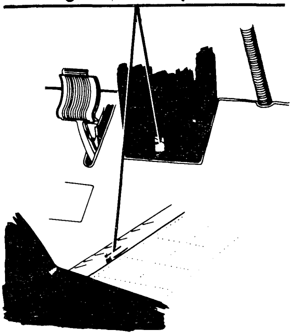
Comfort . . . .

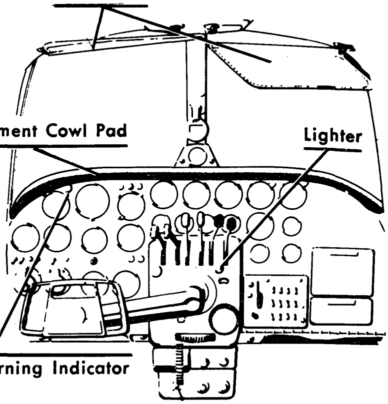
Convenience . . . .

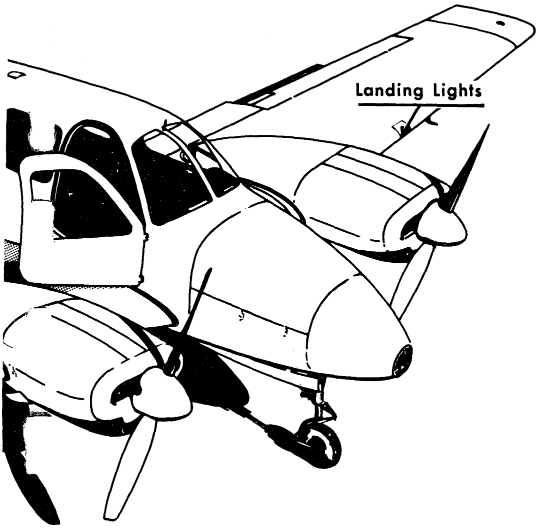
Safety

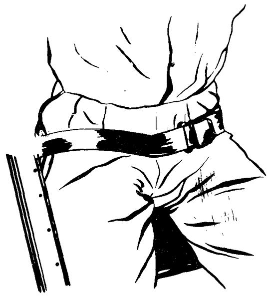


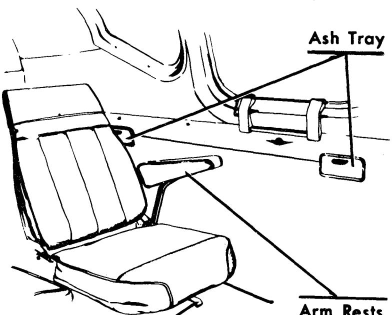


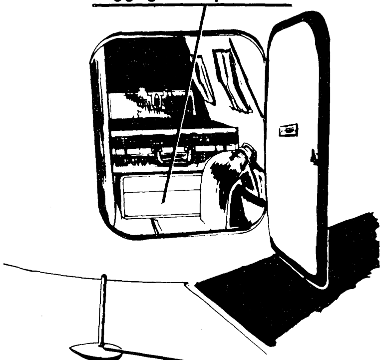





Good Visibility
Landing Lights


Safety Belt


Ash Tray
Arm Rests
Seat Adjustments


Baggage Compartment
Assist Step

Optional Equipment . . .

To Meet Your Flying Requirements for . . .

NAVIGATIONAL EQUIPMENT

DUAL CONTROL WHEEL

Indispensable for instruction and transition purposes.

KOLLSMAN DIRECTION INDICATOR

This is a direct reading magnetic compass. A vertical dial incorporates dual needles, one indicator provides the actual flight course bearing, the other indicator is used as an index pointer to preset your course.

TACTAIR T-3 AUTOPILOT

Makes "hands-off flying" a reality. This fully automatic, three-directional system is pneumatically operated, easy to maintain and almost "fool-proof" in operation. Just set the controls, sit back and relax — the Tactair Autopilot will keep you "on course."

RADIO EQUIPMENT

Equipment consists of either Lear — Narco — ARC — Collins . . . or a combination of such equipment.

INSTRUMENT POST LIGHTS

Makes night flying easier and safer with evenly-distributed illumination, without glare or reflections, of all the panel instruments.

SAFETY EQUIPMENT

GRIMES ROTATING BEACON
DUAL GRIMES ROTATING BEACONS

A continuous rotating, high intensity warning light flashes your in-flight position to other aircraft. These accessory items are good insurance since they provide added safety both for night flights and for operations during conditions of restricted visibility.

SURFACE DE-ICING SYSTEM
PROPELLER ANTI-ICER

A must for all-weather flying.

PROPELLER UNFEATHERING ACCUMULATOR

Gives quicker, more positive propeller unfeathering without the use of the engine starter.

. . . . **FOR YOUR** Beechcraft

. . . . . ***Safety . . . Comfort . . . Pleasure***
Convenience . . . Efficiency

EQUIPMENT FOR COMFORT — PLEASURE AND CONVENIENCE

SUPER SOUNDPROOFING

Thick blankets of modern fiberglass insulation and quarter-inch windshield, seal noise and vibration outside.

FIFTH SEAT ARRANGEMENT

The 5-seat arrangement incorporates a standard seat in the rear of the cabin.

INDIVIDUAL FRESH AIR OUTLETS

Allows individual selection of cool fresh air for each passenger's comfort.

EXTERNAL POWER RECEPTACLE

Permits starting the engines with external power, eliminating the delay for a battery charge.

CARBURETOR AIR TEMPERATURE INDICATORS

Allows accurate control of carburetor heat to prevent carburetor icing.

MISCELLANEOUS OPTIONAL EQUIPMENT

CAGLE BRAKE UNITS

Automatic, self-adjusting brake release unit which completely eliminates brake drag, provides shorter take-off run, easier ground handling and reduced maintenance cost.

DUAL HYDRAULIC BRAKES

A must for instruction and transition purposes.

LOOSE TOOLS AND ACCESSORIES

Includes the same type special tools used at the factory to assemble your airplane.

AUXILIARY WING FUEL TANKS

Two 31-gallon cells replace the 17-gallon cells for an additional 28 gallons of usable fuel for long-range flights.

TAXI LIGHT

The sealed-beam taxi light, which may be used continuously if desired, is of particular value for night operation.

SECTION II

Operating Check Lists

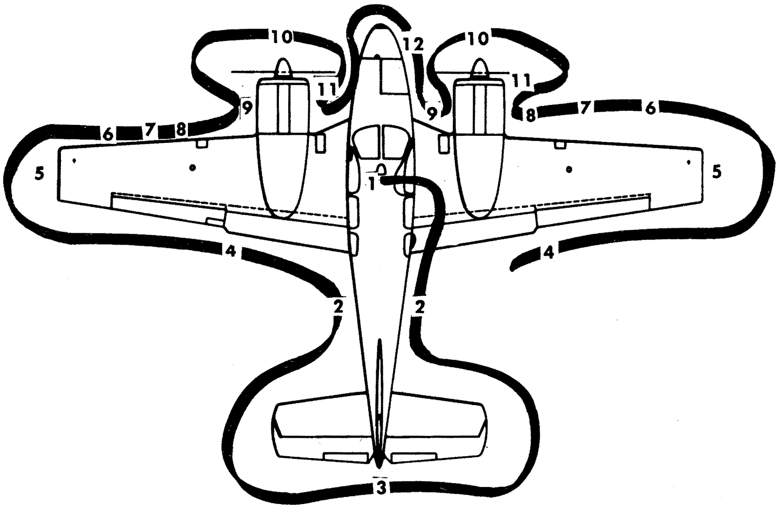
This section has been prepared to give you a quick and easily accessible reference to all operational check lists needed for the normal flight of your airplane. The general techniques presented are based on the recommendations and data compiled by Beech Aircraft Corporation pilots who have test flown and demonstrated the aircraft. The procedures given are intended merely to assist you in developing a good flying technique for your BEECHCRAFT. They constitute the manner in which a good pilot would perform each item under average conditions.

As you become familiar with your airplane, and the individual circumstance under which you fly it, you may find that variations in these techniques will better suit your requirements or personal preference. These checks, if well organized and studied, should become so much a matter of habit that you will find it unnecessary to make reference to this portion of the manual except as a refresher. Made carefully, these checks not only will help prevent mishap or malfunction during operation, but will help lower maintenance cost.

Whether the check is a visual exterior check or a specific operational check, it is a definite responsibility the pilot owes to himself and to his passengers. However, as stated previously, the procedures are intended primarily as guides and are no substitute for good judgment.

Know your airplane's capabilities as well as your own.

WALK AROUND INSPECTION



PREFLIGHT INSPECTION

1. Cockpit — checked; battery and magneto switches "OFF." Tab controls "O"; remove and stow control lock.
2. Static pressure buttons free of foreign material.
3. Check empennage and control surfaces. Aft baggage compartment — cargo secure.
4. Inspect wings, aileron and flaps.
5. Wing tips — checked; remove pitot cover and tie-down lines.
6. Outboard fuel tanks — FULL, fuel tank caps — secured.
7. Drain fuel sediment bowls, strainers, fuel selector valves and fuel cell sumps.
8. Tires and shock struts inflated and clean. Landing gear safety switch — checked.
9. Check each nacelle for oil, fuel or exhaust leakage.
10. Propeller blades — checked; induction filter clean.
11. Check engine oil level, inboard fuel tanks — FULL — secure filler caps, fasten cowling.
12. Forward baggage compartment — cargo secured; weight and balance — checked; all inspection doors — secured.

BEFORE STARTING CHECK

1. Fasten safety belts, set parking brake.
2. Battery and generator master switches — ON. Battery — only, if external power is used.
3. Check circuit breakers, all switches and controls.
4. Landing gear switch DOWN. Mechanical indicator full DOWN.
5. Cowl flaps OPEN, cowl flap position light, amber.
6. Fuel selector valves on main fuel tanks.
7. Carburetor heat controls — OFF.
8. Check the fuel level indication for all cells.
9. Check the landing gear and flap position lights; test the stall warning light.

STARTING CHECK

1. Position throttles ¼ inch open.
2. Propeller controls — High rpm. Cold engine starting: mixture full rich, prime as required. Hot engine starting: mixture in idle-cut-off until cranking, do not prime.
3. Left magneto switch — ON, for engine to be started.
4. Fuel boost pump — ON, for engine to be started. Check fuel pressure.
5. Actuate starter switch.
6. Warm-up 800 to 1300 rpm.
7. Switch fuel boost pump — OFF, check engine driven fuel pump pressure.
8. Normal readings all gages — checked.
9. Disconnect external power, if used.
10. Start remaining engine using the same procedure.

BEFORE TAKE-OFF CHECK

1. Propellers — exercise at 2200 rpm.
2. Magnetos — checked (2200 rpm).
3. Trim — set for take-off, depending on load.
4. Check all controls for full travel and freedom of movement.
5. Fuel boost pumps — ON; check indicated pressure.
6. Check pitot heat, when switch is — ON and OFF.
7. Mixture — FULL RICH.
8. Carburetor control — IN.
9. All instruments and controls — checked.
10. Doors and windows — latched.
11. Parking brake — OFF.

BEFORE LANDING CHECK

1. Safety belts — secure.
2. Check main cell fuel quantity, then switch both fuel selector valves to main cells.
3. Mixture — FULL RICH.
4. Carburetor heat controls should be in the COLD position unless icing conditions exist.
5. Fuel boost pumps — ON.
6. Landing gear DOWN, check indicators.
7. Flaps — as required.
8. Cowl flaps — closed until on ground.
9. Propellers — High rpm.
10. Set altimeter to local setting.

SHUT-DOWN CHECK

1. Parking brake — set.
2. Electrical and radio equipment — OFF.
3. Propellers — High rpm.
4. Throttles — advance to approximately 1100 rpm.
5. Mixture — IDLE-CUT-OFF.
6. Throttles — full aft as engines quit firing.
7. Magneto switches — OFF — after engine stops turning.
8. Battery and generator switches — OFF.
9. All switches — OFF — after engine stops turning.
10. Fuel selector valves — OFF, if airplane is to remain parked for any length of time.
11. Controls locked, if conditions warrant.
12. Cabin door — closed.

SECTION III

Performance Specifications and Limitations

In this section, for your convenient reference, charts and tabular listings of speeds, performance and engine limitations have been grouped. The limitations and performance data in this section has been established by flight tests and engineering calculations to assist you in operating your BEECHCRAFT. The limitations have been approved by FAA and are mandatory. These charts and listings have been established under normal operating conditions, the flight tests being made under standard atmospheric conditions with a maximum gross weight, therefore, allowances for actual conditions must be made. Advance planning, allowing for any changes which may occur in operating conditions due to weather, temperature, altitude or loading, will assure you of safe, fast, comfortable and economical transportation.

During all phases of engine and flight operation, observe the rpm and manifold pressure limits as computed on your horse-power calculator to avoid excessive cylinder pressures. Use your horse-power calculator to arrive at rpm, manifold pressure and fuel flow settings for climb and cruising flight. Note that the manifold pressure required to obtain a given horsepower will vary with outside air temperature. When increasing power, set rpm first, then manifold pressure. Make power reductions with manifold pressure first, then rpm.

In addition, an Approved Maneuvers Chart and information concerning proper weight and balance of your BEECHCRAFT is found in this section. Become familiar with your BEECHCRAFT and its operation. Know the contents of this handbook.

NOTE

The figures denoting speeds in this section, have been calculated as Indicated Air Speeds.

Airspeed Charts

TAKE-OFF SPEEDS

Normal

Take-off	mph	85
Climb-out at 50 feet	mph	100

Short Field

Take-off	mph	70
Climb-out	mph	90

CLIMB SPEEDS

Two Engine

Cruising climb speed (normal rate of power, full throttle, gear and flaps up)	mph	140
Best rate of climb speed, 5,000 ft.		
(gear and flaps up)	mph	103
(gear down)	mph	83
(gear and flaps down)	mph	79
Best angle of climb speed, 5,000 ft.		
(gear and flaps ups)	mph	83
(gear down)	mph	69
(gear and flaps down)	mph	69

Single Engine

Best rate of climb speed, sea level		
(gear and flaps up)	mph	102
Best angle of climb speed, sea level		
(gear and flaps up)	mph	88
Minimum control speed	mph	80

STALL SPEEDS

GROSS WEIGHT 4100 LBS.	LEVEL 	15° 	30° 	45° 
POWER	GEAR AND FLAPS UP			
*ON	60.0	61.0	64.5	71.5
OFF	85.0	86.5	91.5	101.0
	GEAR AND FLAPS DOWN 28 DEGREES			
*ON	49.0	50.0	52.5	58.5
OFF	75.0	76.5	80.5	89.5
* 25.0" Hg AND 2700 RPM				

LANDING SPEEDS

Normal

Approach . . . . 91 mph
Contact . . . . 75 mph

Short Field

Approach . . . . 85 mph
Contact . . . . 75 mph

AIRSPEED LIMITATIONS

Never exceed (Glide or Dive, smooth air) (Red Line) . . . 240 mph
Caution Range (Yellow Arc) . . . . 185-240 mph
Maximum Structure Cruising Speed
(Level Flight or Climb) . . . . 185 mph
Normal Operating Range (Green Arc) . . . . 84-185 mph
Flap Operating (White Arc) . . . . 70-130 mph
Maximum Design Maneuvering Speed . . . . 160 mph
Maximum Gear Extended Speed . . . . 150 mph

Engine Operations Limitations

Maximum Power
(all operations) . . . . 180 hp @ 2700 rpm

ENGINE INSTRUMENT MARKINGS

Oil Temperature

Caution (Yellow Line) . . . . 60° to 140°F
Normal (Green Line) . . . . 140° to 245°F
Maximum (Red Line) . . . . 245°F

Oil Pressure

Minimum Pressure (Red Line) . . . . 25 PSI
Normal Operating Range (Green Arc) . . 65 to 85 PSI
Maximum Pressure (Red Line) . . . . 85 PSI

Manifold Pressure

Normal Operating Range (Green Arc) . . 14.5 to 28.5" Hg.
Maximum, Sea Level (Red Line) . . . . 28.5" Hg.

Cylinder Head Temperature

Normal Operating Range (Green Arc) . . 200° to 500°F
Maximum Temperature (Red Line) . . . . . 500°F

Tachometer

Engine Warm Up . . . . 1300 rpm
Normal Operation (Green Arc) . . . . 2000 to 2700 rpm
Maximum (Red Line) . . . . 2700 rpm

Fuel Pressure

Minimum (Red Line) . . . . 0.5 PSI
Normal (Green Arc) . . . . 0.5 to 6 PSI
Maximum (Red Line) . . . . 6 PSI

Suction

Minimum (Red Line) . . . . 4.4" Hg.
Normal (Green Arc) . . . . 4.8 to 5.2" Hg.
Maximum (Red Line) . . . . 5.5" Hg.

Carburetor Air Temperature

(when installed)

Caution (Yellow Arc) . . . . 120° to 165°F
Maximum (Red Line) . . . . 165°F

Gliding Distance Table

The Gliding Distance Table shown below gives the horizontal distance you can glide, assuming the glide ratios shown, for several different altitudes and wind conditions. Maximum glide is obtained with propellers feathered, gear up, and flaps up. Refer to Section V for correct glide ratio procedure.

GLIDE DISTANCE
(Statute Miles)

IAS	111	113	116	120	123	126	130
Altitude Above Ground (Feet)	30 MPH Tail-wind	20 MPH Tail-wind	10 MPH Tail-wind	Zero Wind	10 MPH Head-wind	20 MPH Head-wind	30 MPH Head-wind
1000	3.3	3.0	2.8	2.6	2.4	2.2	2.0
2000	6.6	6.1	5.6	5.2	4.7	4.3	3.9
3000	9.8	9.1	8.4	7.7	7.1	6.5	5.9
4000	13.1	12.1	11.2	10.3	9.5	8.6	7.8
5000	16.4	15.2	14.0	12.9	11.8	10.8	9.8
6000	19.7	18.2	16.8	15.5	14.2	13.0	11.7
7000	22.9	21.2	19.6	18.0	16.6	15.1	13.7
8000	26.2	24.2	22.4	20.6	18.9	17.3	15.6
GLIDE RATIO	17.3	16.0	14.8	13.6	12.5	11.4	10.3

MANEUVERS

This is a normal category airplane. Maneuvers, including spins, are prohibited.

WEIGHT AND BALANCE

It is the responsibility of the airplane owner and pilot to insure that the airplane is properly loaded. At the time of delivery of an airplane, BEECH AIRCRAFT CORPORATION provides with the airplane a FAA Approved Airplane Flight Manual which is required by the FAA to remain in the airplane at all times. In Section IV of the FAA Approved Airplane Flight Manual is compiled all of the necessary weight and balance data the owner or pilot may need in order to arrive at the necessary weight and balance computation which will assure proper loading.

SECTION IV

Flying Your Beechcraft

Specific information, necessary precautions and procedures presented in this section have been determined through engineering computations and flight testing of the aircraft. The general handling technique presented is based on recommendations and data compiled by Beech Aircraft Corporation pilots who have test flown and demonstrated the aircraft and may be followed with confidence in forming your own procedures. The tables and diagrams in Section VI give a working basis for figuring the aircraft's performance under many combinations of the variable factors connected with flying. However, except for the limitations and precautions mentioned, both the procedures and the graphs are intended primarily as guides and are no substitute for good judgment.

For your convenient reference purposes, various types of data are grouped in other sections of the handbook. Section II is a complete listing of abbreviated check lists. Section III consists of tabular listings or charts of performance data, such as air speeds, engine operation data, maneuvers, and weight and balance information. Section V covers unusual operating conditions. Section VI contains all the graphs and performance data needed for computing flight plans and other variables needed in everyday flying.

EXTERIOR INSPECTION

To a pilot the general airworthiness of his aircraft is both a legal obligation and a direct responsibility to his passengers and himself. Personal attention to the preflight procedures is the mark of a safe pilot and will repay you not only in safety, but in lower maintenance costs as well.

In addition to the check lists in Section II the "Walk-around" portion of your preflight inspection should include checking the rig and freedom of control surfaces, visually checking the condition of the windshield and side windows, antenna rigging, and dents and scratches in the skin or other minor damage which should be noted and evaluated.

CAUTION

Under circumstances where propeller blasts or wind conditions are likely to be encountered, when opening the cabin door, retain the door forcibly by hand and position it against the open stop, thus preventing the possibility of damage to the door or its hinges.

STARTING

Look over the area around the aircraft and be sure of sufficient taxi clearance with respect to other aircraft, buildings or other structures. Make sure your propeller blast is in the clear before running up the engines. The use of prime for engine starting is largely a matter of individual preference and the operational temperatures concerned, both atmospheric and mechanical. With atmospheric temperatures above 30°F, priming normally is unnecessary, while below 30°F it is usually beneficial. Refer to the starting check list in Section II.

Turn the left magneto switch to the "ON" position for the engine to be started. During cold weather operation place mixture control full forward, then apply two or three full strokes with the hand primer. When starting a hot engine advance the mixture control from the full aft (idle cutoff) position, *after* the starter is actually cranking the engine; do not prime. Turn the fuel boost pump to the "ON" position for the engine to be started. Check fuel pressure indication. Actuate the starter switch, but limit each cranking period to a ten or twelve second operation. The five minute cooling and rest interval between cranking periods will extend starter life.

NOTE

Should the engine stop firing completely due to an excessively rich mixture or flooded condition move the mixture control full aft (idle cutoff), turn "OFF" the magneto switch and move the throttle control full forward. Engage the starter and turn the engine through approximately ten revolutions. Following the check list procedures, attempt a re-start. *Do not pump the throttle; to do so will only increase the possibility of flooding.*

After the engine is running evenly, turn on the right magneto switch and open the throttle to an approximate indicated engine speed of 800 rpm; check the engine gage for oil pressure indication. If no pressure is shown in thirty seconds, stop the engine and investigate. When engine temperatures have begun to rise, advance the throttle to the recommended warm-up rpm. Switch the fuel boost pump "OFF" and check the engine driven fuel pump pressure and operation, then start the remaining engine using the same procedure.

TAXIING

NEVER TAXI WITH A FLAT SHOCK STRUT

To taxi, simply release the parking brake control and allow the aircraft to start rolling forward. Check the brakes by applying them several times lightly, thus assuring that the brakes are functioning properly. Govern your taxi speed with throttle coordination. Most turns may be made with the steerable nose wheel and the throttles. Tight turns may be accomplished by applying a combination of inside brake and outside power. When taxiing over rough surfaces use minimum power settings and allow the aircraft to coast over obstruction. Hold the control column full back to reduce weight and relieve loads on the nose gear assembly.

ENGINE WARM-UP

Head the aircraft into the wind. Straighten the nose wheel and set the parking brake. Allow the engines to complete their warm-up at the rpm prescribed in Section III. Limit ground running as near as possible to four minutes in cold weather and two minutes at temperatures above 70°F. To attain maximum engine cooling, place propellers in full low pitch (high rpm). After completing the instrument check pull the propeller control lever aft to the high pitch detent (at 2,200 rpm) and reposition it full forward again after the propeller has changed to high pitch (low rpm) and the engine speed has stabilized. Exercise propeller through this cycle two or three times to assure correct governing action.

NOTE

When exercising propellers in their governing range, do not move the control lever aft past the detent. To do so will allow the propeller to change rapidly to the full feathered position.

Advance the throttle to approximately 2,200 rpm and perform the magneto check. Maximum drop should not exceed 125 rpm. Reduce the engine speed to idle rpm and switch "OFF" both magnetos just long enough to determine if the engine has stopped firing. To avoid spark plug fouling, do not idle the engines at low speed for long periods.

With the propeller controls full forward, in the low pitch (high rpm) position, open both throttles simultaneously with a steady smooth motion and observe if power is developed equally in both engines. Return the throttle to warm-up rpm range. Bear in mind that atmospheric conditions affect both the manifold pressure and rpm obtainable and that on a cold day with high barometric pressure, it is possible to exceed the manifold pressure limit.

NOTE

Since the propellers are feathered by a spring which exerts a constant pressure, and will do so whenever the governor boosted oil pressure to the propeller hub is relieved, it is not necessary to check the feathering cycle with each preflight inspection. The heavy loads imposed on the engine offset the advantages of the check.

NORMAL TAKE-OFF

When you are ready for the take-off run and have moved into position on the active runway, release the brakes and open both throttles smoothly and evenly to take-off power, maintaining positive directional control with the rudder pedals.

CAUTION

If you are taking off or landing behind a large multi-engine or jet aircraft, allow sufficient spacing so that the air turbulence in the wake of the other airplane will dissipate and settle before you encounter it.

As lift-off speed is *approached,* apply a steady back pressure, sufficient to bring the wings to a slightly positive angle of attack. As lift-off speed is *reached,* the aircraft should become airborne.

Maintain a shallow climb until normal climb speed is obtained. Retract the landing gear as soon as you are firmly airborne with no danger of settling back to the runway. If 10° or more of wing flap are used, delay your retraction until a safe airspeed is attained. Turn the fuel boost pumps "OFF" individually and check the fuel pressure indication.

On a hot day a longer run will be required for take-off than under average temperatures. The same rule is true as field elevation increases since lift is obtained only through actual density of air or atmosphere. Though airspeed indications will be the same, almost twice the runway length will be required to attain lift-off speed at an airport elevation of 6,000 feet, than under the same conditions at sea level. Watch the airspeed needle rather than the runway markers and be sure to have *sufficient airspeed* before applying back pressure for the lift-off. Other conditions to be considered are runway surface condition, runway gradient, aircraft gross weight, and surface winds. A good take-off speed depends on the correct allowances for all these factors. Do not forget them.

CLIMB

A climb at best rate-of-climb speed will get you to altitude quickly. It may be mandatory in IFR conditions; or save some fuel overall if you have a good tail wind aloft. However, you will have reduced forward visibility due to the high climb angle and the ascent will be less comfortable for your passengers. On the other hand, a cruising climb will give you good visibility, it will be more comfortable and with good fuel management, it may save both time and fuel since you can make shallow climbs at near cruise speed with only moderate power increases. Your choice of method will depend on the weather, the length of the flight, your load, and your own preference. 2,450 rpm and 25 in. Hg is suggested as a normal climb-out power setting.

For the best rate-of-climb, which will give the greatest gain in altitude per minute, use normal rated power and full throttle. Hold the best rate-of-climb speed shown on the climb graph for your altitude. For cruising climb, power settings should be somewhat less than those used for best rate-of-climb.

To commence leaning, after you have the desired rpm and manifold pressure settings, pull the mixture control aft in small increments. While observing the cylinder head temperature indicators closely, continue to lean out until the engine begins to run rough. Richen the mixture by moving the mixture control forward just enough to smooth out the engine. If it is desired to operate at a higher power output, enrich mixture, increase the throttle to the desired rpm and repeat the leaning procedure. When applying carburetor heat adjust power setting and mixture as necessary.

CAUTION

If dense haze or clouds are encountered the rotating anti-collision beacon should be turned off. The reflection of these lights can produce severe vertigo.

CRUISE

Level off when you have reached your intended cruising altitude and maintain climb power until you have accelerated to your intended cruising IAS. This procedure will allow your airspeed, engine temperatures, and power settings to become stabilized in a shorter period of time.

As cruising speed approaches reduce your power settings. There is no best "cruise power setting for all flights." Your choice of power settings will depend on load, temperature, altitude and perhaps most important, the purpose of your flight. You should, however, weigh these factors in advance and decide on your approximate power settings during your flight planning prior to take-off. The graphs in Section VI were placed there to aid you in doing so.

Since the efficiency of the aircraft in cruise is effected considerably by its trim, your trimming procedure becomes an important task. Using the turn-and-bank indicator, adjust the rudder trim as required to zero the ball, then adjust the elevator and aileron trim. By stabilizing your directional control first you eliminate any slipping or skidding and the excess drag that results. For maximum efficiency merely trimming "hands-off" is not sufficient. Use turn-and-bank, rate-of-climb, airspeed and gyro instruments as trimming aids. They supply a far more reliable reading of what the aircraft is actually doing than may otherwise be detected.

Synchronize the propellers and make final mixture adjustments using the same leaning procedure as applied during the climb-out. The fuel selector valve may be positioned to use fuel as desired while normal cruising operations are continued. However, since your take-offs, climbs and landings must be made using the main fuel cells only, a sufficient reserve for a safe landing at your destination must be maintained. Providing the length of a flight will allow enough fuel for this reserve, the main cells only may be used for this operation. Otherwise, you should switch to the auxiliary fuel cells when you have established your cruising altitude. Also remember that the auxiliary fuel and crossfeed systems may be used in level flight only. When one selector valve is positioned on crossfeed, both engines are using fuel from a cell indicated by the remaining selector valve. If both the selector valves are on crossfeed, the fuel supply for both engines is cut off. Normal operation allows fuel to be consumed from the cell as indicated by the fuel selector valves.

Normal cruise control should be used for all flying when weather and distance are well within the normal operating limitations of the aircraft and its pilot. The power settings used, however, will be governed basically by the objective of the flight — high speed, economy, or comfort. In general your climb operation should not exceed 80% power. Level flight cruise operations should be at the lowest power that will satisfy the speed requirements, usually not to exceed 65% power. Observing these limits will normally result in the optimum balance between aircraft performance and over-all operation economy.

To obtain best engine power the mixture may be leaned during a climb at 75% power or less — starting at an altitude of 5,000 feet. Under 5,000 feet, the mixture should be in the FULL RICH position when more than 75% power is being used; and only at the pilot's discretion with less than 75% power. Full throttle operations should be avoided below 5,000 feet with an engine speed of less than 2,450 rpm.

Cruise control for maximum range differs from that for maximum endurance chiefly in the air speeds used. Range increases with increased air speed due to the improvement in aerodynamic efficiency until the speed reaches a point where the increased drag and the proportionally higher fuel requirements of the engines begin to offset the aerodynamic improvement. Conversely, a speed below this point also will result in fewer miles per gallon and longer flight time, due to increased drag from the less efficient flight attitude of the aircraft and a decrease in both engine and propeller performance.

This point of maximum range, in terms of optimum air speed, must be correctly selected for a given altitude, and must be closely maintained if maximum aircraft performance is to be realized. The selection of this air speed is complicated by several variables: altitude, wind conditions at that altitude, and propeller and engine efficiency. As shown on the range at altitude graphs, the air speed necessary for maximum range may be as much as 20% less than maximum cruise air speed. In selecting the power settings you should use and in predicting your performance, you must also consider weather and terrain, since they will greatly influence your altitude choice.

Maximum endurance cruise control is a flight technique which will keep the airplane in flight the longest time with the fuel available. To obtain minimum fuel consumption, the power is reduced to the lowest value at which the aircraft will fly and handle satisfactory. In practice, this method of operation is used only in emergencies occasioned by weather, traffic, or other conditions. This is efficient operation only in terms of fuel consumption per hour. With reduced power the angle of attack of the wing must be increased to maintain lift. This, in turn, produces increased drag and low flight speeds. In terms of miles per gallon, the flight operation is inefficient; it should be used only when you are going nowhere — for example, in a holding pattern. If power is increased above that for maximum endurance, efficiency in terms of miles per gallon of fuel burned will increase. Aircraft speed will increase at a greater rate than the increase in fuel consumptions per hour due to the more efficient flight attitude. Thus, for any flight the elapsed time is reduced and less total fuel will be burned than if operations were continued at maximum-endurance power. Once cruising altitude is reached, the actual power currently being used to hold an air speed may be computed with the Travel Air's horsepower calculator. Thus, fly an airspeed or power setting — then check your performance through the calculator and graphs. Remember, the calculator is based on outside air temperature as read from the free air instrument, not carburetor mixture temperature; an allowance has been made for the temperature rise in the intake duct.

MANEUVERS

Your Travel Air is licensed under normal category limitations and is intended for only nonaerobatic, nonscheduled passenger and cargo operation. Only those maneuvers incidental to NORMAL flying including stalls (except whip stalls) and turns in which the angle of bank does not exceed 60° are permitted. Refer to Section III for maneuver and stall speeds.

During a normal stall approach, a slight buffeting will provide a sufficient warning to permit a normal recovery; the severity of this warning will increase slightly with power on. In addition, the stall warning indicator gives visual and aural indication of an impending stall approximately four to six mph above the actual stall.

If a spin is entered inadvertently cut the power on both engines. Apply full rudder opposite the direction of rotation and then move elevator forward until rotation stops. When the controls are fully effective, bring the nose up smoothly to a level flight attitude. Don't pull out too abruptly.

Because of the Travel Air's clean design, speed is picked up rapidly in a nose-low attitude. Speed should be carefully controlled, especially if a "red line" speed is approached or rough air encountered unexpectedly. During a pull-out be aware of the amount of control pressure you must use to complete a safe recovery in the altitude you have available, and the load you can apply to the structure in a pull-out. Avoid any abrupt maneuvering or sudden application of the controls during this "red line" condition.

FLIGHT THROUGH TURBULENT AIR

When flight through a storm area or extremely rough air can not be avoided, the problem becomes one of choosing the correct air speed for safe operation under your present weight configuration. If you maintain a high air speed, structural damage or complete failure may result; yet you must maintain sufficient air speed for full control.

Your safe operating range between the two danger zones varies with the severity of the gusts: the stronger the gusts the narrower your safe operating range. Refer to the penetration speed graphs in Section VI.

Once you have established your chosen air speed and trimmed for level flight, you can increase the stability of the aircraft still more by extending the landing gear; the landing gear may be lowered at speeds up to 200 miles per hour IAS, as an extreme emergency measure. If you lower the landing gear as an aid to reducing your speed, you should be alert for the changes in spiral control, elevator trim, and rate of sink. Lower the gear while in level flight, to avoid excessive speed build-up rather than as a corrective measure once the airplane is in a dive.

NOTE

> After extending the landing gear at high speed, the landing gear doors and supporting structure should be inspected for possible damage.

Do not lower the flaps however, unless you are letting down.

If you have leaned the engine, you should place the mixture controls in full rich, switch to the main fuel cells and turn on the boost pumps since you may encounter abrupt and severe changes in altitude and attitude as you fly through the turbulence.

DESCENT

Your preflight planning should have determined the procedure you intend to use. Generally a slow cruising descent starting well out from your destination is more comfortable and with the higher cruising speed attained during the shallow descent with reduced power settings, an over-all savings in fuel will result. Adverse weather, however, if encountered at these lowering altitudes might nullify these advantages and make a sharp rate of descent more profitable; therefore, pilot preference and weather will determine the rate of descent.

Throughout descent watch your engine temperatures and regulate the cowl flaps accordingly, since temperatures may go below a safe minimum for full power which you may need during your approach and landing. During the final portion of the let-down and prior to traffic pattern entry, perform the "before landing" check items listed in Section II.

NORMAL LANDING

The approach speed on final is governed by changing wind conditions, aircraft loading, weather, pilot technique, etc. As you cross the end of the active runway, start decreasing the power settings to idle rpm and maintain sufficient back pressure to hold a slightly nose high attitude just off the runway. As air speed is dissipated, constantly increase back pressure until the aircraft settles to the runway in a nose high attitude just as stalling speed is reached. Touch down should be on the main wheels with only partial relaxation of back pressure. As speed continues to diminish, back pressure may be slowly relaxed and the nose wheel lowered gently to the runway. Apply brakes only after the nose wheel is down and avoid any hard braking action unless absolutely necessary. On any landing retract the wing flaps near the end of the landing roll. Set the elevator trim to a "0" reading and open the cowl flaps.

During high altitude landing operations, watch your air speed closely. Don't attempt to estimate your actual speed from your rate of ground travel. While the required IAS for maneuvering at high altitude will not change, the allowances you must make in take-off and landing distances will be almost doubled at an elevation of 6,000 feet as compared to the same conditions at sea level. This is due to the decrease in air density as altitude increases. The exact allowance increases you must use for your particular altitude, temperature and loading may be seen by studying the performance graphs provided for this purpose.

NIGHT LANDING

The pre-landing procedures for night operation are the same as used during a normal landing with the exception of using the different lighting elements. Many experienced pilots prefer power usage completely through the approach, flare out and actual touch-down which is most desirable when it is difficult to estimate the aircraft's exact altitude as is often the case without runway lights. By holding this partial power the aircraft will settle to the runway in a semi-power stall; just as the ground is contacted the power should be cut-off. At any time during a power-on approach, simply by increasing power, the rate-of-descent may be reduced sharply to allow for errors in judgment or a go-around if necessary.

The use of landing lights is not always entirely beneficial as a certain glare is associated with their use, especially in haze conditions; however, if you decide to use them they should be turned on while the aircraft is well above the ground in order to avoid sudden changes in the appearance of the landing area as the landing position is approached. In haze it is often beneficial to use only the landing light on a side away from the pilot to reduce reflected glare.

ENGINE SHUTDOWN

Check all instruments for readings within specified limitations; advance the throttles to an engine speed of approximately 1,100 rpm. Position the propeller controls in low pitch (high rpm) and pull the mixture controls back to the idle cut-off position. As the engines slow, move the throttles to the full aft position until the engines quit firing. Switch off the magneto switches after the engines have stopped rotating. Check the panel for all desired switches and controls in the "OFF" position. Fuel selector valves may be turned off.

COLD WEATHER OPERATION

In addition to the normal preflight exterior inspection, remove ice, snow, and frost from the wings, tail, controls surfaces and hinges, propeller, windshield, pitot tube, fuel cell filler caps, and fuel and oil tank vents. If you have no way of removing these formations of ice, snow, and frost, leave the aircraft on the ground as these deposits will not blow off. The wing contour may be changed by these formations sufficiently that its lift qualities are considerably disturbed and sometimes completely destroyed. Complete your normal preflight procedures, including a check of the flight controls for complete freedom of movement.

Conditions for accumulating the moisture, in both the engine oil sumps and the fuel cells, are most favorable at low temperatures due to the condensation increase in the tanks and the moisture that enters as the systems are serviced. Therefore, close attention to draining the fuel cells and oil sumps will assume particular importance during cold weather.

Engine oil viscosity weights should be changed according to the oil weight as shown in the Consumable Materials Chart in Section VII, provided a sufficient amount of your flying is going to be in cold weather. Under extremely cold conditions, it may be necessary to preheat the engine oil prior to a start. Always pull the propeller through by hand several times to clear the engine and "limber up" the cold, heavy oil before using the starter. This also will save battery energy if an auxiliary power unit is not available.

Normal engine starting procedures will ordinarily be used, with the exception of priming, which will probably require an extra few shots. Use carburetor heat as necessary for smooth engine operation during the warm-up period. If there is no oil pressure within the first thirty seconds of running, or if oil pressure drops after a few minutes of ground operation, shut-down and check for broken oil lines or radiator.

Avoid taxiing through water, slush or muddy surfaces if possible. Water, slush or mud, when splashed on the wing and tail surfaces may freeze increasing weight and drag and perhaps limiting control surface movement.

Use your brakes with caution; taxi slowly for best control.

During warm-up watch your engine temperatures closely since it is quite possible to exceed the cylinder head temperature limit in trying to bring up the oil temperature. According to the engine manufacturer, normally the engines are warm enough for take-off when the throttles can be opened without back-firing or skipping of the engine.

During the engine run-up, carburetor heat controls should be in the "cold" position; however, if your run-up is not immediately prior to take-off, make a special check using carburetor heat to eliminate carburetor ice that may have accumulated during taxi operations or take-off delays. Return the carburetor heat control to the "cold" position for take-off. Turn on the pitot heat and run the propellers through their pitch range several times to flush cold oil from the actuating cylinders.

For in-flight operation, use carburetor heat as required and adjust power and mixture as necessary. Cycle the propellers occasionally to flush cold oil from the propeller hubs.

During your let-down and landing, complete the normal checks and procedures, giving special attention to the engine temperatures which will have a tendency toward over-cooling. Use carburetor heat as necessary until reaching the landing pattern or if severe freezing conditions prevail, just prior to the flare-out. Be prepared to change to normal air if you should need full power for a go-around.

As soon as the aircraft is on the ground, retract the flaps and use the brakes sparingly.

ENGINE ICE PROTECTION

I. Cold Weather Operation

Induction system icing may occur during flight through visible moisture at plus 5 degrees C. (plus 41 degrees F.) or below. To minimize the possibility of icing, always apply FULL CARBURETOR HEAT before entering these conditions. Indications of possible icing may be engine roughness or a decrease in manifold pressure. When either of these conditions occurs in visible moisture, immediately apply full carburetor heat. Continue using full carburetor heat until you are assured that all ice has been removed and you are well clear of icing conditions. If a return to filtered air causes engine roughness, due to melting snow or ice remaining in the air scoop, return immediately to full carburetor heat. Application of carburetor heat will result in a slight loss of power.

II. Warm Weather Operation

Under certain moist atmospheric conditions it is also possible for ice to form in the mixture chamber even in summer weather. This ice may build up to such an extent that a drop in manifold pressure results. If not detected, this condition will continue to such an extent that the reduced power will cause complete stoppage. To avoid this condition, use full carburetor heat to remove the ice and then sufficient heat to prevent its reforming.

INSTRUMENT FLIGHT

Properly equipped, your Travel Air is an instrument airplane, but are you an instrument pilot? Even the most careful VFR pilots occasionally will encounter weather conditions beyond their piloting skill and for this reason a technique perfected by the University of Illinois Institute of Aviation should be made a part of your own skill. Known as the "180-Degree Turn," it is a technique designed to return the VFR pilot to VFR conditions, safely.

Essentially, the technique consists of (1) increasing drag by lowering the gear — *in an extreme emergency the gear may be lowered at speeds up to 200 miles per hour IAS;* (2) reducing airspeed; (3) trimming the airplane for a predetermined slow-flight speed; (4) WITH THE HANDS OFF THE WHEEL, making a turn with the rudders only, to a heading of 180° from the heading on which you were flying when you lost visual contact.

This technique is simple, but rapid, smooth and precise execution is essential to its success, and you should learn it from a qualified instructor, preferably in your own airplane, so that it can become completely familiar and automatic. We suggest that you contact the University of Illinois for more precise details on this procedure.

Always operate your Travel Air so that you and your passengers are comfortable; discomfort will usually appear well in advance of danger. Remember — the final responsibility for safe flight falls squarely upon your shoulders as the pilot.

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SECTION V

Unusual Operating Conditions

"The best time to know procedures and the worst time to practice them is during an emergency."

Emergencies created by the failure or malfunction of one or more components or accessories may be broadly classified in one of two groups: those requiring immediate action and those in which you have sufficient time to decide on and execute a plan of action according to the demands of the particular situation.

In this discussion of emergencies the situations requiring immediate corrective action are treated in check list style for easy reference and familiarization. Other situations are discussed with respect to cause, condition, effect, and possible corrective measures. Your practice of these suggested techniques should be frequent enough for you to maintain proficiency in the rapid initiation of the proper procedures. Complete mastering of the emergency procedures peculiar to multi-engine flying can not be over impressed.

Emergency situations seldom will occur if you follow good inspection and maintenance practices; otherwise, your need for a complete understanding of this section is multiplied.

SINGLE ENGINE OPERATION

The flight and handling characteristics of your Travel Air on one engine are excellent. The aircraft may be safely maneuvered or trimmed for normal hands-off operation, which is easily sustained by the operative engine as long *as sufficient airspeed is maintained*. However, to properly use these safety and performance characteristics, you must have sound understanding of single engine performance and the limitations resulting from an unbalance of power.

Two major factors govern the single engine operation; airspeed and directional control. The minimum control speed is the speed at which you still have directional control with the aircraft in take-off configuration, one engine inoperative and full take-off power on the operating engine. However, bear in mind that this speed is a minimum for control and *below the speed at which the aircraft will climb.*

The best single engine rate of climb speed at sea level is indicated by the blue line on the airspeed indicator. This speed is extremely important for best performance in an emergency. If this speed is allowed to vary from the optimum, your rate of climb will decrease, or if you are above the critical single engine altitude, your rate of sink will increase. The variation in best rate of climb speed with altitude is shown in the graphs in Section VI.

The safe single engine speed, also the blue line on the airspeed indicator, is probably the most important speed you will be concerned with during your practice of emergency procedures and should an actual emergency occur. If you have safe single engine speed, normal single engine procedures may be followed. Otherwise, you must attain this necessary airspeed through an altitude loss or make a landing. The technique to be used in a given situation and the decisions you must make will depend entirely upon your altitude and airspeed at the particular time the emergency arises.

Airspeeds given in Section III and Section VI are recommended for average piloting techniques, under average conditions; they do not represent the maximum aircraft performance under ideal conditions, but have been determined on the basis of actual flight tests to afford you with a reasonable margin of safety.

The chief advantage of an additional engine is the ability of the aircraft to go on flying if one engine fails. However, having two engines, like having blind flying instruments, is a safety factor which depends on the knowledge, technique and the recent experience of the pilot in his particular airplane.

A zero-thrust graph with instructions for simulated one engine out conditions is provided to aid in reduction of risks involved in single engine practice. Practice these techniques until they become instinctive.

SIMULATED ONE ENGINE OUT PROCEDURE

Simulated one engine out conditions may be set up whereby zero thrust power settings may be used instead of complete engine shut-down in order to avoid the risks involved in the training or practice of single engine technique. The two airspeeds represented in the accompanying graph are Vmc minimum control speed, and V minimum single engine take-off speed, with the landing gear up and the propeller feathered. In order to set up a zero thrust condition for single engine practice, use the following procedure:

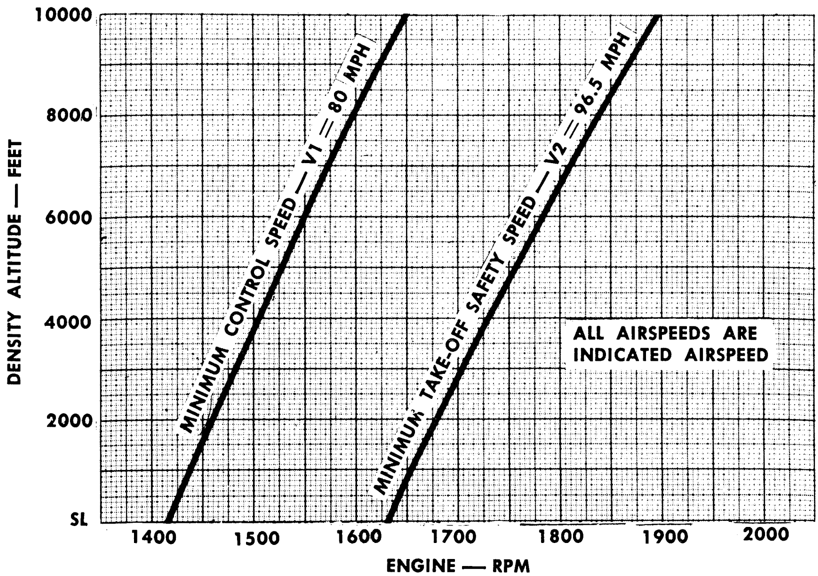
Use of the Zero Thrust Graph

1. Select your pressure altitude (altimeters set at 29.92 inches Hg.) and either the Vmc or V airspeed.

2. Observe the OAT and determine the standard altitude from the altitude conversion chart.

3. To find the correct engine rpm, read horizontally across the

ENGINE SPEED FOR ZERO THRUST AT ALTITUDE



zero thrust graph at the standard altitude, calculated in step 2, to the selected airspeed where it intersects the airspeed curve. Then read the engine rpm directly below.

Application

1. To obtain zero thrust rpm, adjust power to minimum throttle setting for the required rpm and airspeed, with the prop control in the FULL HIGH RPM position.

2. After setting up the above zero thrust practice conditions, single engine flight characteristics will be as set forth in the following paragraphs. The engine speed for obtaining zero propeller thrust can be affected quite markedly by variations in atmospheric conditions and indicated airspeed. Care should be exercised in determining the standard altitude and setting up the zero thrust power at the proper rpm and minimum manifold pressure at the airspeed for the given condition.

3. For recovery after the practice condition, apply throttle and retrim as necessary.

Determining Inoperative Engine

Once an engine has actually failed, your first consideration is to continue to fly the aircraft. Apply all available power immediately; *all six levers full forward.* Then determine for certain which engine has failed, since there is a chance you may feather the propeller on the good engine. The following checks will aid you in deciding which engine has failed:

1. *Dead foot — dead engine.* The rudder pressure required to maintain directional control will be on the side of the good engine.

2. *The cylinder head temperature gage* immediately will indicate a lower than normal reading for the inoperative engine.

3. *Partially retard the throttle* on the engine that is believed inoperative. There should be no change in control pressures or in the sound of the engine, if the correct throttle has been selected. Under conditions of low altitude and IAS, this particular check must be accomplished with extreme caution.

Never try to determine the inoperative engine by reading the tachometer or the manifold pressure gages. After power has been lost on an engine, the tachometer often will indicate the correct rpm and the manifold pressure gage frequently will indicate approximate atmospheric pressure or above.

NORMAL SINGLE ENGINE PROCEDURE

After determining the inoperative engine, if your IAS is at or above safe single engine speed, use the following shut-down procedure. The over-all goal of the steps is to reduce all unnecessary drag in as short a time as possible.

1. Apply take-off power (throttles, propellers and mixtures for both engines FULL FORWARD), to obtain or maintain desired altitude and airspeed; apply rudder to maintain directional control. Bank approximately 5 degrees into the heavy rudder.
2. Retract the landing gear.
3. Pull the propeller and mixture control back into the full feathered and idle cut-off positions for the inoperative engine.
4. Close the cowl flaps on the inoperative engine. Retract flaps gradually if in use.
5. As the propeller feathers and the engine stops rotating, shut off generator and magneto switches. If propeller fails to completely stop, decrease airspeed slightly.
6. Turn fuel selector valve for inoperative engine to OFF and check fuel boost pumps OFF.
7. Turn off unnecessary electrical equipment to prevent battery drain.
8. Maintain take-off power until a safe altitude is attained or until single engine procedures and checks are satisfactorily accomplished. Select a cruise power setting for the good engine to maintain minimum speed for hands-off trim on one engine.
9. Set rudder trim for single engine flight and trim wing on the inoperative engine side to hold three to five degrees high.
10. Land as soon as practicable.

ENGINE FAILURE DURING TAKE-OFF

If an engine failure has occurred within IAS of less than safe single-engine speed and the gear is extended, cut your power, get the nose wheel on the runway and apply the brakes. If the aircraft cannot be stopped within field limits and ground looping is not feasible, prepare to stop straight ahead; turn no more than necessary to avoid obstructions. To minimize the chances of fire, turn off all switches and controls you can.

If an engine fails after you have gained safe single engine speed, retract the landing gear immediately and follow normal single engine procedure. If the failure occurs after you are airborne, but before you have safe single engine speed, reduce power and land straight ahead. A glance at the single engine climb graph will show clearly that the first requirement for continuing flight after an engine failure is to clean up the airplane as quickly as possible. *With the airplane clean, you can climb; with gear down, windmilling propeller and cowl flaps open, you will not be able to maintain altitude.* Bear in mind also that the performance shown on the graph is for standard altitude; if your ambient temperature is higher than standard, your rate of climb will be less than that shown, while on a cold day it will be better. To visualize the amount of these variations, determine a few density altitudes based on typical summer and winter conditions and check the performance shown on the graph for these densities. Note also the effect of temperature on single engine climb.

ENGINE FAILURE DURING FLIGHT

Follow normal single engine procedures, if the difficulty is apparent and can not be remedied. Otherwise, if you have a safe altitude, the following checks may be accomplished in addition to the normal procedures. These checks should be made prior to feathering the propeller and turning off the magneto switches on the inoperative engine.

1. Check fuel pressure, if deficient, turn on the fuel boost pump.
2. Check fuel quantity, switch to another cell if necessary.
3. Check oil pressure and temperature indications; shut down the engine if oil pressure is low.
4. Check magneto switches.

RESTARTING FEATHERED ENGINE

Prior to a restart of an engine that has failed, the cause of failure should be located and corrected. It is wiser to continue on one engine than chance ruining an engine that may need only minor repairs.

During cold weather, your restarts should be completed within a few minutes after shut-down, since cold oil in the governor passages and propeller may impede un-feathering.

For engine to be started:

1. Turn fuel selector valve to either MAIN or AUXILIARY position; boost pump can be used on any cell selected.
2. Adjust throttle to normal starting position.
3. Turn on magneto switches.
4. Move propeller control full forward to LOW PITCH (high rpm) range.
5. Turn the engine over with starter, unless unfeathering accumulators are installed.
6. After several engine revolutions, advance mixture control to FULL RICH.
7. As soon as engine starts, adjust throttle to prevent an engine overspeed condition. Check for fuel and oil pressure. If both indicators do not respond normally, abandon attempt at starting. Refeather and secure engine.
8. After engine starts, turn off fuel boost pump.
9. Let engine warm up at approximately 2,000 rpm and 15 inches manifold pressure. Observe oil pressure closely; if not normal in 30 seconds, shut down and refeather.
10. When oil temperature is in normal range, bring engine up to normal power and retrim. Set rpm first then open throttle.

SINGLE ENGINE LANDING

Essentially, a single engine landing is the same as a normal landing, except that you should allow a larger safety margin during the pre-landing pattern and final approach. This safety margin is in the form of more airspeed, a slightly higher pattern and final approach altitude, and a wider pattern which will eliminate any steeply banked turns.

Since you have more altitude, your final approach may be higher and because of the larger pattern you may line up with the runway further out; thus you will have time to correct for any wind drift, stabilize your final approach speed and rate of descent and judge more accurately your use of gear and flaps. Also, you can ease off the power on your good engine a little sooner; rudder trim should be reduced to neutral as power is decreased.

Lower the landing gear only after final approach is established. If a base leg is used, the gear may be lowered as you roll out of the turn on final; in making a straight-in approach aim for the first few feet of runway and set up a glide path to overshoot rather than undershoot, then lower the gear. Do not lower the flaps until the gear is down and locked and you are sure of making the field. Full flaps may be used to shorten the landing roll or to steepen the approach if you are over-shooting.

With full flaps and gear down, level flight cannot be maintained at full gross weight on one engine; unless time will permit you to clean up the airplane, do not attempt to go around.

SINGLE ENGINE GO-AROUND

A single engine go around may be executed when it appears this is the only way to avoid a possible accident. The following procedure should be used and rapid execution of the individual steps is very important:

1. Apply full power and correct for yaw as the throttle opens. Maintain best single engine rate of climb speed.
2. Retract the landing gear and close cowl flaps on dead engine.
3. If flaps are full down, retract to approximately half flap.
4. Retract the remaining flap as soon as practicable to obtain maximum rate of climb.
5. Trim for single engine climb.

SINGLE ENGINE OPERATION ON CROSS FEED

The suction type cross feed system enables the operating engine to use the entire fuel supply of either wing. Once you have completed your single engine procedures, if you desire to use the fuel in the opposite wing cells, turn the fuel selector valve handle for the operating engine to cross feed and the dead engine selector handle to the desired fuel cell, either main or auxiliary. If both fuel selector valves are set on cross feed the fuel supply for both engines is cut off. The cross feed system is designed for level flight only.

Normally the engine will operate satisfactorily from cross feed, but if necessary, the fuel boost pump for the operative engine may be turned on to supplement the engine driven pump.

CROSSWIND TAKE-OFF

Crosswind take-off procedures differ from into-the-wind technique only during the latter part of the take-off run and during the actual lift-off. Wing flap and trim tab settings correspond to a normal take-off operation. As flying speed is gained, apply forward pressure on the control wheel to keep the nose gear solidly on the ground for positive directional control. Counter the crosswind action by holding the wings level with the ailerons. When you have attained lift-off speed, pull the aircraft off with a definite back pressure on the control wheel; relax aileron and rudder pressures to allow the aircraft to establish its own crab angle. This will effect a straight track in reference to your ground roll.

OBSTACLE TAKE-OFF

When a maximum of altitude in a minimum of forward distance must be attained, use 20 degrees of wing flap and set the elevator trim between "0" and 3 points "nose up," as required; apply full power and release the brakes. Hold the wings in a near level flight attitude during the take-off run, until lift-off speed is attained, then smoothly and positively apply back pressure to assume a nose-high climb angle. After you have positively cleared the ground, retract the landing gear and maintain the nose-high attitude to obtain the maximum angle of climb until the obstacle is cleared. The best angle-of-climb speed will allow you to climb clear of an obstruction in the shortest distance. After you are in the clear, level off and accelerate to normal climb speed and retract the wing flaps.

OPERATION FROM UNIMPROVED FIELD

To get the aircraft airborne in the shortest forward distance traveled, under less than ideal surface conditions, use 20 degrees of wing flap and adjust the elevator trim from "0" to 3 points "nose up," depending on the loading; apply full power and release the brakes. The control wheel should be held well back during the beginning of the take-off run, to establish the maximum possible angle of attack. As the take-off run progresses and landing gear drag decreases, the angle of attack should be gradually reduced for better acceleration to flying speed. As you become fully airborne, relax back pressure to permit the aircraft to accelerate, and retract the landing gear. Retract the wing flaps as normal climb speed is attained.

To land the aircraft in the shortest forward distance, use full flaps and approach with as little power as practicable. Cross the approach end of the runway with a slightly nose-high attitude and dissipate the remaining altitude and airspeed with throttle and elevator coordination in such manner as necessary to cause the aircraft to touch-down in the shortest horizontal distance traveled, just as a stall is reached. The remaining procedure, after touch-down of the main gear, is determined by the type of landing surface used and available runway length.

OBSTACLE LANDING

Your final approach must be higher than normal to clear the obstacle and allow you to set up your desired rate of descent. Use full flaps and maintain airspeed with elevator control and rate of descent with power. Hold airspeed within close tolerances as your sharp rate of descent will make it necessary to lead your normal flare out by a few extra feet of altitude; if necessary, add power. Lower the nose wheel immediately after the main gear touches down and apply the brakes as required.

CROSSWIND LANDING

The recognized procedures for a crosswind landing are: slipping into the wind on final approach just enough to maintain a straight ground track and hold a heading to the intended landing strip, and by crabbing. Usually crabbing into the wind on final approach to correct for drift, and so maintain a straight track toward the landing strip, will handle a greater crosswind component than will the slipping approach. In addition, the crab method maintains normal glide angles and allows the best view of the landing area.

Turn to the runway heading soon enough to prevent contacting the surface with the heading you used for drift correction.

BALKED LANDING

Advance the throttles to take-off power and simultaneously apply sufficient pressure to control column to maintain a safe climb attitude for your present airspeed. Raise the landing gear, if you are solidly airborne, and push the carburetor heat controls in (COLD). Raise the wing flaps. However, do not raise them rapidly when very close to the ground, because of the rapid loss of lift. Climb out at best angle-of-climb speed, until you can level off safely.

GEAR UP LANDING

If you are to make a gear up landing, make a normal approach and if possible, choose a hard surface to land on. Use flaps as necessary. When you are sure of making the runway, close the throttle, move the mixture control levers to IDLE CUT-OFF, cut the battery master and all ignition switches, and turn the fuel selector valve to the OFF position. Keep the wings level and make the touchdown as gentle as conditions will permit. If possible, avoid a gear up landing on soft ground, since sod has a tendency to roll up into chunks which may damage the aircraft structure.

LANDING GEAR EMERGENCY EXTENSION

The landing gear handcrank will lower the gear manually if the electrical system fails or if you wish to do so for some other reason. The handcrank is designed only to lower the gear; you should not attempt to retract it manually. To preclude an excessive speed build-up, in an extreme emergency situation, the gear may be lowered at speeds up to 200 mph IAS.

NOTE

After an emergency extension of the landing gear at high speeds, the landing gear doors and supporting structure should be inspected for possible damage.

Manually extending the gear will be easier if you can reduce your airspeed first. Use the following procedure:

1. Landing gear circuit breaker — pulled.
2. Landing gear switch — DOWN position.
3. Remove safety boot from handcrank handle (at rear of front seat). Turn counter-clockwise as far as possible.
4. Check mechanical indicator to ascertain that gear is down.

If electrical system is operative also check your position light and warning horn.

ENGINE FIRE IN FLIGHT

In case of fire in an engine compartment during flight, shut down the affected engine and follow normal single engine procedures. Land immediately.

1. Fuel selector valve handle — OFF.
2. Mixture control — IDLE CUT-OFF.
3. Propeller lever — FEATHER.
4. Boost pump — OFF.
5. Magneto switches — OFF.
6. Generator switch — OFF.

MAXIMUM GLIDE

Maximum gliding distance can be obtained by feathering both propellers, retracting the wing flaps, landing gear and cowl flap. The glide ratio under this configuration, as shown in the Glide Distance Chart in Section III, is approximately two and one-half miles of gliding distance for every 1,000 feet of altitude.

SECTION VI

Operational Data

All operational data, in the form of graphs or diagrams are grouped in this section of your owner's manual for quick easy reference. The data is grouped as nearly as possible in flight sequence and for your convenience an index is included below.

A carefully detailed and analyzed flight plan will enable you to realize the maximum benefit from your Bonanza. In using the graphs, bear in mind that no allowances have been made for reserves, nor for variable factors such as winds and fuel consumed in warm-up and taxiing; you must make allowances for these conditions as they actually exist from one flight to the next.

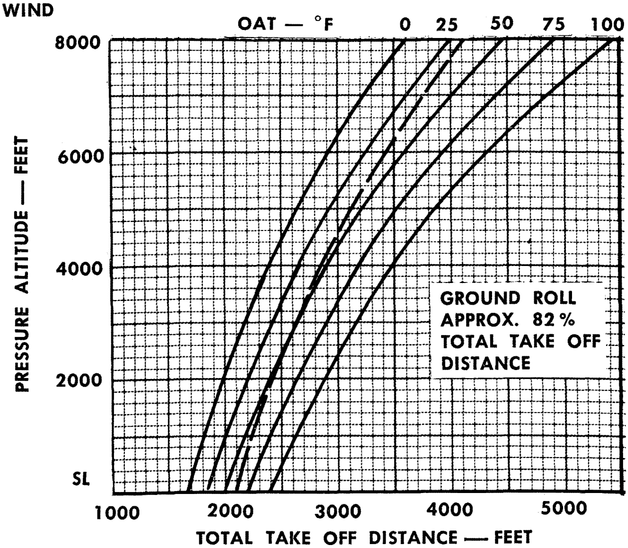
Having made a flight plan based on estimates taken from the graphs, you should check your actual performance and review the differences between your forecast conditions and actual conditions during the flight, so that your future estimates may be more accurate.

TABLE OF CONTENTS

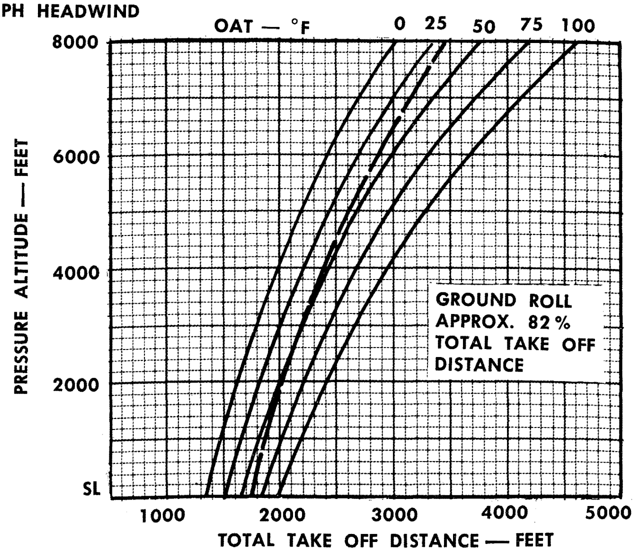
NORMAL TAKE-OFF

DISTANCE OVER 50 FEET
GROSS WEIGHT 4100 LBS.
ZERO FLAPS
TAKE OFF SPEED = 85 MPH (IAS)
— — STD. TEMP.

NO WIND



10 MPH HEADWIND

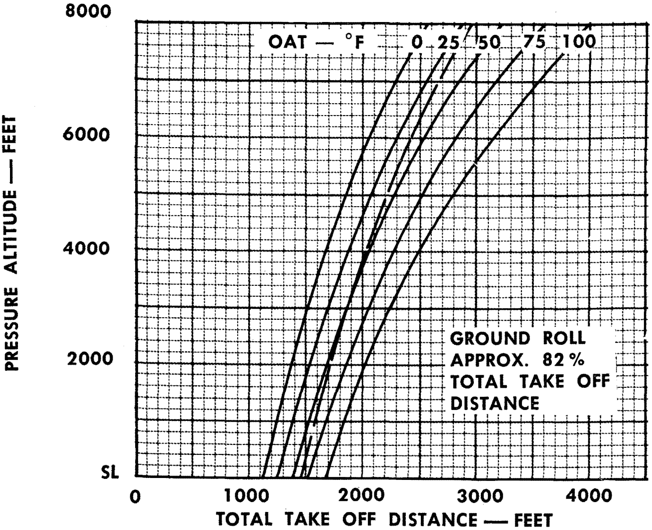


NORMAL TAKE-OFF

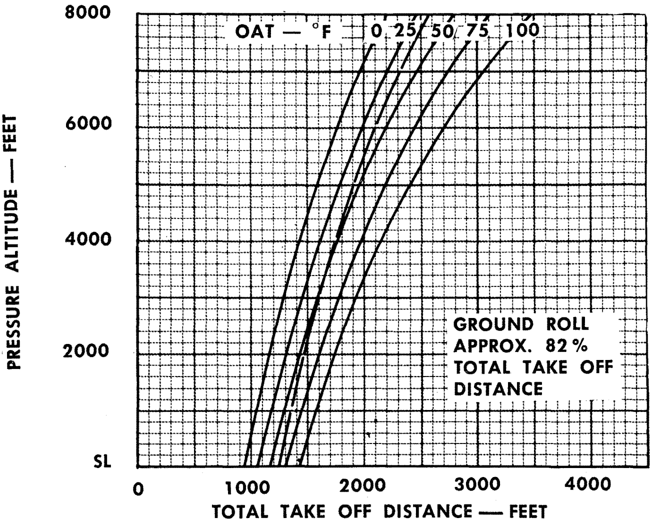
DISTANCE OVER 50 FEET
GROSS WEIGHT 4100 LBS.
ZERO FLAPS
TAKE OFF SPEED = 85 MPH (IAS)

—— —— STD. TEMP.

20 MPH HEADWIND



30 MPH HEADWIND

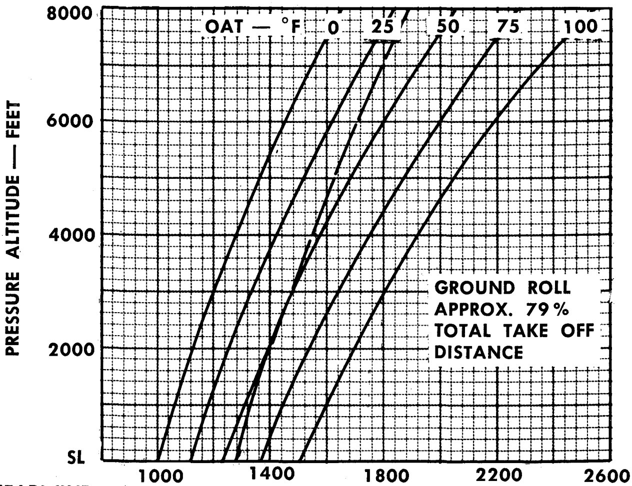


SHORT FIELD TAKE-OFF

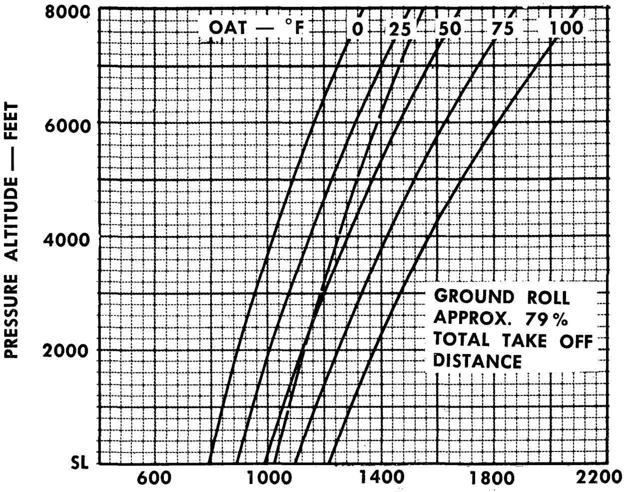
DISTANCE OVER 50 FEET
GROSS WEIGHT 4100 LBS.
FLAPS 20 DEGREES
TAKE OFF SPEED = 70 MPH (IAS)

NO WIND

——— ——— STD. TEMP.



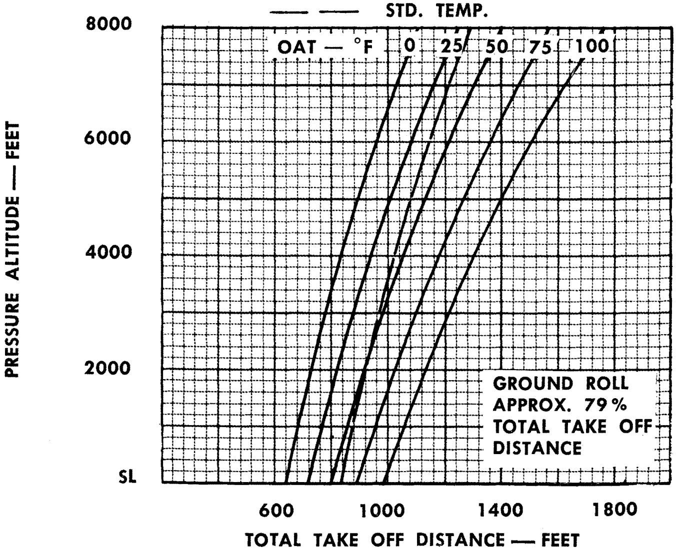
10 MPH HEADWIND



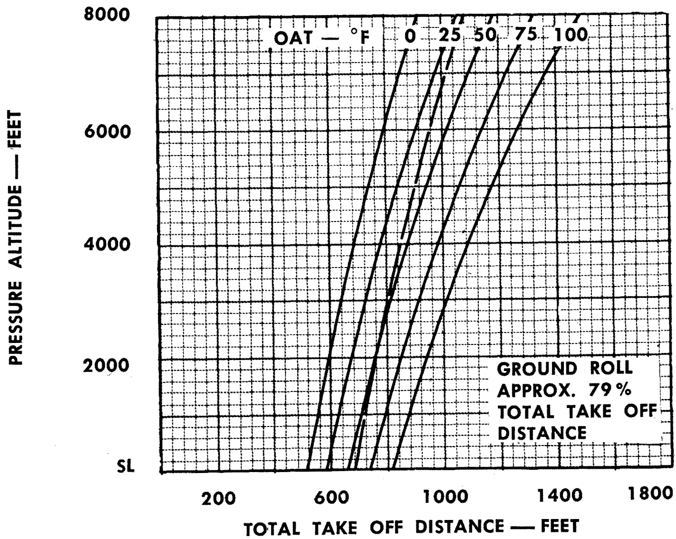
SHORT FIELD TAKE-OFF

DISTANCE OVER 50 FEET
GROSS WEIGHT 4100 LBS.
FLAPS 20 DEGREES
TAKE OFF SPEED = 70 MPH (IAS)
— — STD. TEMP.

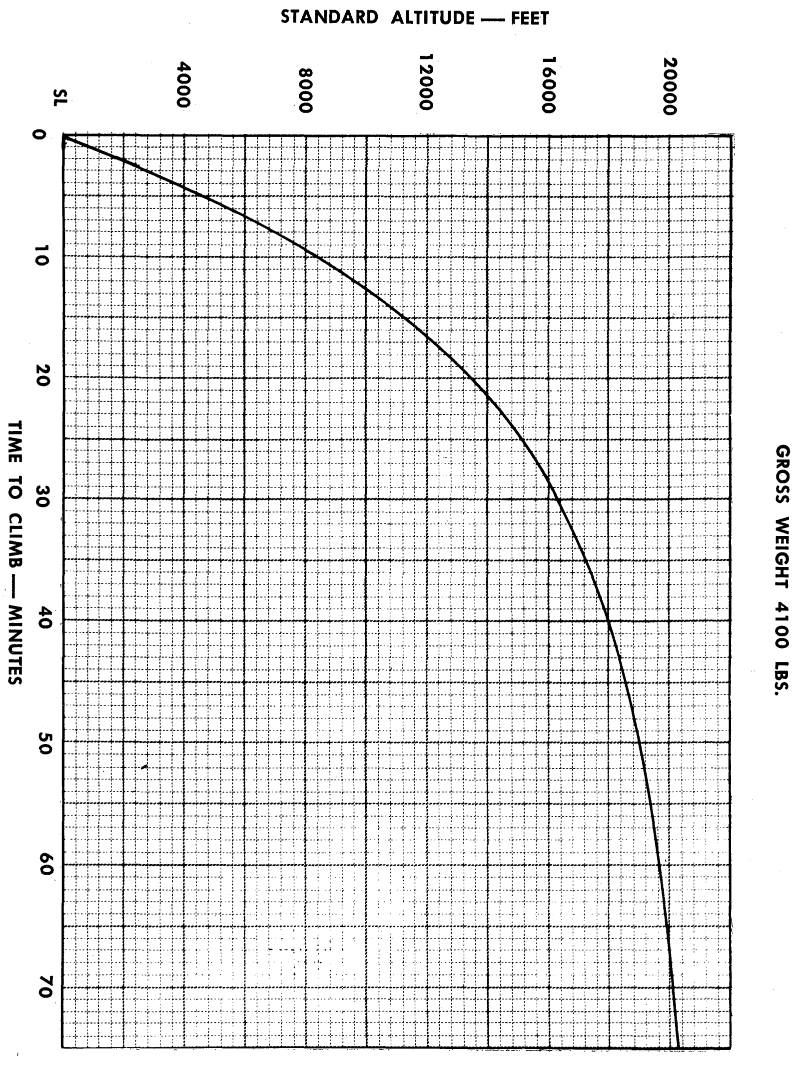
20 MPH HEADWIND



30 MPH HEADWIND

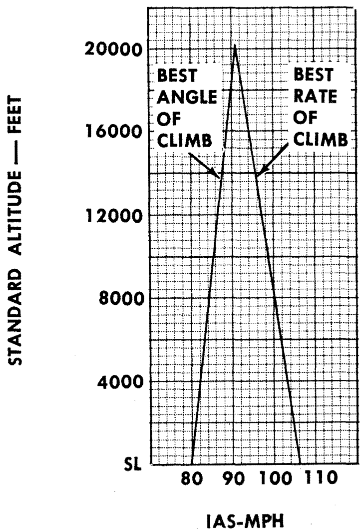


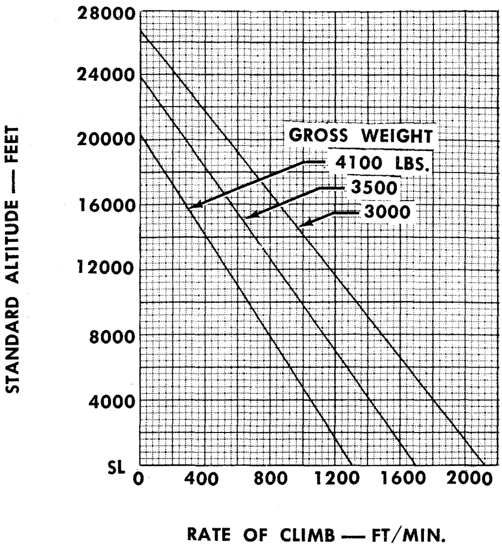
TWO ENGINE TIME TO CLIMB



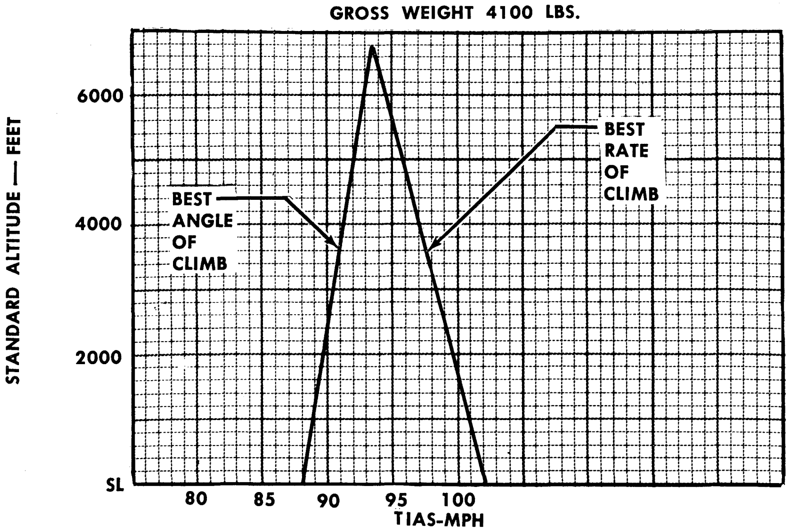
TWO ENGINE CLIMB PERFORMANCE

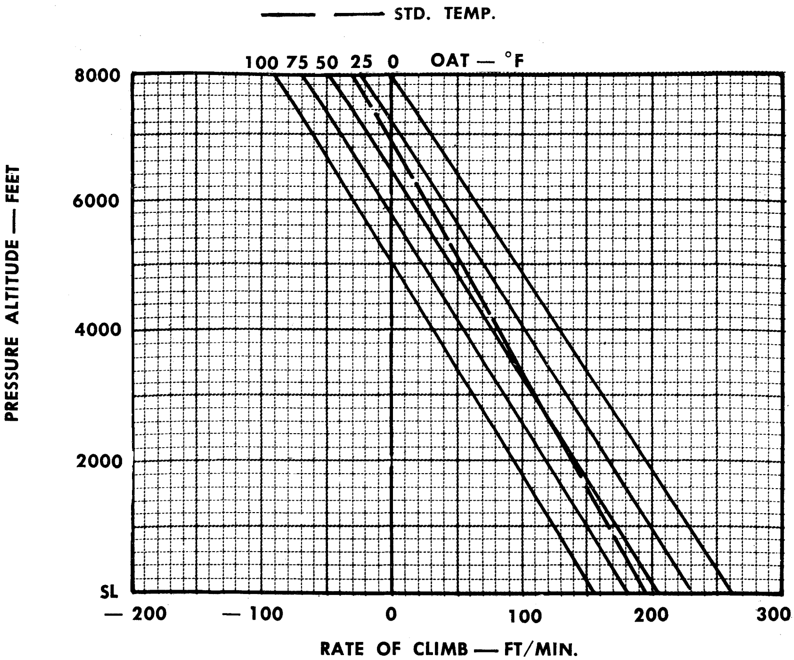
GROSS WEIGHT 4100 LBS.



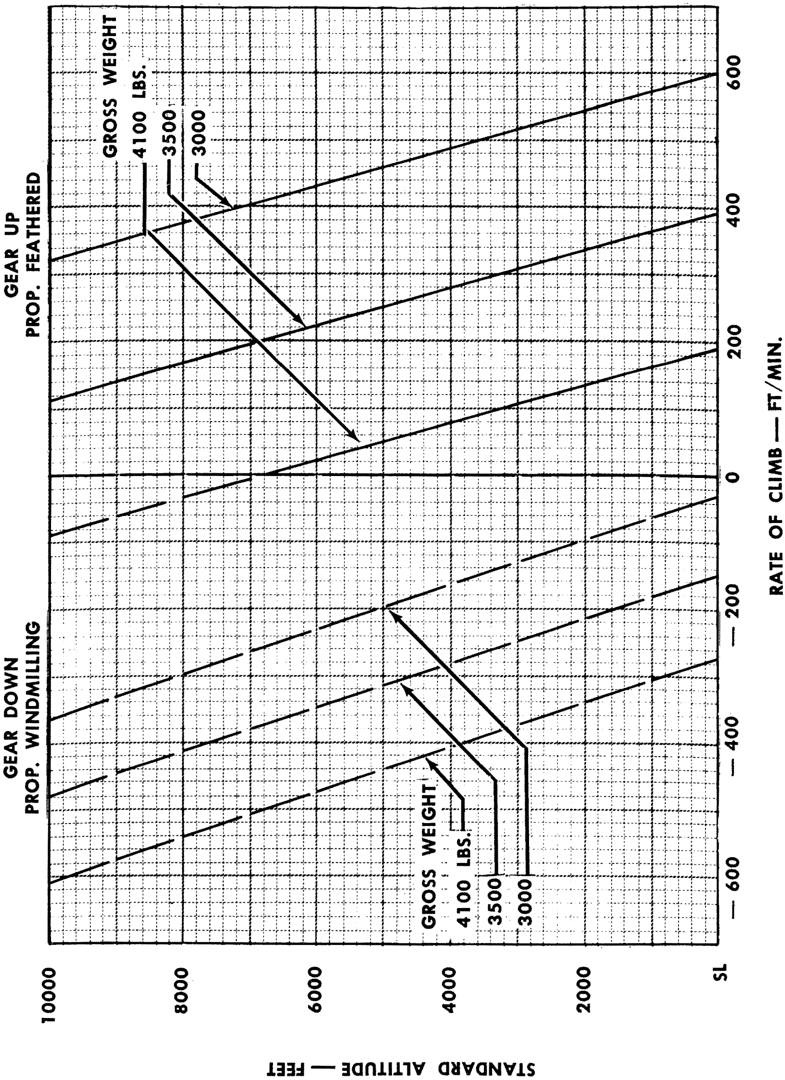


SINGLE ENGINE CLIMB PERFORMANCE

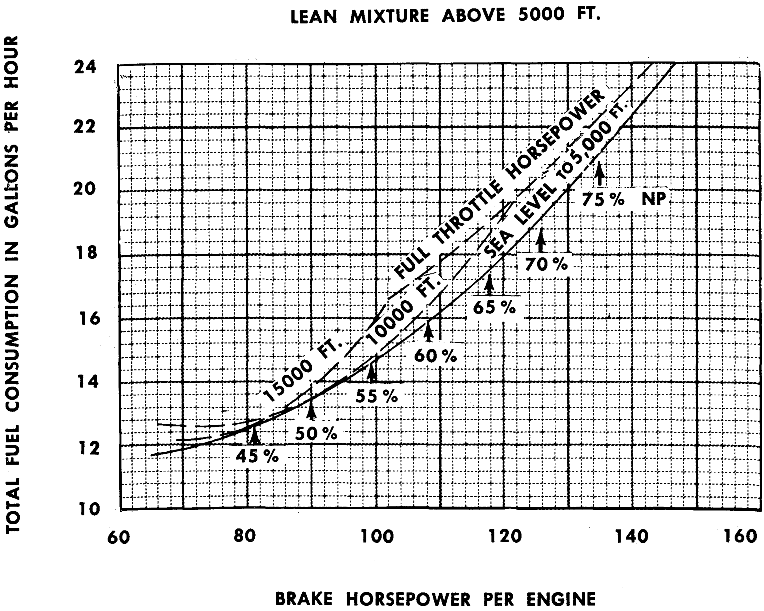




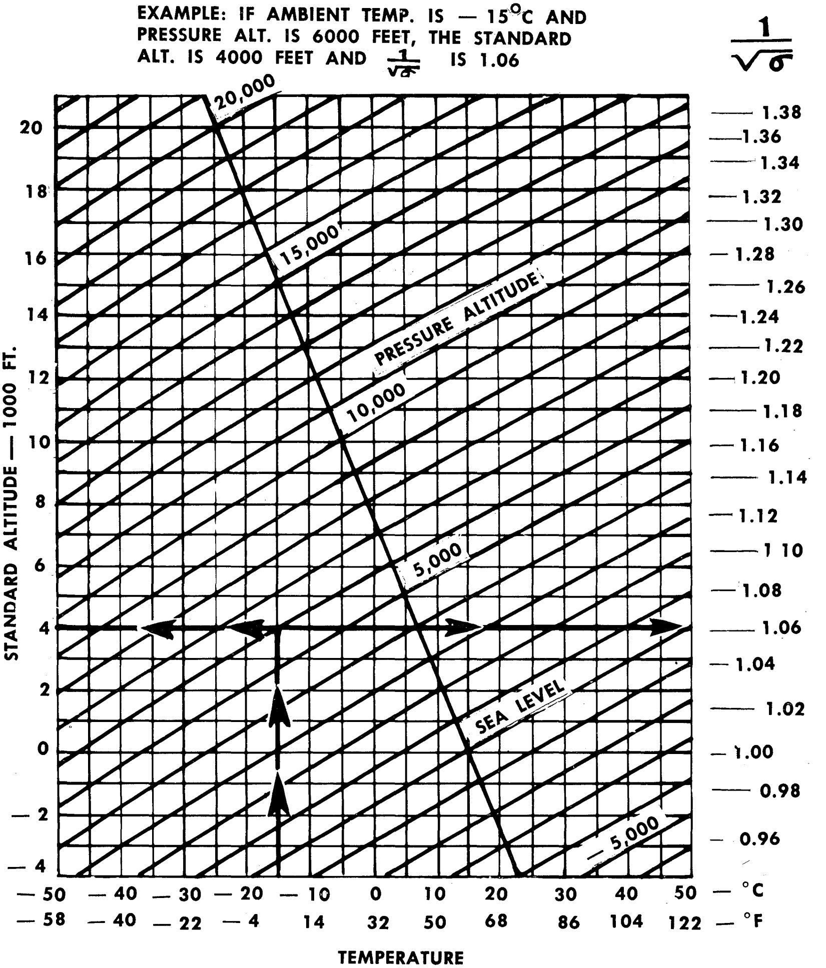
SINGLE ENGINE EMERGENCY RATE OF CLIMB



HORSEPOWER VS FUEL CONSUMPTION



ALTITUDE CONVERSION

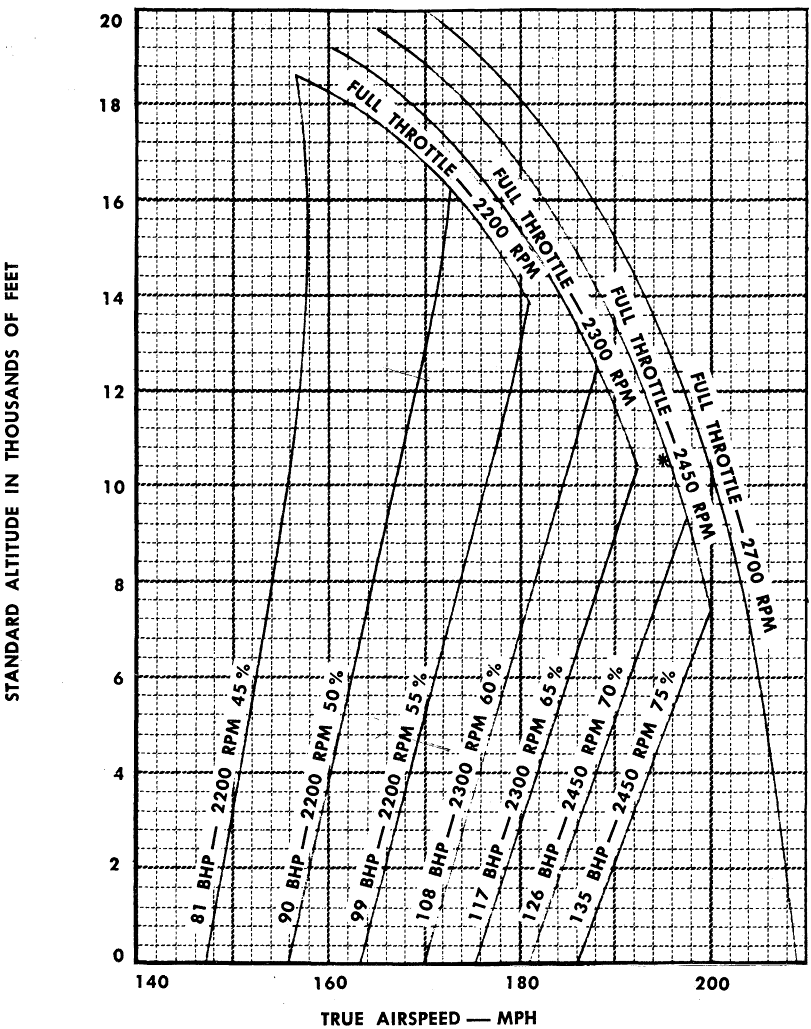


CRUISING OPERATION

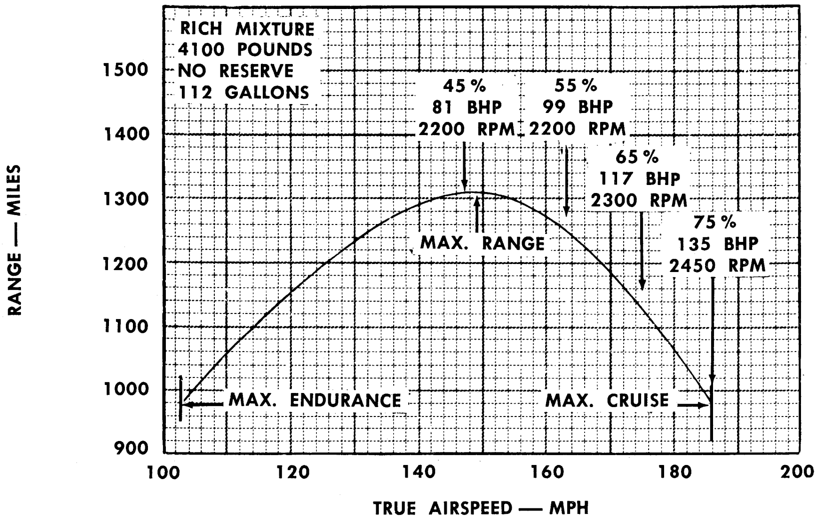
4100 LBS. LOAD

GUARANTEED @ 65% POWER AT 10,000 FT.

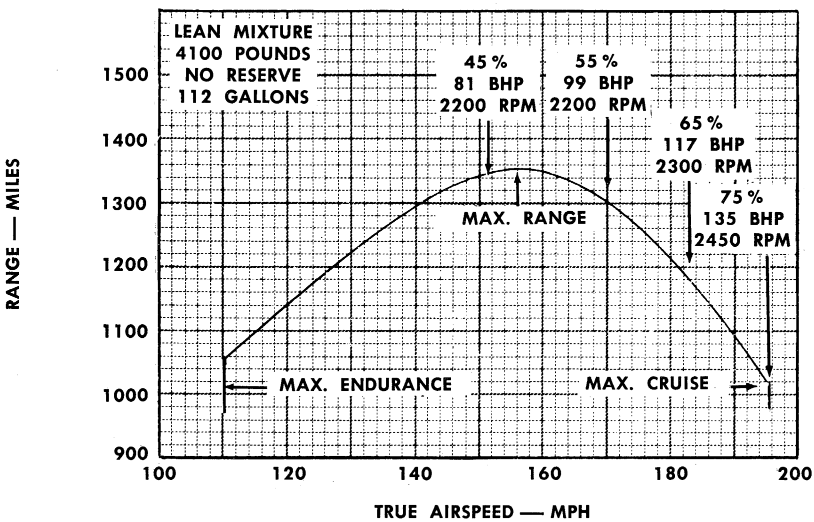
CRUISING OPERATION CHART AT 4000 LB.
LEAN MIXTURE ABOVE 5000 FT.



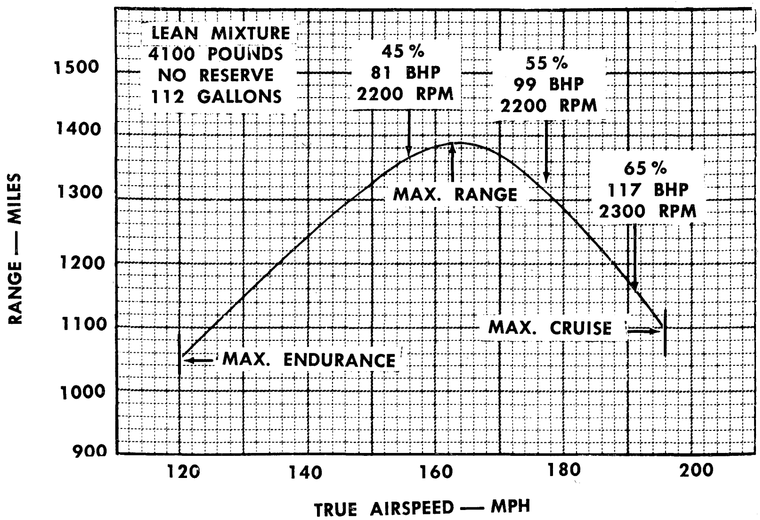
RANGE SEA LEVEL



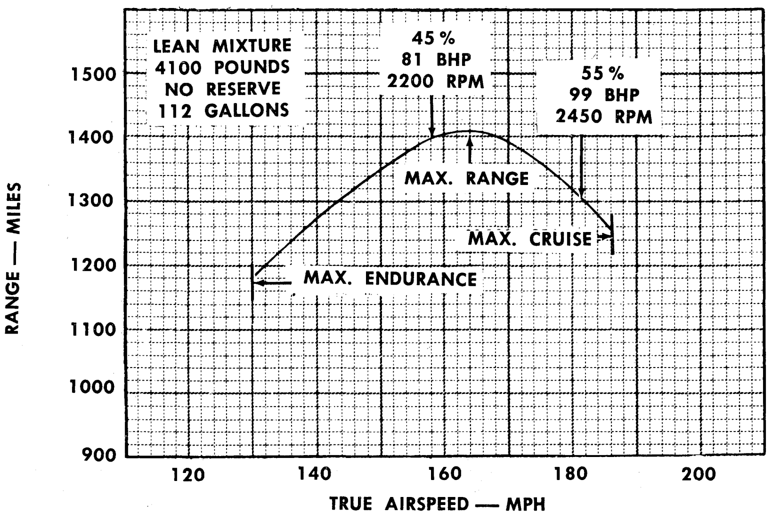
RANGE 5,000 FEET



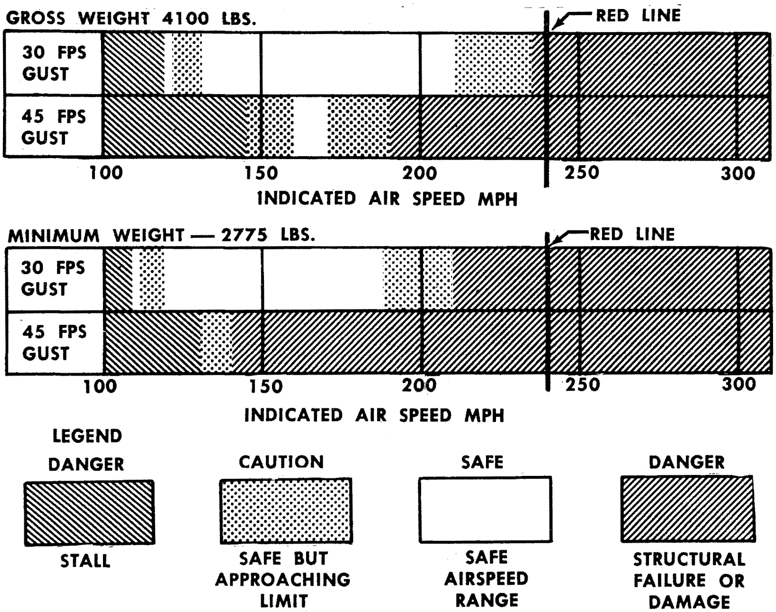
RANGE 10,000 FEET



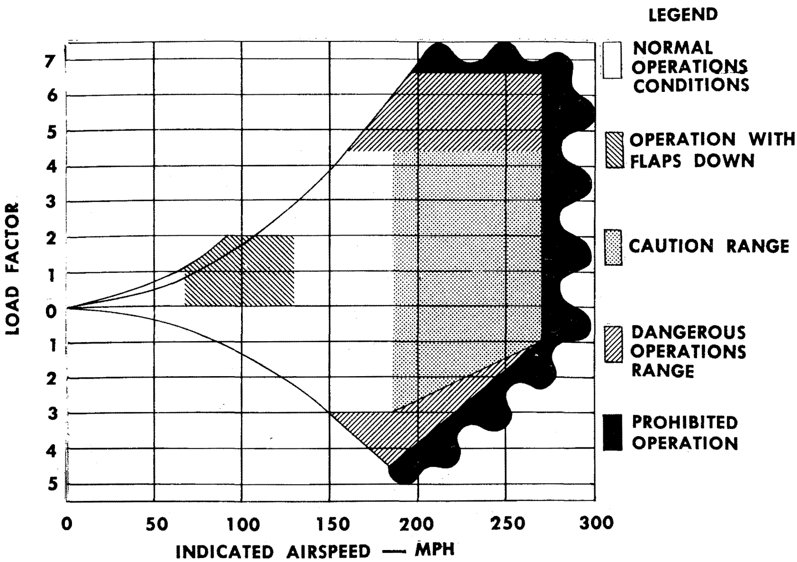
RANGE 15,000 FEET



TURBULENT AIR PENETRATION SPEEDS



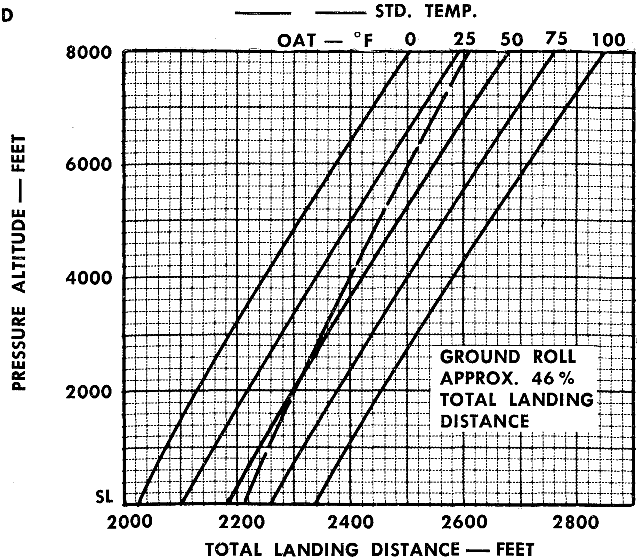
FLIGHT LOAD FACTORS



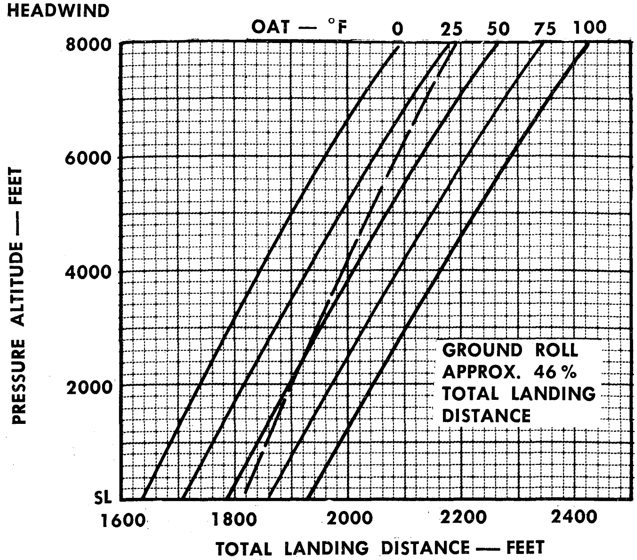
NORMAL LANDING

DISTANCE OVER 50 FEET
GROSS WEIGHT 4100 LBS.
FLAPS 28 DEGREES
APPROACH SPEED AT 50 FT = 91 MPH (IAS)

NO WIND



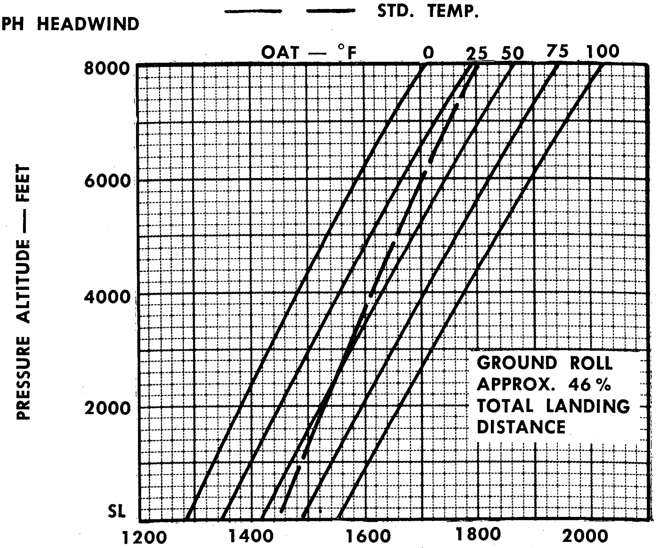
10 MPH HEADWIND



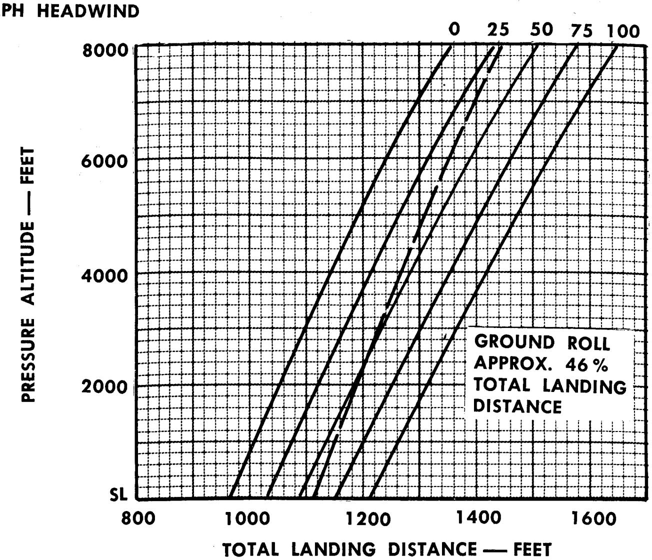
NORMAL LANDING

DISTANCE OVER 50 FEET
GROSS WEIGHT 4100 LBS.
FLAPS 28 DEGREES
APPROACH SPEED AT 50 FT = 91 MPH (IAS)

20 MPH HEADWIND



30 MPH HEADWIND



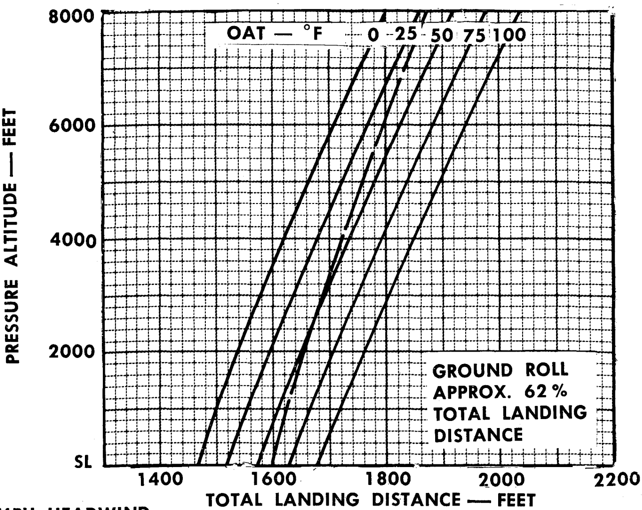
SHORT FIELD LANDING

DISTANCE OVER 50 FEET
GROSS WEIGHT 4100 LBS.
FLAPS 28 DEGREES

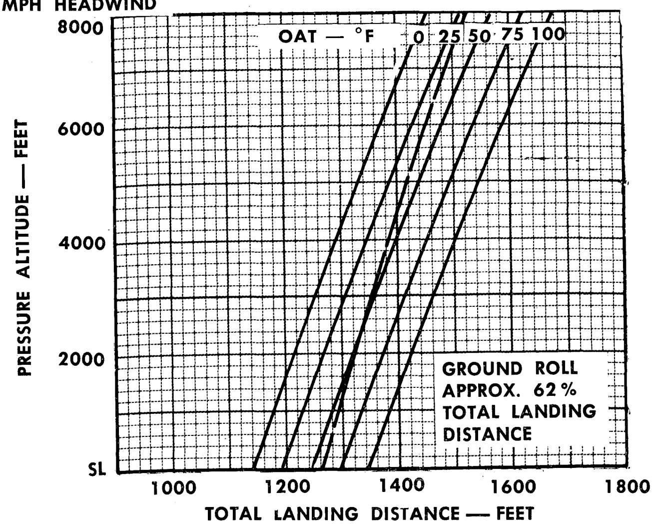
APPROACH SPEED AT 50 FT = 85 MPH (IAS)

—— —— STD. TEMP.

NO WIND



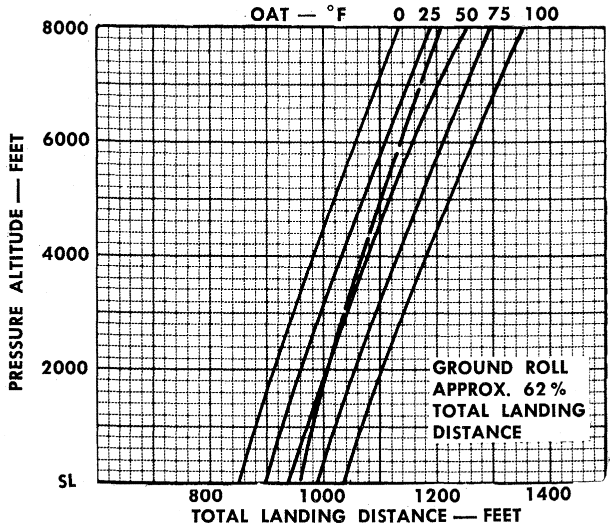
10 MPH HEADWIND



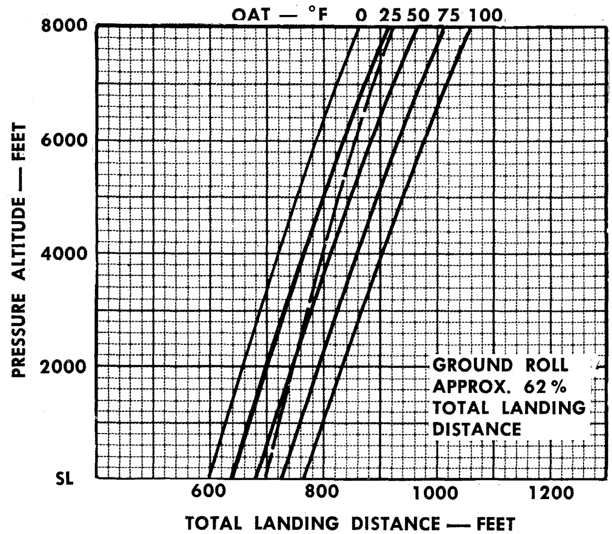
SHORT FIELD LANDING

DISTANCE OVER 50 FEET
GROSS WEIGHT 4100 LBS.
FLAPS 28 DEGREES
APPROACH SPEED AT 50 FT = 85 MPH (IAS)
—— —— STD. TEMP.

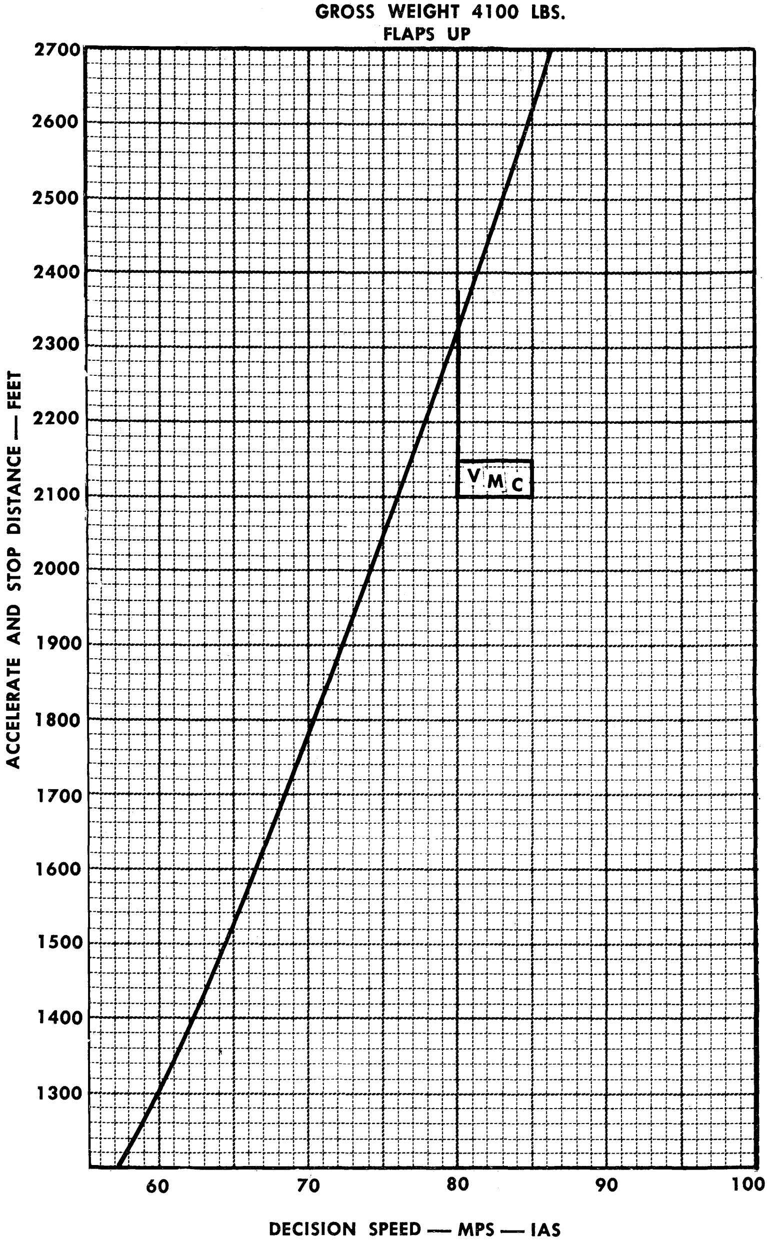
20 MPH HEADWIND



30 MPH HEADWIND



ACCELERATE AND STOP DISTANCE



SECTION VII

Servicing and Maintenance

PREVENTIVE MAINTENANCE

Preventive maintenance is a program designed to keep things from going wrong or not going at all, or quitting before they should reasonably be expected to quit.

Preventive maintenance is in part the responsibility of the airplane's owner or pilot — the best service facility is helpless until the airplane is in the shop with instructions to do the necessary work. The purpose of this section is two fold: first, to provide you with the information necessary for you to decide when the airplane should be sent to a shop, and second, to guide you should you choose, or be obliged by circumstances to do some minor servicing yourself. It is in no sense a substitute for the services of your BEECHCRAFT Certified Service Station. This section includes also information on ground handling, hangar clearances, oil and grease specifications and tire and strut inflation which will be useful on a strange airport.

Carefully followed, the suggestions and recommendations in this section will help keep your Travel Air at peak efficiency throughout its long useful life.

BEECHCRAFT CERTIFIED SERVICE

Aware of our responsibility to our customers to insure that good servicing facilities are available to them, Beech Aircraft Corporation and BEECHCRAFT distributors and dealers have established a world wide network of Certified Service Stations. Service facilities to qualify for certification are required to have available special tools designed to do the best job in the least time on BEECHCRAFT airplanes; to maintain a complete and current file of BEECHCRAFT service publications; and to carry in stock a carefully pre-determined quantity of genuine BEECHCRAFT parts. In addition, key personnel must have factory training in BEECHCRAFT servicing techniques as well as FAA certificates in engine, airframe and radio maintenance. A Certified Service Station must be an FAA approved repair station or employ an A and E mechanic with inspection authorization. Certified Service Stations also benefit from frequently scheduled mechanics' training schools held at the factory and from the visits of factory service representatives to the end that their personnel are kept informed of the latest techniques in servicing BEECHCRAFTS.

BEECHCRAFT SERVICE PUBLICATIONS

To bring the latest authoritative information to BEECHCRAFT distributors dealers and Certified Service Stations and directly to you as the owner of a BEECHCRAFT, the Customer Service Division of Beech Aircraft Corporation publishes and revises as necessary the operating instructions, shop/maintenance manuals and parts catalogs for all BEECHCRAFT airplanes as well as service bulletins, service letters and numerous miscellaneous publications dealing with various phases of flying from general discussions of flying problems to specific repair or maintenance information. With the delivery of your Travel Air, you were placed on the mailing list for all of the service publications directed to Travel Air owners attention, including service bulletins and service letters. These publications are mailed to you by your BEECHCRAFT distributor.

SERVICE BULLETINS AND SERVICE LETTERS

BEECHCRAFT service bulletins and service letters are occasional publications dealing with improved operating techniques, revised servicing instructions, special inspections and changes in detailed parts or equipment. Service bulletins and service letters differ mainly in the degree of urgency of their subject matter; service letters usually will announce changes or new equipment which are available for purchase if you choose, or discuss improved operating techniques; service bulletins on the other hand deal with operating techniques, special inspections or changes in the airplane which have a direct bearing on the safety, performance or service life of your Travel Air. Service bulletins carry definite time intervals for compliance, depending on the urgency of their subjects, and you should see that they are complied with before the expiration of the allotted time. One of the services offered by BEECHCRAFT Certified Service Stations is maintaining a record of all service bulletins complied with by them on your airplane.

YOUR SERVICE INFORMATION KIT

In addition to this handbook and the FAA Approved Airplane Flight Manual, the service information kit issued with your Travel Air contains a copy of the official BEECHCRAFT Certified Service Station Directory, an abbreviated check list, a horsepower calculator for reference in flight, several booklets discussing different aspects of flying of general interest, and a complete set of BEECHCRAFT Safety Suggestions to date.

BEECHCRAFT CUSTOMER SERVICE

Should a special problem arise concerning your Travel Air, your BEECHCRAFT Certified Service Station, dealer or distributor will supply the information, or if necessary, he will enlist the services of factory personnel through the Customer Service Division. His query will be answered by men who are thoroughly familiar with all parts of your Travel Air, and in addition to their own knowledge may call on the engineers who designed it and the expert workmen who built it. The Customer Service Division maintains service records containing all information received by the factory on all BEECHCRAFT airplanes.

The work of the Customer Service Division also includes conducting service schools at the factory for BEECHCRAFT mechanics and annual Service Clinics at the facilities of various BEECHCRAFT distributors to which you will be invited to bring your Travel Air each year. During the Service Clinic, factory experts will inspect your Travel Air and give you a written report of their findings without obligation to you.

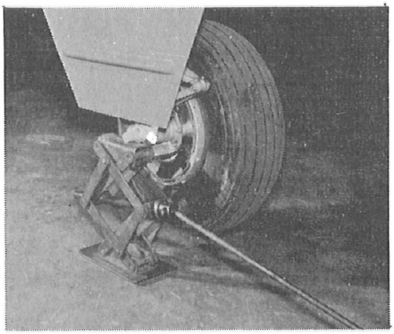
GROUND HANDLING

Knowing how to handle the airplane on the ground is fully as important as knowing how to handle it in the air. In addition to taxiing, parking and mooring, you may find it necessary to maneuver into a hangar by hand or with a tug; or to jack up a wheel. Doing these jobs is not difficult, but if they are done incorrectly, structural damage may result.

So that you may make certain a strange hangar with doubtful clearance is adequate, the three-view drawing on Page *vi* shows the minimum hangar clearances for a standard airplane. You must, of course, make allowances for any special radio antennae you have installed; their height should be checked and noted on the drawing for future reference.

Main Wheel Jacking

If it becomes necessary to replace a wheel or tire, proceed as follows: Make certain the shock strut is properly inflated to the correct height.



Insert the main wheel jack adapter furnished with the airplane as part of the loose equipment into the main wheel axle. If the strut is not inflated to the recommended height, it will be impossible to insert the jack adapter into the main wheel axle. Raise and lower the main wheel as necessary. A scissor-type jack is recommended. When lowering the airplane, care should be taken not to compress the shock strut, thus forcing the landing gear door against the jack adapter.

NOTE

Do not walk on the wing walk while the airplane is on the main wheel jack.

Towing

To tow the Travel Air, attach the hand towbar to the tow lug on the nose gear lower torque knee. One man can move the aircraft on a smooth and level surface with the towbar.

CAUTION

Do not push on propeller or control surfaces. Do not place your weight on the horizontal stabilizers to raise the nose wheel off the ground.

EXTERNAL POWER — (Optional Equipment)

Before connecting an auxiliary power unit, turn off the battery and generator switches and any other electrically operated equipment. If the auxiliary power unit does not have a standard AN type plug, check the polarity of the unit and connect the positive lead to the center post and the negative lead to the front post of the aircraft's external power receptacle. The aircraft having a negative ground system requires a negative ground auxiliary power unit.

After the engine has been started and the auxiliary power unit disconnected, the electrical system switches may be turned on and normal procedures resumed.

Recharging a battery without removing it from the aircraft may be accomplished by connecting a known negative ground auxiliary power unit to the aircraft's external power receptacle and turning on the battery master switch. In case of an extremely weak battery, removal and pre-charging may be necessary, since the battery may not have sufficient capacity to close the battery solenoid. It is essential that you make certain the power unit is negative ground; otherwise a battery fire may result.

SERVICING

The following service procedures will keep your Travel Air in top condition between visits to your Certified Service Station. These procedures were developed from engineering information, factory practice and the recommendations of engine and parts suppliers, as well as operating experience with thousands of BEECHCRAFTS using identical or similar components. They are the essence of preventive maintenance.

Magnetos

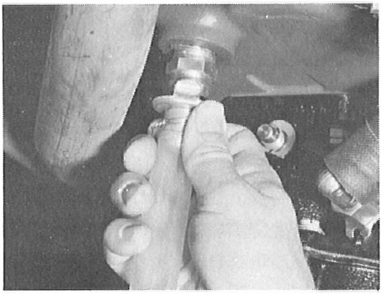
Ordinarily, the magnetos will require only occasional adjustment, lubrication and breaker point replacement, which should be done by your Certified Service Station.

CAUTION

To be safe, treat the magnetos as hot whenever a switch lead is disconnected at any point; they do not have an internal automatic grounding device. The magnetos may be grounded by replacing the switch lead at the noise filter capacitor with a wire which is grounded to the engine case. Otherwise, all spark plug leads should be disconnected or the cable outlet plate on the rear of the magneto should be removed.

Servicing the Oil System

The Travel Air is provided with a wet sump pressure-type oil system. Each engine sump capacity is eight quarts with an absolute minimum capacity of two quarts required for safe engine operation. An access door is provided in the cowling to service the oil system. A calibrated dipstick attached to the filler cap indicates the oil level. The oil should be changed every 50 hours under normal operating conditions. When operating under adverse weather conditions or continuous high power settings, the oil should be changed more frequently.



NOTE

The special preservative oil in the engines of the Travel Air, when the airplane is delivered from the factory, should be changed for normal oil after 25 hours of engine operation.

The oil may be drained by opening the drain valve from the bottom inboard side of the oil sump, the low spot of the system. The engines should be warmed up to operating temperature to assure complete draining of the oil. Moisture that may have condensed and settled in the oil sump should be drained by occasionally removing the oil drain plug and allowing a small amount of oil to escape; this is particularly important in winter when moisture will collect more rapidly and freeze.

The oil suction and pressure screens should be cleaned at each periodic oil change. To clean the suction screen, remove the hexhead plug at the rear of the oil sump and pull out the screen. To clean pressure screen, remove four bolts that secure screen housing to engine accessory section. Pull housing back and remove screen. Wash the screens in Stoddard Solvent, Federal Specification P-S-661.

Oil grades listed in the Consumable Materials Chart in the latter portion of this section are recommendations only and will vary with individual circumstances. The determining factor for choosing the correct grade of oil is the oil inlet temperature observed during flight. Inlet temperatures consistently near the maximum allowable indicate a heavier oil is needed.

Servicing the Fuel System

Service the system with fuels as recommended in the Consumable Materials Chart on Page 7-16. A 25-gallon main fuel cell is installed in each wing stub and a standard 17-gallon auxiliary fuel cell or an optional 31-gallon auxiliary fuel cell is installed in the wing panels outboard of each nacelle. Fill each cell separately through the filler neck by removing the flush type filler caps from the upper wing skins. Prior to transferring fuel, ground the refueling hose to one of the aircraft's grounding jacks.

Open each of the snap type fuel drains daily to allow contaminated fuel to drain from the system. The four sump drains extend through the bottom of the wing skins; the two selector valve drains are located at the system low spot to drain the interconnecting lines and extend through the bottom of the fuselage center section skin; the fuel strainers which are provided with drains are located in the wheel wells.

CAUTION

Never leave the fuel cells completely empty or the cell inner liners may dry out and crack, permitting fuel to diffuse through the walls of the cell after refueling. If cell is to be left empty for a week or more, spray inner liner with a light coat of engine oil.

Servicing the Landing Gear

The shock struts are filled with hydraulic fluid (Consumable Materials Chart Item 2) and compressed air.

The same procedure is used for servicing both the main and nose gear shock struts. To service a strut, proceed as follows:

a. Remove the air valve cap and depress the valve core to release the air pressure.

WARNING

Do not unscrew the air valve assembly until all air pressure has been released or it may be blown off with considerable force, causing injury to personnel or property damage.

b. With the weight of the aircraft on the gear, loosen the filler plug slowly to assure that all air has escaped. Then remove the filler plug.

c. With the shock strut fully deflated, jack the strut barrel one-quarter inch off fully compressed. Block it there and fill to the level of the filler plug hole with the hydraulic fluid recommended in the Consumable Materials Chart.

d. Jack the main strut an additional two inches. Then replace the filler plug. Depress the valve core and lower the jack, releasing excess oil and air. On the nose strut, merely remove the block and allow the excess oil to drain away, then install the filler plug.

e. While rocking the airplane gently to prevent possible binding of the piston in the barrel, inflate the strut to an extension of two inches of exposed piston (aircraft resting on the gear).

f. The shock strut pistons must be clean. Remove foreign material by wiping the strut with a cloth containing hydraulic oil.

Servicing the Brakes

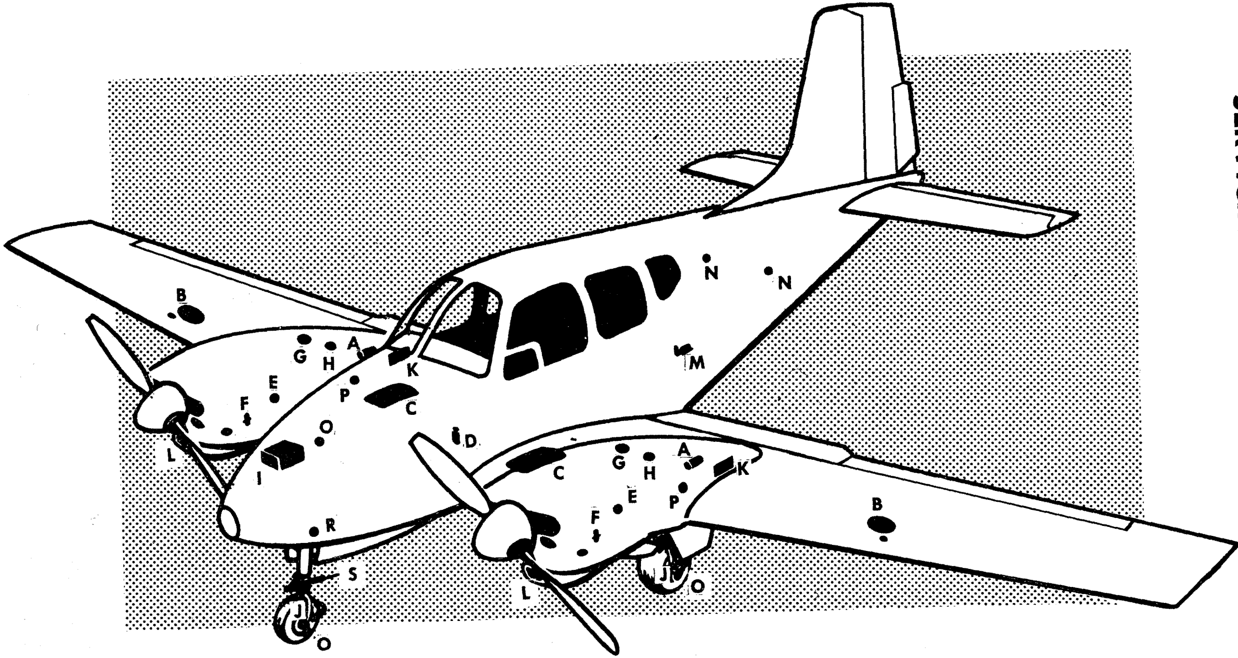
The Goodyear single disc hydraulic brakes require no adjustments, as the pistons move outward to compensate for lining wear. Linings

SERVICING POINTS

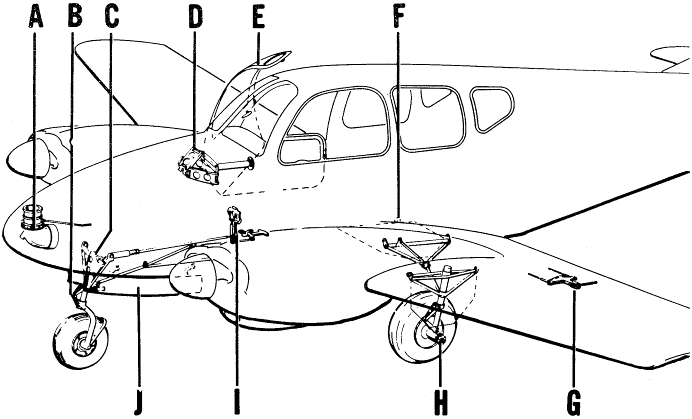
A OIL PRESSURE SCREEN
B AUXILIARY FUEL TANK FILLER
C MAIN FUEL TANK FILLER
D FUEL SUMP DRAIN
E FUEL STRAINER DRAIN
F OIL SUMP DRAIN

G OIL FILLER
H OIL SUCTION SCREEN
I BATTERY
J BRAKES
K EXTERNAL POWER RECEPTACLE
L CARBURETOR AIR FILTER

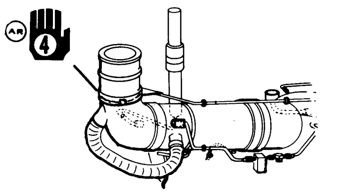
M STATIC AIR DRAIN
N STATIC AIR PORTS
O TIRE INFLATION
P MAIN STRUT FILLER
R NOSE STRUT FILLER
S SHIMMY DAMPENER



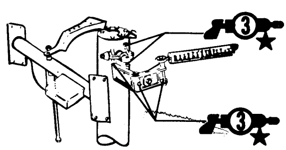
LUBRICATION POINTS



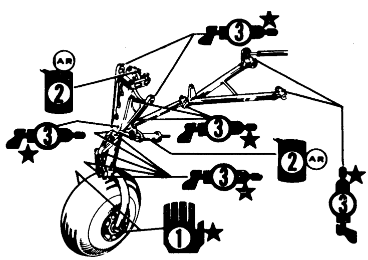
A VENTILATION AIR INTAKE VALVE



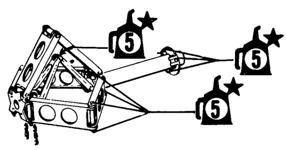
C STEERING MECHANISM LINKAGE



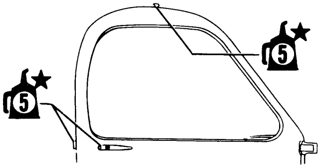
B NOSE GEAR ASSEMBLY



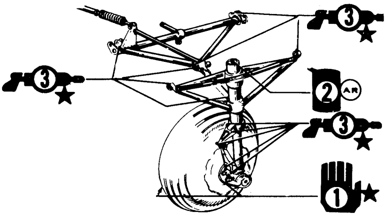
D CONTROL COLUMN LINKAGE



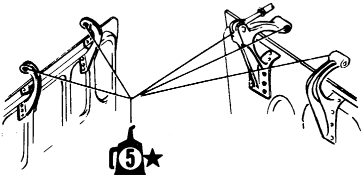
E CABIN DOOR



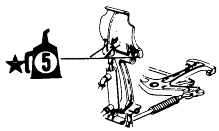
H MAIN GEAR ASSEMBLY



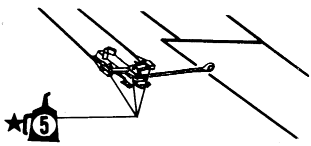
F MAIN LANDING GEAR DOORS



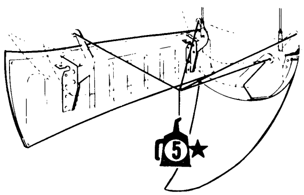
I RUDDER PEDAL AND BELLCRANK



G AILERON CONTROL LINKAGE



J NOSE LANDING GEAR DOORS



★ 100 hours

(AR) As Required

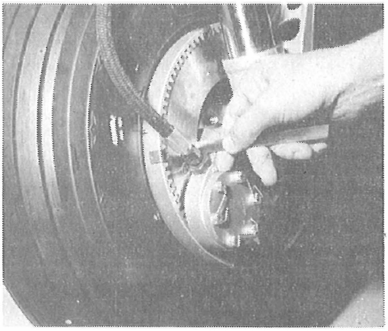
ZERK FITTING

HYDRAULIC FLUID

HAND OR PACK

SQUIRT CAN

Note — Numbers refer to items in the Consumable Materials Chart.



should be checked for small nicks or sharp edges which could damage the brake discs. Worn, dished or distorted brake discs should be replaced. The fluid reservoir, accessible through the forward baggage compartment should be checked regularly and, a visible fluid level maintained on the dipstick at all times. Refer to the Consumable Materials Chart for hydraulic fluid specification.

Servicing Tires

The main wheel tires are six ply, 6.50 x 8 tires and require 36 pounds air pressure. The nose wheel tire is a six ply 5.00 x 5 tire and requires 36 pounds air pressure. Maintaining proper tire inflation will minimize tread wear and aid in preventing tire rupture caused from running over sharp stones and ruts. When inflating tires, visually inspect them for cracks and breaks.

Heat and Vent System Maintenance

The cabin heater ignition unit is equipped with two sets of points; if one set of points fails a toggle switch located on the left sub-panel may be positioned to place the alternate contact points in service. The switch should be repositioned when the points are replaced to indicate that the alternate set of points is available.

The over heat fuse should not be replaced until a thorough inspection of the system has determined the cause of its blowing and the malfunction has been corrected.

After every 25 hours of heater operation, remove the heater fuel pump strainer by turning the base of the pump counter-clockwise. Wash the strainer in clean, unleaded gasoline and dry with compressed air.

A fuel filter is installed in the nose wheel well next to the heater fuel pump and filters foreign matter from the fuel. The strainer is equipped with a snap type drain and should be drained daily during cold weather to remove accumulated moisture, which if allowed to freeze could cause heater malfunction.

Lubricate the iris valve at the blower inlet occasionally with Consumable Materials Chart Item 4, never with oil or any liquid lubricant which will collect dust.

Servicing the Battery

To service the battery, open the forward utility compartment door and remove the battery box cover. Maintain the electrolyte level to cover the plates by adding distilled battery water. Avoid filling over the baffles and never fill more than one-quarter inch over the separator tops. The specific gravity should be checked weekly and maintained within the limits placarded on the battery. The battery box is vented overboard to dispose of electrolyte and hydrogen gas fumes discharged during the normal charging operation. To insure the disposal of these fumes, the vent hose connections at the battery box should be checked frequently for obstructions.

Carburetor Air Intake Filters

To clean the carburetor air intake filters, remove from the aircraft and flush thoroughly with cleaning solvent; if possible, use an air blast for drying. After the filters are completely dry, saturate with clean engine oil and allow to drain before re-installation.

Propellers

Since propellers are subject to wear and atmospheric conditions, blades and hub should be periodically checked for oxidation and corrosion. Brush corroded or oxidized areas with a phosphatizing agent to remove superficial corrosion, then smooth etched and pitted areas by buffing (by hand) with an aluminum polish.

Take the following precautions while cleaning propellers:

1. Be sure ignition switch is off.
2. Make sure the engine has cooled down completely. When moving the propeller, STAND IN THE CLEAR. There always is some danger of a cylinder firing when a propeller is moved.
3. If a liquid cleaner is used, avoid using excessive amounts because it may spatter or run down the blade and enter the hub or engine.

4. After cleaning, check the area around the hub to be sure all compound is removed.

Engine

The engine may be cleaned with kerosene, white furnace oil, Stoddard solvent, or any standard engine cleaning solvent. Spray or brush the solvent over the engine, then wash off with water and allow to dry. Blow excess oil off the engine with compressed air.

Exterior Cleaning

Prior to cleaning the exterior, cover the wheels, making certain the brake discs are covered; attach pitot covers securely. Install plugs in or mask off all other openings. Be particularly careful to mask off both static air buttons before washing or waxing.

CAUTION

> Do not apply wax or polish for a paint cure period of 90 days after delivery. Waxes and polishes seal the paint from the air and prevent curing. For uncured painted surfaces, wash only with cold or lukewarm (never hot) water and a *mild non-detergent soap.* Any rubbing of the painted surface should be done gently and held to a minimum to avoid cracking the paint film.

The airplane should be washed with a mild soap and water. Loose dirt should be flushed away first with clean water. Harsh, abrasive or alkaline soaps or detergents which could cause corrosion or make scratches should never be used.

Soft cleaning cloths or a chamois should be used to prevent scratches when cleaning and polishing. Any ordinary automobile wax may be used to polish painted surfaces.

To remove stubborn oil and grease, use a rag dampened with naphtha. However, after cleaning with naphtha, the surface should be re-waxed and polished.

Interior Cleaning

The seats, rugs, upholstery panels, and head lining should be vacuum cleaned frequently to remove as much surface dust and dirt as possible.

Commercial foam type cleaners or shampoos can be used to clean rugs, fabrics, or upholstery. However, be sure to follow the cleaner manufacturers instructions when using.

Cleaning Windshield and Windows

Since the plexiglass in the windshield and windows can be easily scratched, extreme care should be used in cleaning it. Never wipe the windshield or windows when dry. First, flush the surface with clean water or a mild soap solution then rub lightly with a grit free soft cloth, sponge, or chamois. Use trisodium phosphate completely dissolved in water to remove oil and grease film. To remove stubborn grease and oil deposits use hectane, naphtha, or methanol. Rinse with clean water and avoid prolonged rubbing.

NOTE

> Do not use gasoline, benzine, acetone, carbon tetrachloride, fire extinguisher fluid, deicing fluid, or lacquer thinners on windshield or windows as they have a tendency to soften and craze the surface.

INSPECTION

Correct servicing being half the secret of preventive maintenance, the other half is inspection. Proper servicing will prolong the life of your Travel Air and careful regular inspections will not only assure that servicing has been done correctly, but will disclose minor troubles so that they can be corrected before they become malfunctions. Patronize your BEECHCRAFT Certified Service Station. They are equipped and especially trained to service your Travel Air.

CONSUMABLE MATERIALS CHART

ITEM	MATERIAL	SPECIFICATIONS
1.	Lubricating Grease High Temperature	MIL-L-3545
2.	Hydraulic Fluid	MIL-H-5606
3.	Lubricating Grease (General Purpose)	MIL-L-7711
4.	Molybdenum Disulfide	MIL-L-7866A
5.	Lubricating Oil	SAE No. 20
6.	Engine Oil	SAE No. 20 (Below 10°F) SAE No. 30 (Below 40°F) SAE No. 50 (Above 40°F)
7.	Fuel, Engine	Octane 91/96

NOTES

1. In extremely cold climates, MIL-G-3278 grease may be used in place of MIL-L-7711.
2. If 91/96 octane fuel is not available, 100/130 or 115/145 octane fuel may be used as an alternate. Never use 80/87 octane fuel.
3. Landing gear components may require lubrication every 25 or 50 hours, depending on operation.

LAMP REPLACEMENT GUIDE

LOCATION	NUMBER
Wing navigation lights	1524
Tail light	1203
Landing light	4523
Cabin dome light	303

LAMP REPLACEMENT GUIDE — Continued

LOCATION	NUMBER
Overhead instrument light	303
Map light	303
Tab position indicator light	356
Tab position indicator light	AN3121-1819
L. G. visual indicator light	95-324006-75
Compass light	327
Stall warning light	AN3121-1819
Instrument light	327
Rotating beacon	A-7079-24
Taxi light	4570
Flap position light	AN3121-313
Landing gear position light	AN3121-313
Cowl flap position light	AN3121-313
Fuel pump placard light	AN3121-1819
Console light	AN3121-1819
R. H. C. B. and switch panel light	AN3140-327
Ignition panel light	AN3140-327

CONTROL SURFACE CHART

CABLES	CABLE TENSION	SURFACE TRAVEL
Aileron	25 lbs +5 −0 lbs	20° Up and Down ±1°
Aileron Tab	10 lbs +5 −0 lbs	10° Up and Down ±1°
Elevator	25 lbs +5 −0 lbs	30° Up, 15° Down ±1°
Elevator Tab	15 lbs +5 −0 lbs	10° Up, 20° Down ±1°
Rudder	25 lbs +5 −0 lbs	34° R, 30° L ±1°
Rudder Tab	15 lbs +5 −0 lbs	25° Left and Right ±1°
Flaps		28° Down +0° −2°

TOPICAL INDEX

Warranty

A. Beech Aircraft Corporation warrants those products purchased herein that are new and manufactured by Beech Aircraft Corporation to be free from defects in material and workmanship under normal use and service, provided, however, that the liability of Beech Aircraft Corporation under this warranty is limited to replacing or repairing any part or parts of such products which shall, within sixty days after delivery of such products to the purchaser from Beech Aircraft Corporation, be returned to Beech Aircraft Corporation at Wichita, Kansas, with transportation prepaid, and which shall upon examination by Beech Aircraft Corporation be disclosed to the satisfaction of Beech Aircraft Corporation to have been thus defective. This warranty shall not in any way apply to or cover any products purchased herein which may in any manner be altered or repaired outside of the factory of Beech Aircraft Corporation. No warranty is made with respect to parts, equipment or accessories not manufactured by Beech Aircraft Corporation, such as engines, propellers, fuel pumps, tires, wheels, instruments, magnetos, or any other parts, equipment, or accessories not manufactured by Beech Aircraft Corporation even though not mentioned herein, and purchaser must make all claims for any defects in such parts, equipment, or accessories to the respective makers thereof.

B. The warranty provisions contained in Section A above are expressly in lieu of (and purchaser hereby waives) all other warranties, express, statutory, or implied in fact or by law, and all other remedies against Beech Aircraft Corporation for consequential or other damages, arising out of the sale, use, or operation of the products purchased herein. Beech Aircraft Corporation neither assumes nor authorizes any other person or business organization to assume for it any other warranty or liability in connection with the sale, use, or operation of the products purchased herein.