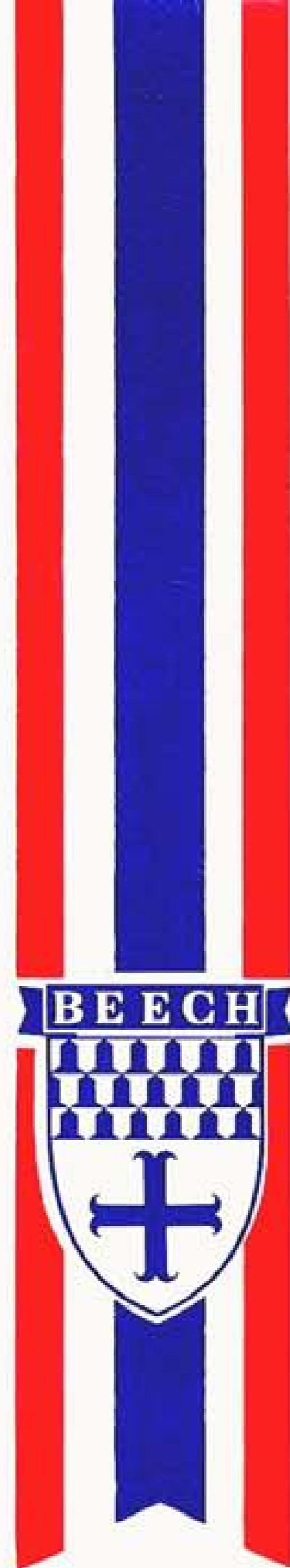


Beechcraft.[®] Bonanza



MODEL **N35**

OWNER'S MANUAL

**OWNER'S MANUAL
SUPPLEMENT**

for

K35, M35, N35, P35, S35, V35, V35TC, V35A, V35A TC, V35B, V35B TC
33, A33, B33, C33, E33, F33, G33, C33A, E33A, F33A, 36, A36.

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

1. Maximum usable fuel of each 25 or 24½ 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. 13% on 22 gallon main tank system.
 - b. 9% on 37 gallon main tank system.
4. On Models K-35, M-35, 33, and A33 Owners Manuals, reduce range by an additional 190 statute miles to account for climb and 45 minutes reserve at 45% maximum continuous power.

LIST OF EFFECTIVE PAGES

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 95

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**The asterisk indicates pages revised, added or deleted by the current revision.*

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 Bonanza 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 Bonanza. 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.

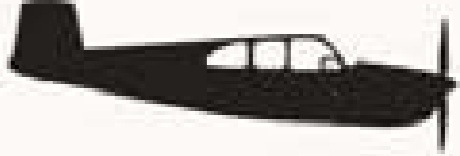
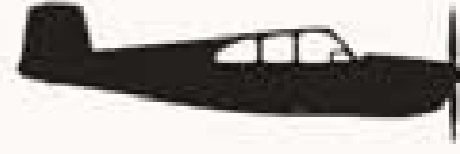
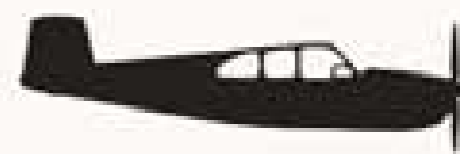
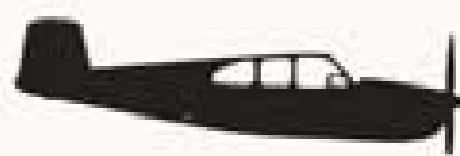
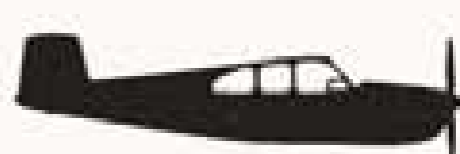


The Federal Aviation Regulations place the responsibility for the maintenance of this aircraft on you, and you should assure yourself that all maintenance is done by qualified mechanics in conformity with all airworthiness requirements established for this airplane.

All limits, procedures, safety practices, time limits, servicing, and maintenance requirements contained in this manual are considered mandatory for the continued airworthiness of your aircraft, in a condition equal to that of its original manufacture.

Authorized BEECHCRAFT Part and Service Outlets will have recommended modification, service, and operating procedures issued by both FAA and Beech Aircraft Corporation, 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 Bonanza 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.

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... As the owner of a new

**Know about your Beechcraft's
performance and economy**

Suggestions and recommendations throughout this manual can help you get the best performance from your airplane without sacrificing good economy.

... And when your **Bonanza**



Read your Beechcraft

Bonanza . . . *you should*

Get acquainted with your airplane

Read all of this manual carefully to become familiar with the operation of your new Beechcraft.

Keep your airplane looking and running like new

Know when to have your Beechcraft serviced inside and out.

***needs service***

Your airplane's best friend is your Beechcraft Certified Service Station

He'll be glad to answer your questions or discuss any problems you may have concerning your airplane.



NEW AIRPLANE WARRANTY

General Specifications

PERFORMANCE

Maximum cruising speed:

- (a) at 75% power (2450 rpm).....195 mph at 7,000 feet
- (b) at 65% power (2450 rpm).....190 mph at 10,500 feet

Economical cruising speed:

- at 55% power (2300 rpm).....175 mph at 10,000 feet

High speed at sea level:

- (2625 rpm, full throttle).....205 mph

Rate of climb at sea level:

- (Rated power, 260 hp at S.L.).....1,150 ft. per minute

Service ceiling:

- (Rated power, 260 hp at S.L.).....19,200 ft.

Stalling speed (landing) with flaps.....60 miles per hour

*Cruising range:

- at 189 mph (65% power) at 10,000 ft....620 miles on 49 gallons
1,090 miles on 78 gallons

*Maximum range:

- at 159 mph (45% power) at 10,000 ft....690 miles on 49 gallons
1,215 miles on 78 gallons

Take-off run (20° flaps):

- at sea level, 10 mph wind.....745 feet

Landing run (30° flaps):

- at sea level, 10 mph wind.....505 feet

The above performance figures are the results of flight tests of the N35 Bonanza conducted by Beech Aircraft Corporation under factory-controlled conditions and will vary with individual aircraft and numerous factors affecting flight performance.

*Include allowance for warm-up, taxi, take-off, climb and 45 min. reserve.

BAGGAGE

Maximum 270 pounds

WEIGHTS

	Standard Seating	Optional 5-Place Seating
Gross Weight.....	3,125 pounds	3,125 pounds
Empty Weight.....	1,855 pounds	1,872 pounds

(Empty weight includes complete set of flight instruments; cabin heating and ventilating system, with windshield defrosters; sound-proofing; constant speed propeller; navigation, cabin, instrument and landing lights.)

Useful load1,270 pounds 1,253 pounds

Available weight for people, baggage and optional equipment with

standard tanks full..... 948 pounds 931 pounds

WING AREA AND LOADINGS

Wing area.....	181 square feet
Wing loading, at gross weight.....	17.27 lbs./sq. ft.
Power loading, at gross weight.....	12.02 lbs./hp

DIMENSIONS

Wing span.....	33 ft. 5.5 in.
Length.....	25 ft. 2 in.
Height (Cabin).....	6 ft. 6½ in.
(Tail Section).....	7 ft. 7 in.

CABIN DIMENSIONS

Cabin length.....	6 ft. 11 in.
Cabin width.....	3 ft. 6 in.
Cabin height.....	4 ft. 2 in.
Passenger door, size.....	36 in. x 37 in.
Baggage door, size.....	22.5 in. x 18.5 in.
Baggage compartments volume.....	16.5 cubic feet
With optional Utility Shelf.....	22.4 cubic feet
Baggage compartment, maximum loading.....	270 pounds

PROPELLER AND EQUIPMENT

Propeller—Beech, with aluminum alloy blades, hydraulically controlled continuously variable pitch, series 278, diameter 82", with Woodward hydraulic governor and Beech spinner.

ENGINE EQUIPMENT

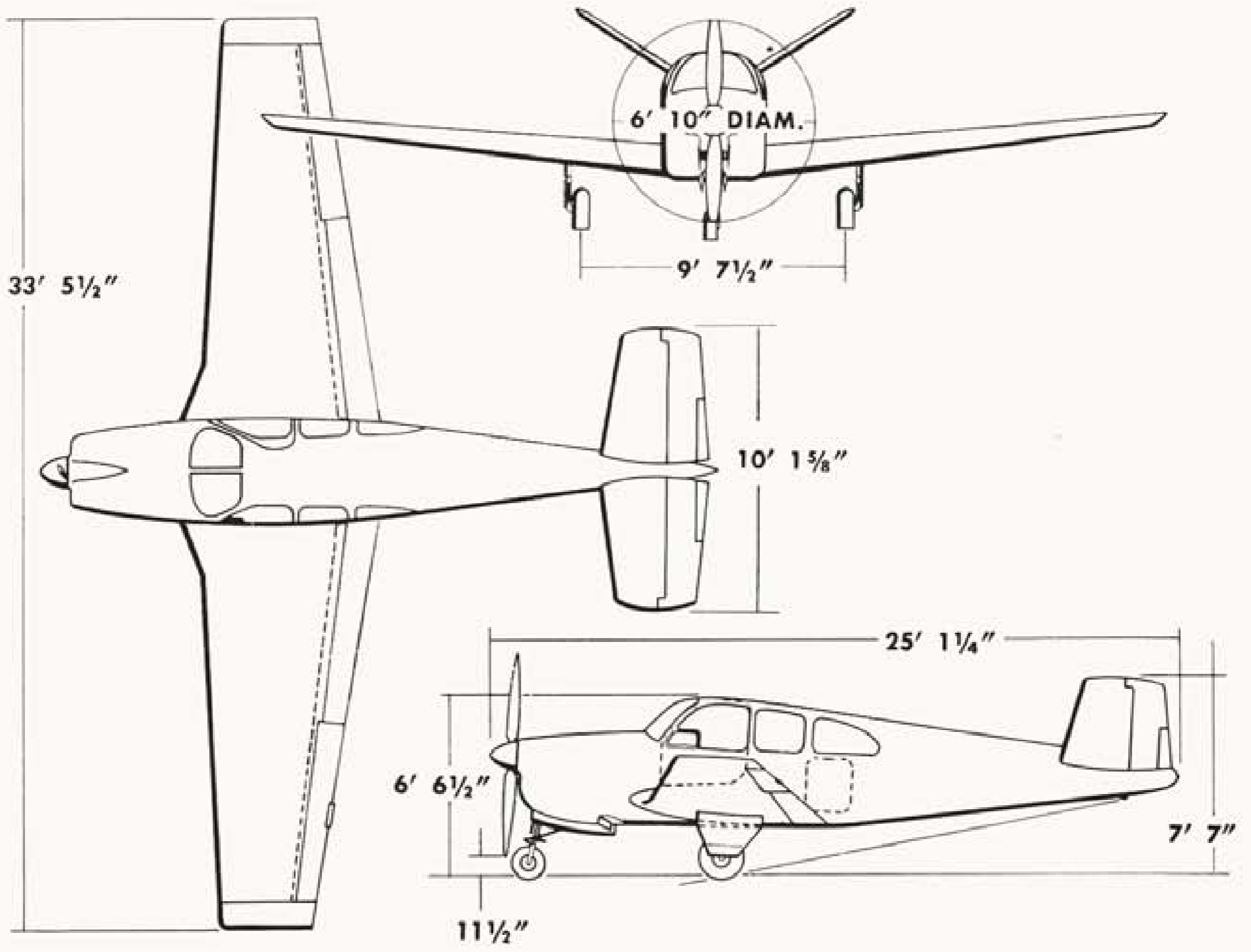
Starter	Induction air filter
Generator (50 ampere)	Mufflers and cabin heaters
Voltage regulator	(stainless steel)
Battery relay	Exhaust Manifolds (stainless steel)
Fuel Pump	Fuel injection

FUEL AND OIL CAPACITY

Fuel capacity in standard wing tanks.....	49 gallons usable
Fuel capacity in optional wing tanks.....	78 gallons usable
Oil capacity.....	10 quarts

LANDING GEAR

Tricycle type with swivelling 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 two-spot hydraulic brakes.



SECTION I

Descriptive Information

Your new BEEHCRAFT is a single-engine, four-place low-wing monoplane with tricycle landing gear and the V-tail which distinguishes it at a glance from all other private airplanes. The aerodynamic cleanness of your airplane, earned it its reputation as the most efficient airplane in its class.

Since your BEEHCRAFT is actually licensed in the utility category it may be used for non-scheduled passenger and cargo operations, for hire as a normal category airplane, and can be flown also in the utility category for pilot training, including limited acrobatic maneuvers except snap or inverted flight maneuvers and spins, which are prohibited.



The semi-monocoque structure of aluminum, magnesium and alloy steel, is riveted and bolted for maximum strength consistent with its weight limitations. The structure is designed for loads far in excess of the requirements of Civil Air Regulations and careful workmanship and thorough inspection make certain that the designed strength is in fact achieved.

Fully efficient and effective operation of your Bonanza can only be achieved through flight experience based on a thorough understanding of the airplane's several systems. The following discussion, under the headings: Flight Controls, Landing Gear, Power Plant, Fuel System, etc., is presented to aid in this understanding.

FLIGHT CONTROLS

Your airplane's V-tail surfaces are operated by the conventional rudder pedal—control column combination, through closed-circuit cable systems. The control column moves both tail surfaces in the same direction, so they act as elevators, while the rudder pedals operate these surfaces in opposite directions to act as rudders. Both controls may be operated simultaneously and the airplane will respond in the same manner as one with a conventional tail.

The trim tabs on the tail surfaces operate as elevator trimmers only, and are controlled by a handwheel at the left of the control console; their position is indicated by a drum-type dial in the lower control console.

The ailerons are actuated through conventional closed-circuit cables and are statically balanced by fixed trim tabs on each surface. Trim changes in the air, required by differential fuel consumption and the like, are accomplished by actuating the aileron trimmer on the control column hub. The trimmer displaces the aileron surfaces themselves, to compensate for any uneven loading. The displacement is maintained by cable loads imposed by the aileron trimmer.

The control column is adjustable for two wheel heights in both the pilot's and copilot's positions; to adjust the height of the wheel, or transfer it from one side to the other, pull out on the T-handle latch at the base of the control arm and position as desired. When transferring control from one side to the other, the aileron trimmer should be held until the wheel is repositioned.

A geared electric motor under the front seat, drives jackscrew actuators, through flexible shafts, to raise and lower the flaps. Up and down limit switches open the electrical circuit and turn off the motor when the flaps reach the extremes of travel. In the retracted position, a green light shows on the upper left of the control console, while a red light shines when the flaps are fully extended. Intermediate flap stations may be set by moving the flap actuator to the DOWN position and then to the OFF position, when the desired degree of travel has been reached. The recommended, 10° and 20° positions, for short field take-off, are marked on the leading edge of the left flap. Alignment of these marks, with the wing trailing edge, will produce the desired flap setting.

LANDING GEAR

The fully-retractable tricycle landing gear is operated by a single electric motor through push-pull tubes and a gearbox under the front seat. When retracted, all three wheels are completely enclosed by doors which operate automatically.

The nose wheel is steerable through linkage connected to the rudder pedals; its maximum deflection with the rudder pedals alone is 17 degrees to either side of center, while with both rudder pedal and brake the deflection may be increased to 29 degrees on either side. The steering linkage is spring-loaded to absorb shocks and will compensate automatically for rudder applied on crosswind landings. When the rudder pedals are released, the nose wheel will caster and align itself automatically. To insure proper retraction a roller-and-slot arrangement will correct any misalignment of the wheel as it enters the wheel well. A hydraulic dampener on the nose wheel strut compensates for any tendency to shimmy.

A green, "down and locked" light glows on the lower right control console, when the gear is fully extended. While the gear is fully retracted, a red position light glows in the upper right corner of the console. In addition, a mechanical indicator mounted on the nose wheel well bulkhead, shows the position of the nose wheel. This indicator is directly linked to the actuating mechanism and moves simultaneously with it. Limiting switches and a dynamic brake automatically stop the extension-retraction mechanism when the gear reaches the extremes of its travel. In addition to the position indicators, the landing gear control circuit has four devices to assist you in operating it safely: a latch

on the control switch which must be moved aside to place the switch in the up position; a warning horn which sounds whenever the throttle is retarded below approximately 12 inches Hg manifold pressure with the gear retracted; the safety switch on the right shock strut which opens the control circuit whenever the strut is compressed by the weight of the airplane, but does not open the warning horn circuit; and when the position switch is placed in the up position and the weight of the airplane is compressing the strut, the warning horn is actuated. You are reminded that these devices are provided as safety precautions, designed to prevent embarrassment. With proper attention to safe operating technique, you may never need their assistance.

The main gear of the Bonanza are fitted with Goodyear, two-spot hydraulic brakes which respond to fluid pressure from the master cylinders. Toe pressure on the rudder pedals actuates the normal system and is employed to "pump up" residual pressure in the parking brake system. To set the parking brakes, pull the center-button locked control, located immediately to the right of the control console, and pump the brake pedals. Actuation of the control closes a one-way check valve, allowing hydraulic fluid and therefore pressure, to flow *to* the brakes, exclusively.

The brakes are self compensating, receiving fluid from a reservoir mounted on the forward side of the firewall. The reservoir, accessible by raising the cowl, should be checked periodically and fluid added when necessary.

POWER PLANT

The Continental IO-470-N engine uses continuous flow fuel injection with increased compression, at 2625 rpm, to gain increased horsepower without increased displacement.

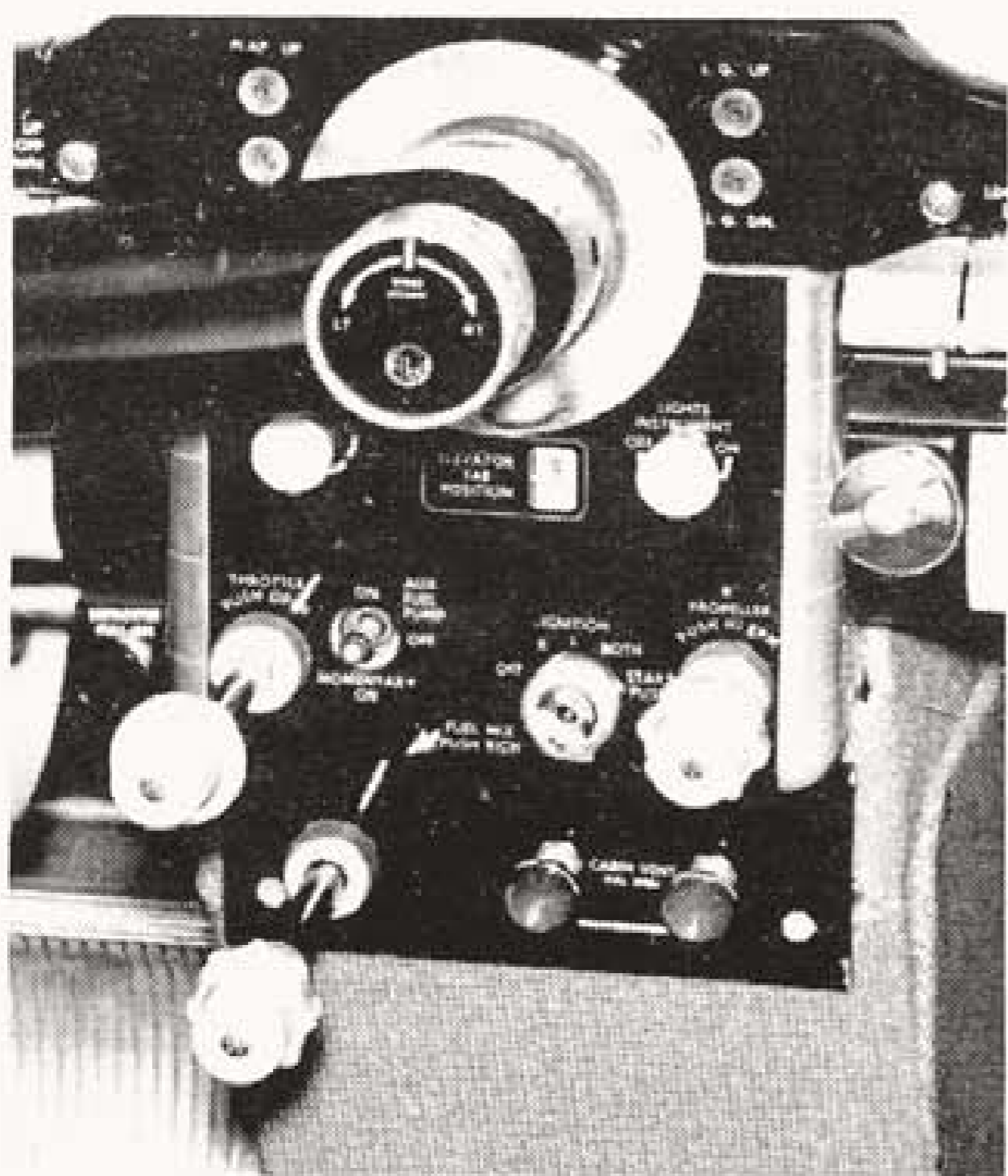
This fuel injection system uses a special, aerated nozzle at the intake port of each cylinder. Fuel flow is controlled by a pressure-regulating valve basically controlled by linkage to the air throttle in the induction manifold. A manual mixture control arrangement overrides the throttle's control of the pressure regulator to establish a basic mixture setting; once this setting is made by the pilot, the throttle linkage varies fuel pressure to approximately the desired mixture. Fine adjustments may then be made with the mixture control. The fuel pressure gage provides a means of precisely determining fuel flow and mixture strength.

Your Bonanza is equipped with the BEECHCRAFT designed, Model 278-116 propeller which uses the centrifugal twisting moment of the blades, opposed by governor boosted, engine oil pressure, to change the pitch. The pitch change mechanism is less than complex, has few working parts, and requires a minimum of maintenance or repair.

The hydraulic propeller governor is of conventional flyweight-and-speeder-spring design, in which the centrifugal force of rotating flyweights and the pressure of the speeder spring are used to operate a pilot valve, directing oil under governor-boosted pressure either to the propeller or back to the engine sump, to maintain the selected rpm. Engine speed is selected by the propeller control, which changes tension on the governor speeder spring. Since the action of both governor and propeller is proportional and quite rapid, the engine rpm you select is maintained to close tolerance throughout a wide range of power and load variations. The gear-type boost pump and pressure relief valve for the governor control system are integral parts of the governor.

Engine Controls

Engine and propeller controls are grouped on the lower control console, within easy reach of a pilot flying the airplane from either side.



The throttle is pushed in to open, pulled out to close, and locks when the button on the end of the knob is released. With the throttle locked, fine adjustments may be made by rotating the knob.

The propeller control is similar to the throttle. The control is pushed in to increase rpm (low pitch) and pulled out to decrease rpm (high pitch). The ignition key switch actuates the starter, after passing clockwise through the RIGHT, LEFT and BOTH magneto positions. It is spring-

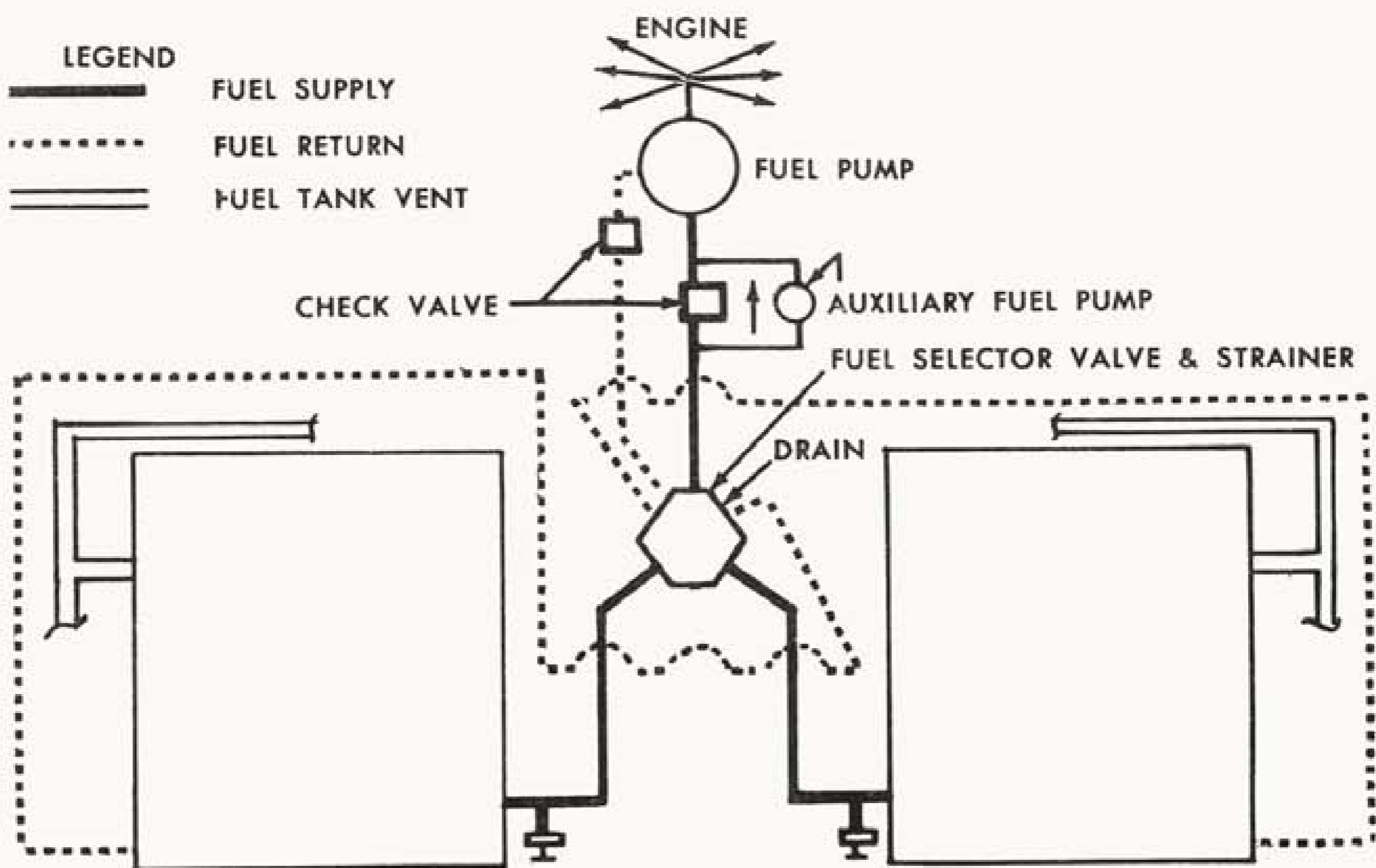
loaded to return to the BOTH position when released.

The mixture control is pushed in for full rich and pulled out to the end of its travel for idle cut-off. Its vernier control, used with the fuel pressure gage, permits accurate control of fuel pressure and hence fuel flow. By programming your power settings in advance and following your schedule closely, you can make quite accurate predictions of fuel consumption.

Fuel System

The Bonanza's 80 gallon optional or 50 gallon standard fuel capacity is supplied by two leading edge fuel cells. Fuel is fed from the desired cell to a selector valve just forward and to the left of the pilot's seat. It then passes through a fuel strainer to the engine driven injector pump; thence to the injector nozzles and the intake valves of each cylinder.

FUEL SYSTEM SCHEMATIC



The positive displacement, injector pump responds to changes in engine speed and governs total fuel flow proportionally. The pump provides greater capacity than the engine requires even at low engine speeds, to assure proper pump pressure and delivery for all engine operating speeds. Relief valves in the pump allow the excess fuel to be returned to the selected tank, assuring the maximum in fuel economy. This re-

lief system returns approximately ten gallons of excess fuel per hour through the selector valve to the selected tank.

A check valve is provided so that boost pressure to the system can bypass the engine driven pump, for starting. This feature is also available to suppress vapor formation under high ambient fuel temperatures. Further, this permits the use of the auxiliary pump as a source of fuel pressure in the unlikely event of injector pump failure.

The system incorporates a fuel strainer and a finger actuated drain cock for each cell plus an additional sump drain located at the low point of the system, below the selector valve. The sump drain is accessible through an access door, inboard of the left wing root. The cell drain cocks are located forward of the landing gear doors. All the drain cocks should be actuated daily to purge any condensed water vapor from the fuel sump and cells.

Consult the Consumable Materials Chart in Section VII for correct fuel grades when servicing your Bonanza.

Oil System

The Continental IO-470-N engine uses a wet-sump oil system, which is an integral part of the engine. The only external component of the oil system is the cooler, which is bolted to the front of the engine case. Oil enters and leaves the cooler through ports which match ports on the oil cooler mounting pad of the engine.

Control of oil temperatures and circulation through the system are completely automatic. The cooler has built-in thermostatic and pressure bypass valves which divert the flow around the radiator section. The bypass valve, set to relieve pressure, automatically opens if sludge or congealed oil in the radiator section block the flow through it. The thermostatic valve bypasses the oil when its temperature is below a pre-set minimum. Oil temperatures are regulated by adjusting the cowl flaps to change the flow of cooling air across the engine and through the cooler.

The engine oil sump is serviced through a filler neck on the left side of the engine case, near the nose; there is an access door for that

purpose in the left upper cowl. In the same location an oil level dipstick is fitted with a lock ring and must be rotated $\frac{1}{4}$ -turn in either direction to remove it. The dipstick must be inserted with its markings forward, to lock properly.

For correct oil grades, refer to the Consumable Materials Chart in Section VII.

Engine Cooling

The engine is cooled by air which enters the openings in the nose cowling, circulates and passes out through openings in the lower cowling. To control engine temperatures, the lower cowl openings are fitted with movable flaps which may be opened or closed with a push-pull control on the left instrument subpanel. Except when operating in extremely low temperatures, the cowl flaps should be open during all ground operations.

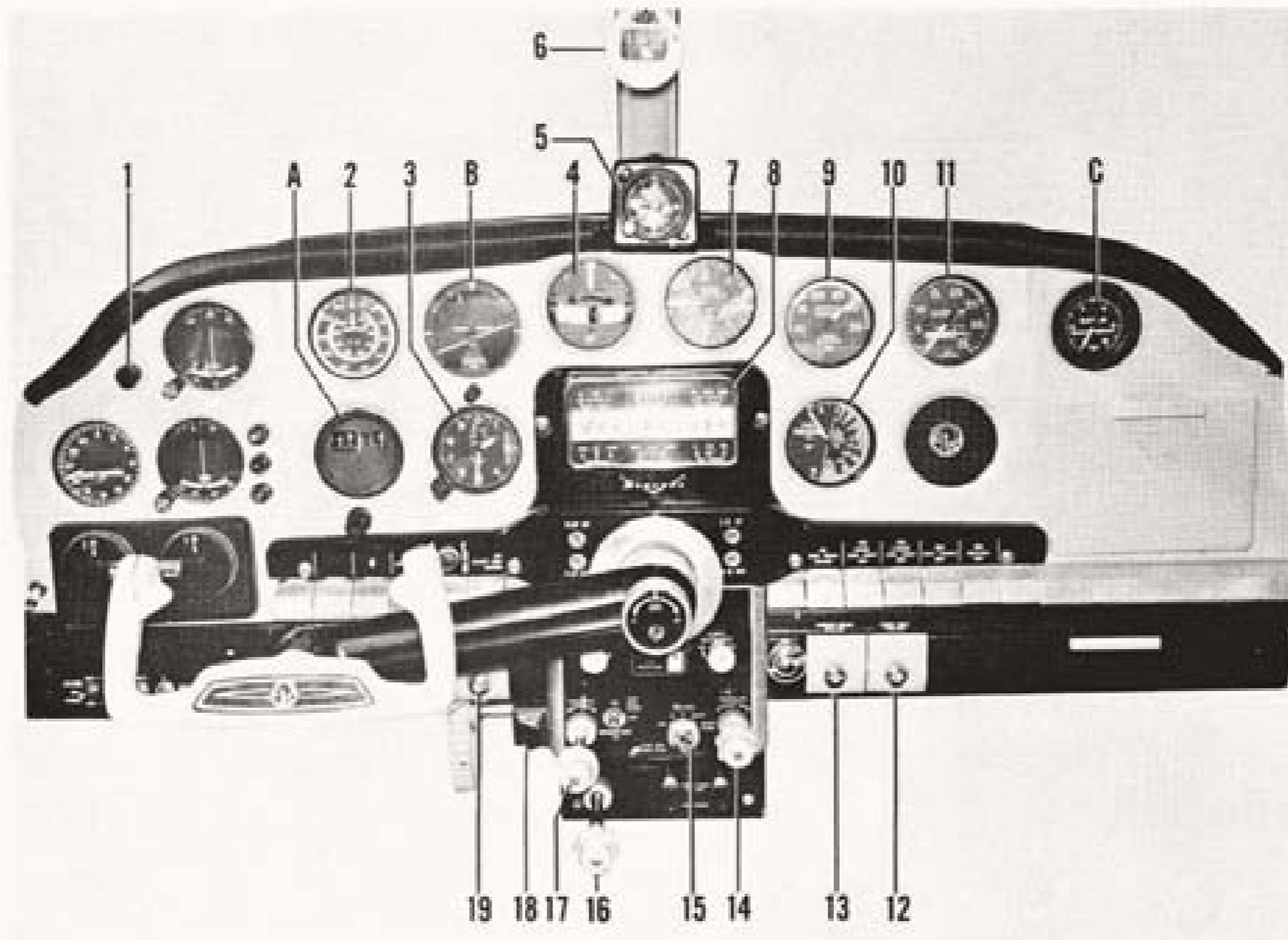
Ground running time should be held to a minimum and engine temperatures watched closely. You should make certain that the engine baffles and baffle seals are maintained properly and that the cowling fasteners are kept tight, so that the airflow across the engine is undisturbed. The propeller, kept in full low pitch for ground operations, will help keep engine temperatures within limits.

INSTRUMENTS

Except for the tachometer, manifold pressure gage and fuel pressure gage, the power plant instruments are grouped together immediately above the control console. The engine gage cluster includes the individual fuel quantity gages for each cell, oil temperature and pressure gages, cylinder head temperature indicator and ammeter. Each fuel quantity gage gives an instantaneous and continuous indication of fuel quantity in the particular cell.

The manifold pressure gage, fuel pressure gage and tachometer are mounted in the instrument panel proper. Incorporated in the tachometer is an engine hour meter which automatically records the total engine operating time.

Standard instrumentation on the airplane includes an airspeed indicator and an electric turn-and-bank indicator, mounted in the



STANDARD EQUIPMENT

- 1. Stall Warning
- 2. Air Speed Indicator
- 3. Altimeter
- 4. Turn-and-Bank Indicator
- 5. Clock
- 6. Magnetic Compass

- 7. Vertical Speed Indicator
- 8. Engine Gage Cluster
- 9. Manifold Pressure Indicator
- 10. Fuel Pressure Indicator
- 11. Tachometer
- 12. Cabin Heat Control

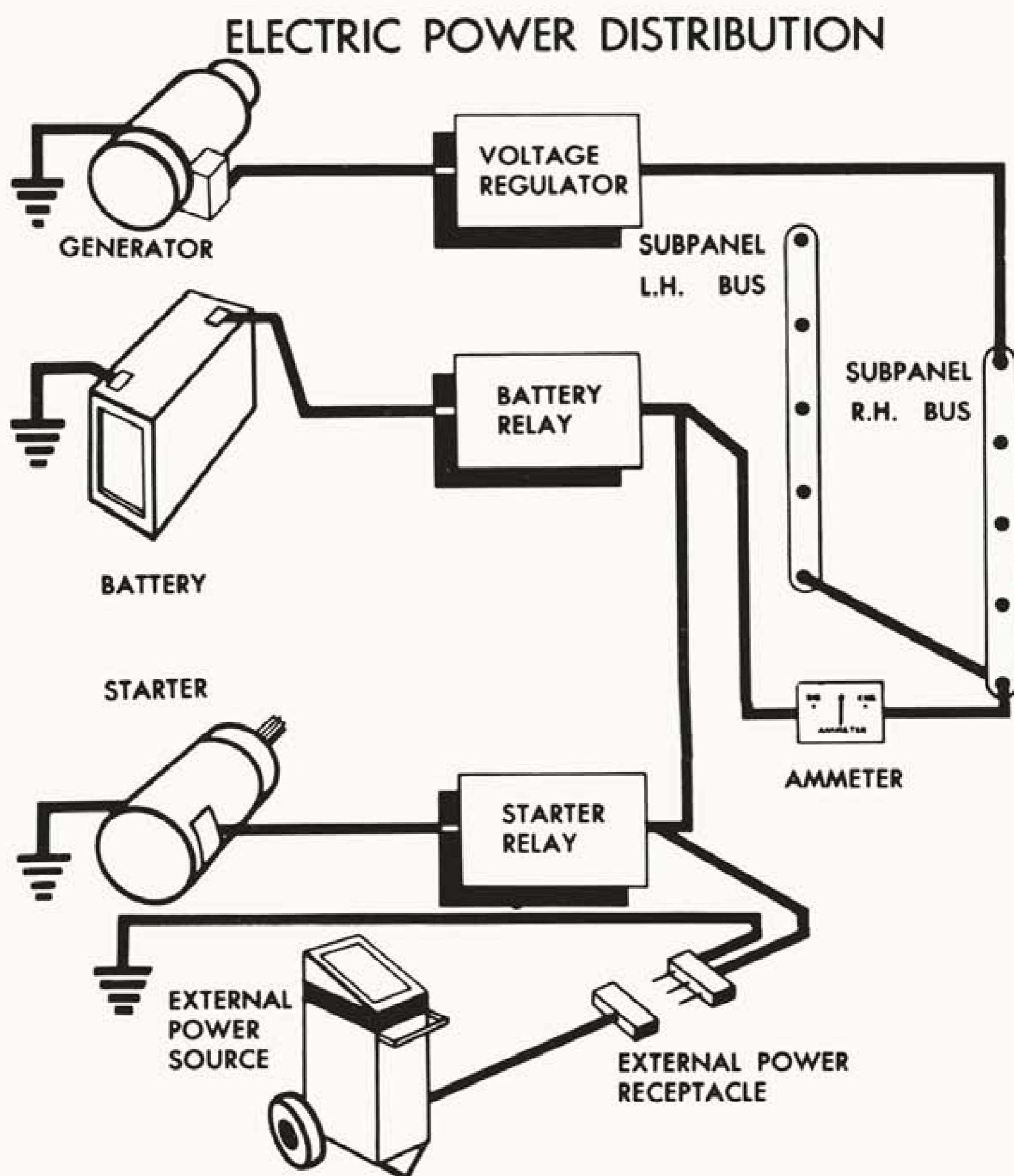
- 13. Parking Brake Control
- 14. Propeller Control
- 15. Starter Switch
- 16. Mixture Control
- 17. Throttle
- 18. Defroster Control
- 19. Cowl Flaps Control

OPTIONAL EQUIPMENT

- A. Directional Gyro
- B. Attitude Gyro
- C. Suction Gage

instrument panel. A clock built into the instrument cowl pad, a magnetic compass mounted on the windshield divider and an outside air temperature gage fixed at the top of the divider, complete the instrumentation.

Ram air pressure for the airspeed indicator is picked up by a pitot tube on a mast under the left wing. Static air pressure for the altimeter, rate-of-climb indicator and airspeed indicator is supplied by two static ports on the sides of the fuselage just back of the baggage compartment.

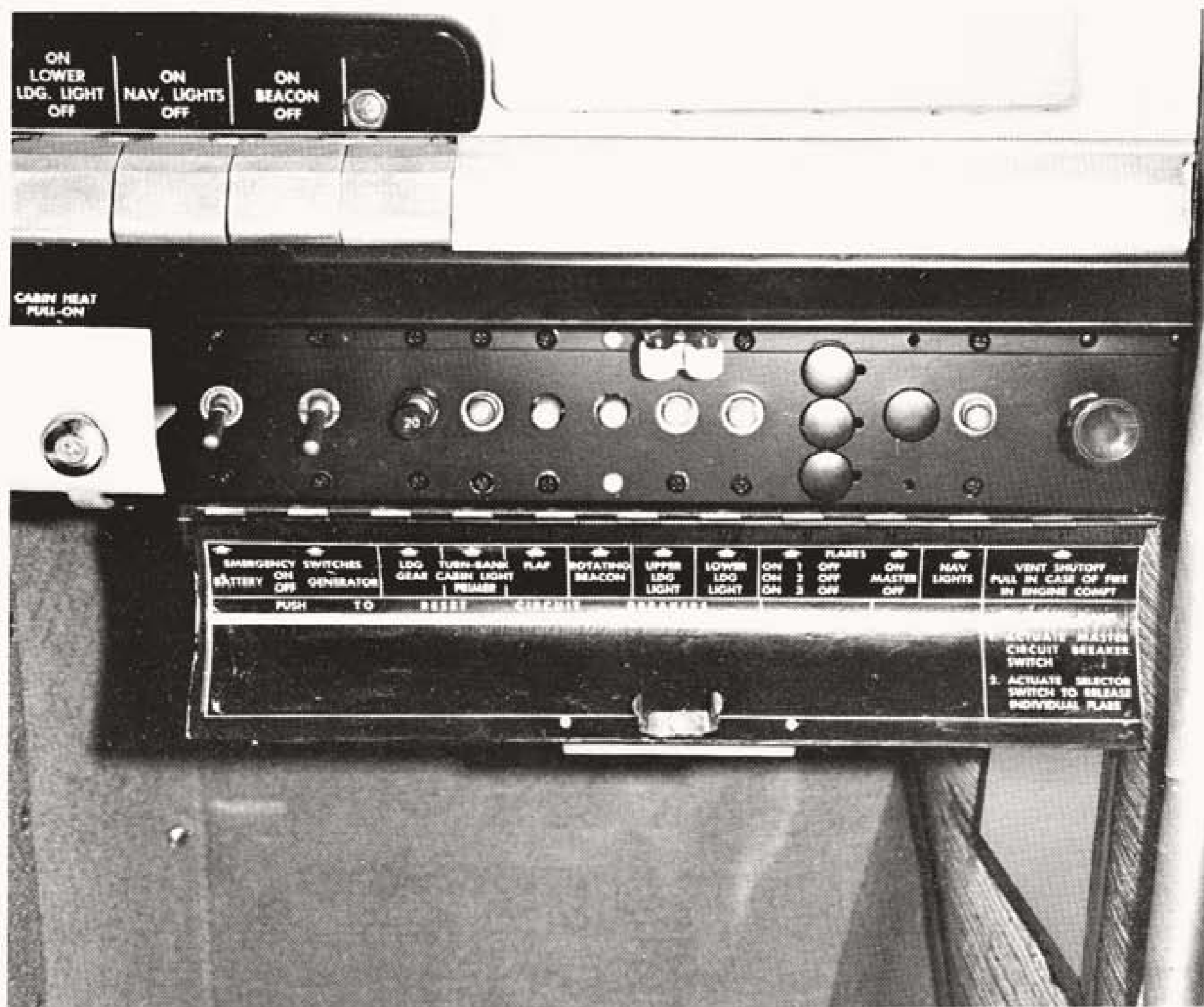


ELECTRICAL SYSTEM

Direct-current electric power is supplied by a 12-volt engine-driven generator of 50 ampere capacity, controlled by a voltage-current regu-

lator which automatically adjusts generator output to its load, including recharging the 33 ampere-hour battery. All circuits in the airplane are single-wire, ground-return, in which the airplane structure itself is used as the ground return.

The various circuits in the system are protected by either push-to-reset or push-pull type circuit breakers. Most of the circuit breakers are located forward of a door which completes the right hand sub-panel. Extra circuit breaker space is also provided here for optional equipment. A placard, which indicates the location and circuit protected,



is affixed to the inside of the door. A vertical circuit breaker panel is located adjacent to the pilot's right knee. It houses circuit breakers for the generator, stall warning, fuel quantity indicators, gear and flap warning lights and engine instruments. Since the generator, battery and starter circuits are relay controlled, the switches and circuit breakers for these items control the relays rather than the actual components.

The ammeter is of the conventional charge-discharge type, actually showing the rate of charge or discharge of the battery. A zero reading, which should be the normal condition in cruising flight, indicates that the battery is fully charged and the generator output has been adjusted by the regulator to balance the load of electrical equipment then in use.

HEATING AND VENTILATING SYSTEM

Hot air for warming the cabin and defrosting the windshield is supplied by a heater muff on the left engine exhaust stack. Air picked up through an intake on the left side of the nose passes through the heater and into a mixer box where it is blended with cold air to obtain the desired temperature, the blending being controlled by valves operated by a push-pull control on the instrument subpanel. The valve linkage is arranged so that with the control pushed in, the hot air valve is closed and the cold air valve open; as the control is pulled out, the hot air valve opens and the cold air valve closes, until at the end of the control travel the cold air valve is fully closed and the hot air valve full open.

Air from the mixer box is distributed to an outlet in the back of the front seat and two outlets just above the rudder pedals, as well as to the two windshield defroster outlets. A defroster control located to the lower left of the center console adjusts or completely shuts off the flow of air through the defroster. If increased defrost heat is necessary, more air may be diverted to the defrosters by closing the valves on the front seat hot air outlets. Slightly better air circulation in the cabin may be obtained by closing the valve on the left duct and diverting more air to the right duct and rear seat duct, when intermediate control settings are used. The front seat outlets are regulated by push-pull controls under the control console.

In addition to the cold air supplied through the mixer box, ducts in each wing root are connected directly to outlets in the side panels, just below the instrument panel. The small outlet on the right side

has a valve which is opened or closed by turning the large knob in the center of the outlet. The large outlet on the left may be opened or closed and the direction of the airflow changed by rotating its cover with the small plastic knob on its rim.

In addition to the fixed air exhaust system, an adjustable vent, overhead, adds to cabin comfort. For additional ventilation on the ground, the rear cabin windows may be opened; these windows, however, must be closed and latched before take-off.

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.

Excellent Visibility

With increasing congestion around airports, the ability to see about you is vital to safe take-offs and landings. Your BEECHCRAFT'S wide, deep windshields and side windows extending behind the rear seat, combined with the nearly-level ground attitude afforded by its tricycle landing gear, give the pilot an excellent view of his surroundings. There is no need to S-turn for adequate forward vision, and from the side windows you can see both tail surfaces nearly to their roots.

Landing Gear and Flap Indicators

Both direct visual indication and signal lights on the instrument console 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. Both the landing gear and flap position switches have latches to prevent inadvertent actuation.

Landing Gear Safety Switch

To avoid inadvertent retraction of the landing gear while the airplane is at rest on the ground, a safety switch on the main landing gear is operated by the compression and extension of the shock strut, breaking the landing gear control circuit when the strut is compressed and completing it so the gear may be retracted when the strut extends. The safety switch is not intended to protect the airplane while in motion; before starting to taxi, always make certain that the control switch is down. As a safeguard, the landing gear warning horn is designed to blow anytime the landing gear switch is placed in the "UP" position with the landing gear safety switch open.

Stall Warning Indicator

To prevent accidental stalls, a stall warning indicator sounds a warning horn and flashes a red light on the instrument panel as an incipient stall develops, while there is 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 airplane approaches a complete stall.

Landing Gear Warning Horn

A landing gear warning horn will sound whenever the throttle is retarded below a setting sufficient to maintain flying speed, unless the landing gear has been lowered. The throttle warning signal is a regular intermittent note, to distinguish it from the stall warning indication. Either opening the throttle or lowering the landing gear will shut off the warning horn. There is no silencing switch.

Landing Lights

For night flying, a high intensity, sealed beam landing light is mounted on the nose gear shock strut. The light is focused to illuminate an

extensive area in front of the aircraft, whether it be in its approach or taxiing. This location provides excellent illumination without blinding glare. Prolonged use of the landing light, in taxiing or in the air, is not recommended. Overheating may result which can induce premature lamp failure.

NOSE LANDING LIGHT

A bright, powerful landing light, which doubles for use during taxiing, has been mounted in the lower nose section of the Bonanza. The bright swath cut by this lamp's illumination removes most of the problems that attend night ground operations.

Safety Belts

The high strength safety belts on your Bonanza lend functional beauty to the interior of the aircraft. They are not only an important safety feature, designed to keep the occupants snugly in their seats in rough air or during rapid deceleration; but further, the nylon strap material, in colors that compliment the upholstery, affords that element of taste so essential to distinctive decor. In addition, this material is soil resistant and is easily cleaned.

The airline type harness buckles may be fastened or released quickly and they are easily adjustable.

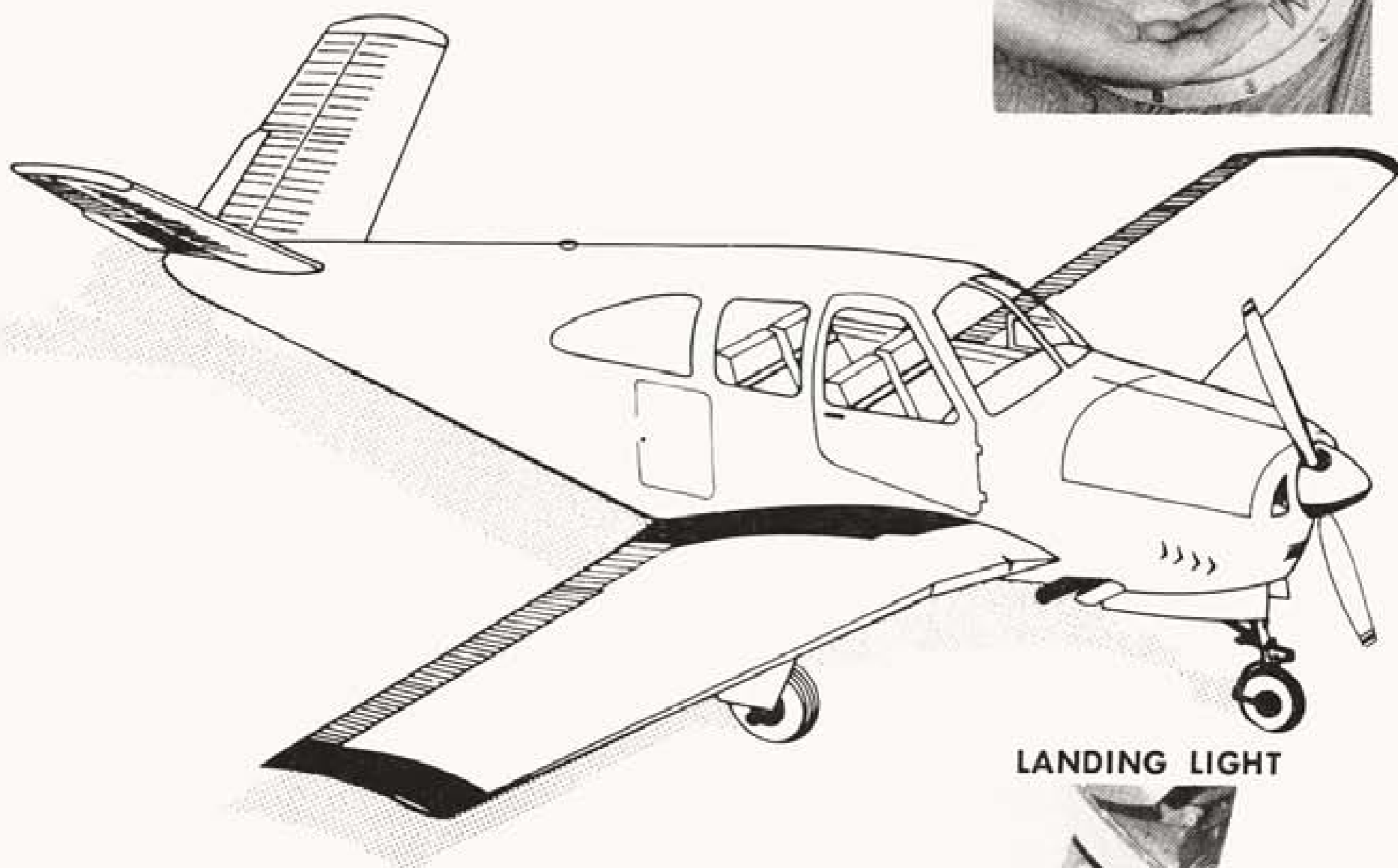
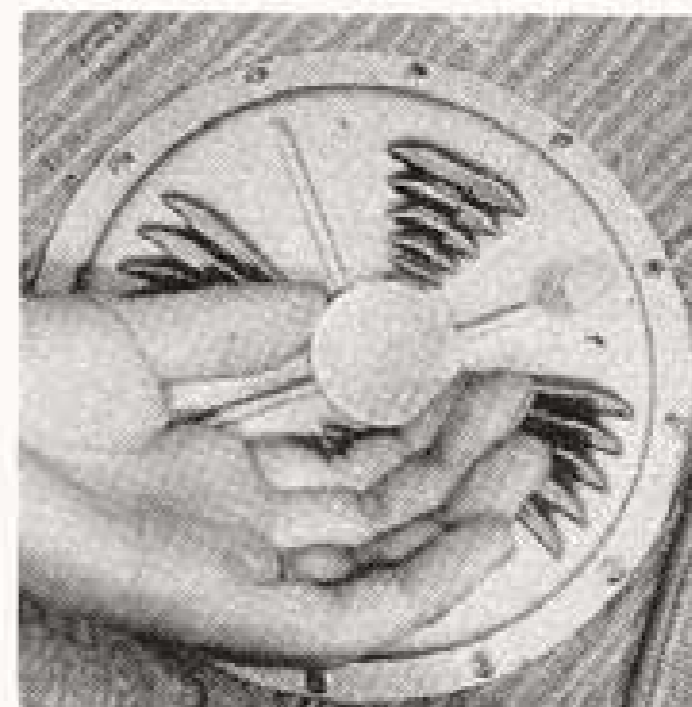
Instrument Cowl Pad

A thick pad of foamed plastic, covered with dull-finished leather, is formed into a roll around the upper edge of the instrument panel.

This pad, coupled with the shoulder harness and/or seat belts, affords the occupants still greater protection from injury during rapid deceleration. In addition, it forms an attractive frame for the instrument panel, and its dull surface prevents annoying reflections and glare.

Comfort
Convenience
Safety

HEAT AND VENT



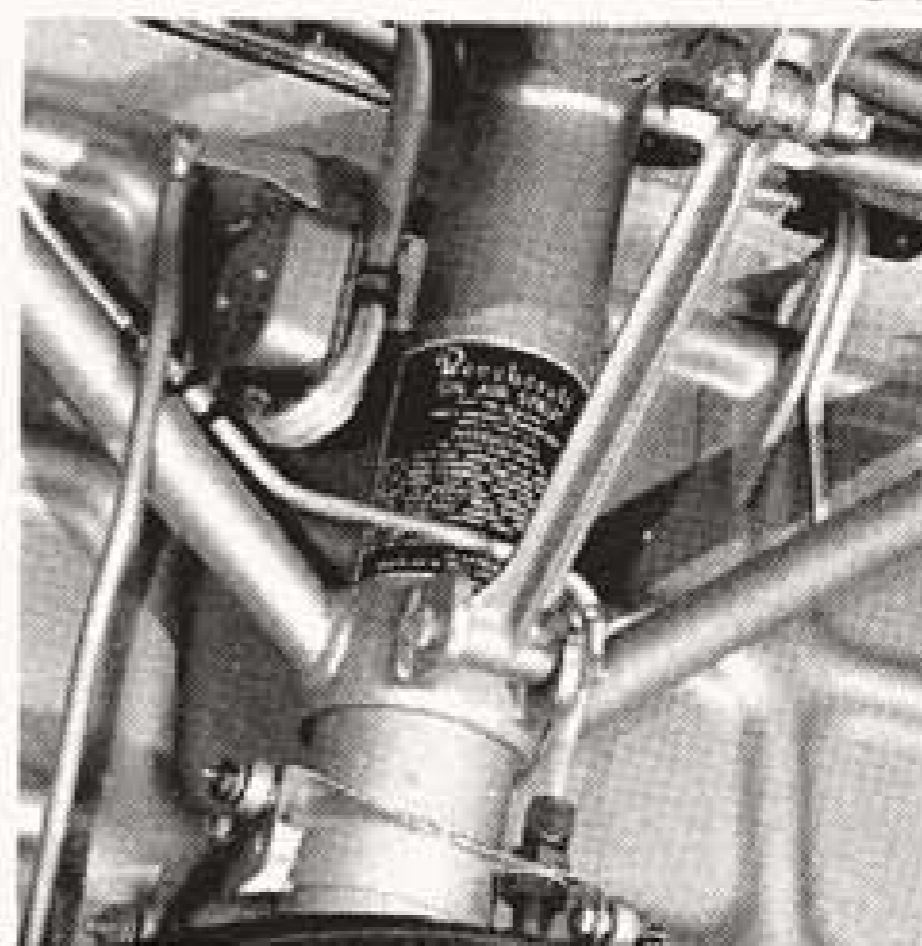
LANDING LIGHT



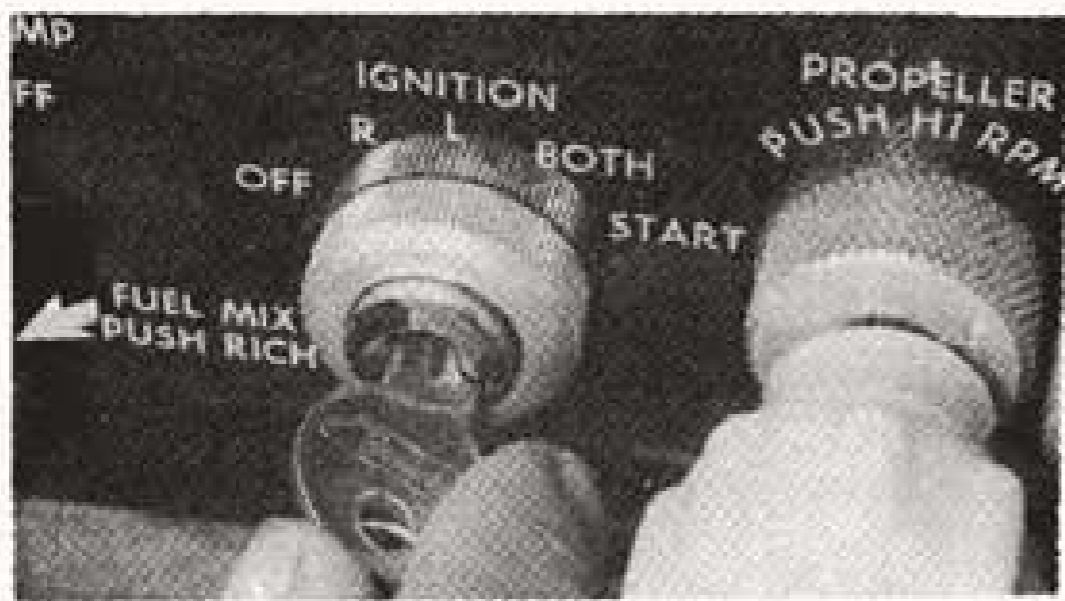
BAGGAGE COMPARTMENT CAPABILITY



LANDING GEAR SAFETY SWITCH



AUTOMOTIVE TYPE STARTER



SAFETY BELTS



ADJUSTABLE RECLINING SEATS



CONTROL TOWER VISIBILITY



Optional Equipment .

To Meet Your Flying Requirements . . .

NAVIGATIONAL EQUIPMENT

GYRO HORIZON and DIRECTIONAL GYRO

These important instruments are essential for weather flying and night operation. They assist materially in maintaining proper flight attitude under all conditions and increase navigational accuracy.

VACUUM SYSTEM

This system is available for Bonanzas in which gyro instruments, alone or with autopilot, are to be installed following factory delivery. System includes engine-driven vacuum pump, oil separator, relief valve and suction gage.

KOLLSMAN DIRECTION INDICATOR

This is a direct type 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.

DUAL CONTROL WHEEL

Indispensable for instruction and transition purposes.

TACTAIR GOLD SEAL T-3 AUTOPILOT AND ALTITUDE HOLD

Makes "hands-off flying" a reality. This fully automatic, three-directional system is pneumatically operated, easy to maintain and fully warranted for one year. Just set the controls, sit back and relax—the Tactair Autopilot will keep you "on course," while Altitude Hold holds your place in the sky.

RADIO EQUIPMENT

- Equipment Consists of Either Motorola — Narco — Collins
. . . or a Combination of Such Equipment

SAFETY EQUIPMENT

SINGLE OR DUAL 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.

HEATED PITOT TUBE

Insures correct operation of the airspeed indicator during icing conditions.

Beechcraft

• • **FOR YOUR**

• • **for . . . 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 folding jump seat in the baggage compartment. Attached to the left side of the airplane, it can be stowed flat against the side. In conjunction with this arrangement, special rear seat backs are installed. These are designed to fold flat on the seat bottom, providing easy access to the jump seat.

TABLE

An attractively styled writing desk may be installed on the back of the front seat. This writing table may be folded and placed in its rack when not in use.

MISCELLANEOUS OPTIONAL ITEMS

SHOULDER HARNESS

The front seats of your Bonanza can be equipped with the BEECHCRAFT High-Strength Shoulder Harness which can protect the wearer in straight-ahead decelerations approaching 20 G's, while allowing free access to all controls.

DUAL CONTROLS

To complete the dual control configuration of the cockpit, your Bonanza can be equipped with a second control wheel or your choice of rudder pedals. For latitude in selection, the copilot's rudder pedals may or may not be equipped with brakes, to suit your preference.

SECTION II

Operating Check Lists

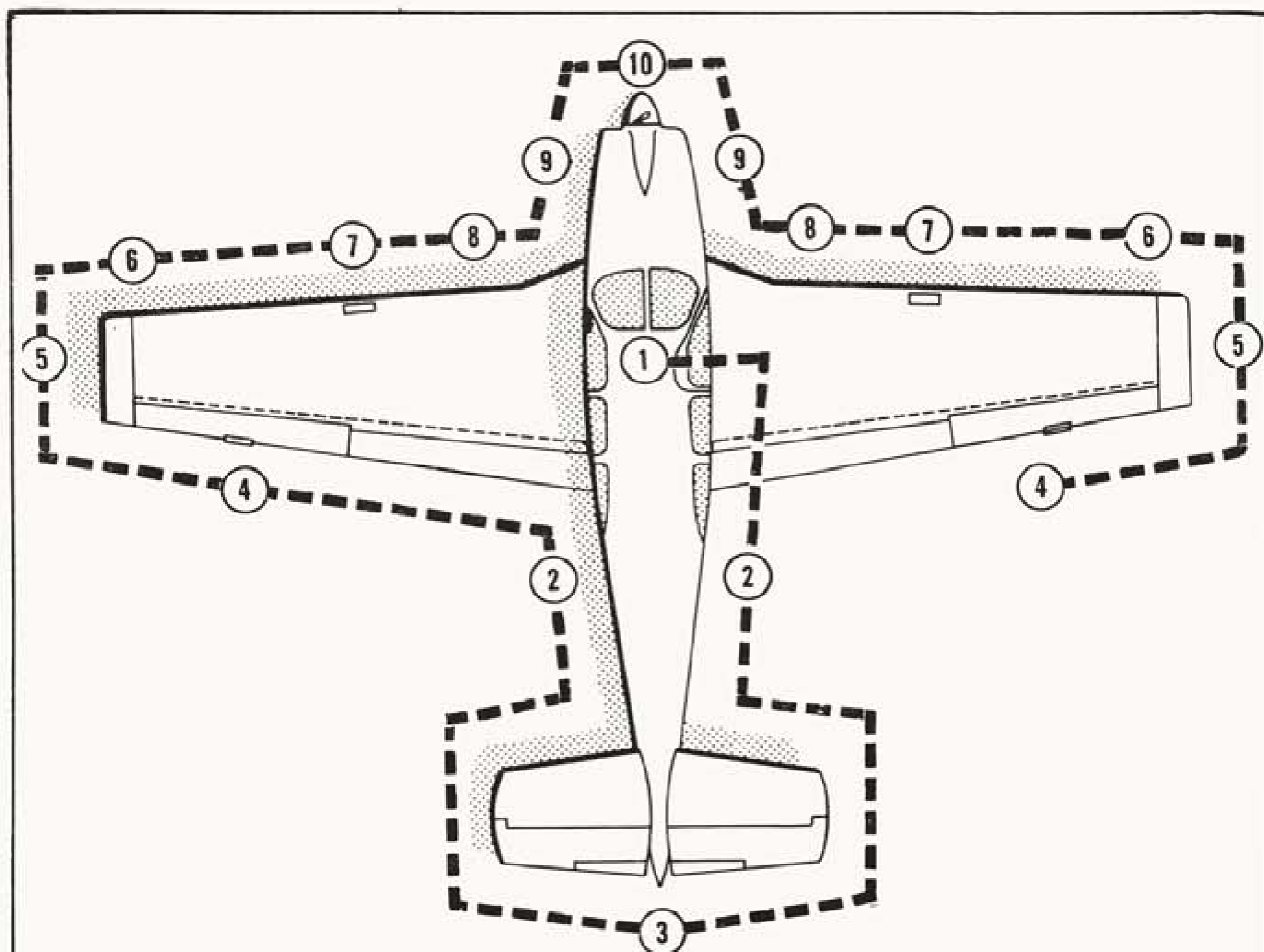
This section has been prepared to give you a quick and easily accessible reference to all operational check lists needed for the normal flight of your airplane. The general techniques presented are based on the recommendations and data compiled by Beech Aircraft Corporation pilots who have test flown and demonstrated the aircraft. The procedures given are intended merely to assist you in developing a good flying technique for your BEEHCRAFT. 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, and made carefully they 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.

PRE-FLIGHT INSPECTION



1. Master Battery and Generator switches — OFF. Control Lock — Removed.
2. Static ports — openings unobstructed.
3. Inspect empennage and control surfaces.
4. Inspect wings, ailerons and flaps.
5. Inspect wing tips and position lights.
6. Remove tie-down lines and pitot cover. Pitot openings unobstructed.
7. Fuel tanks — FULL; caps and covers secured; fuel sumps drained.
8. Shock struts and tires — properly inflated; struts clean.
9. Cowl fasteners — tight. Oil sump — full. Dip stick — secured.
10. Propeller blades — checked for nicks and cracks. Induction filter — clean.

BEFORE STARTING CHECK

1. Parking brake—Set.
2. Master battery and generator switches—On. Leave switches off if external power is used for starting. Use negative ground starting unit. Wait until unit is unplugged before actuating master switches.
3. Circuit breakers—Checked.
4. Landing gear position switch—DOWN. Green "down and locked" light on. Warning horn off.
5. Flaps—Up. Switch—Neutral.
6. Flight Controls—Checked for travel and free, smooth operation. Elevator is held in full down position by the down spring if the tab is between the neutral and the down end position.
7. Ignition switch—Off.
8. Propeller—High rpm.
9. Mixture—Full rich.
10. Cowl flaps—Open.
11. Fuel—Each tank checked. Select fuller tank.

STARTING

1. Ignition key switch—On BOTH.
2. Throttle—Open $\frac{1}{2}$ to 1 inch (4 to 8 turns).
3. Auxiliary fuel pump switch—Held in MOMENTARY ON until fuel pressure reaches 4 psi in cold weather; 3 psi in warm weather.
4. Throttle—Reduce to idle.
5. Starter—Release auxiliary fuel pump switch. Engage starter.
6. Warm-up—1000 to 1200 rpm.
7. Instruments—normal readings on all gages.

BEFORE TAKE-OFF CHECK

1. Trim—Aileron neutral. Elevator set at zero or 3° nose up if only the front seat is occupied.
2. Flight controls—Checked for free movement through full travel.
3. Instruments—All readings normal. Directional gyro and altimeter set. Oil temperature sufficiently low to avoid "red line" on take-off run. Minimum oil pressure occurs when oil temperature is in excess of 190° F.
4. Cabin door and windows—Locked.
5. Mixture—Full rich. Adjust to T.O. power for field elevations above 3000 ft, MSL.
6. Throttle—1900 rpm. Exercise propeller through 300-400 rpm slowly. Return to high rpm. Magnetos checked at 1900 rpm. Maximum drop, 100 rpm.
7. Parking brake—Released.

BEFORE LANDING CHECK

- | | |
|--|--|
| 1. Mixture—Full rich. | 4. Cowl flaps—As required. |
| 2. Fuel tank selector—Fuller tank. | 5. Propeller—High rpm. |
| 3. Landing gear—Down at speeds below 140 mph. Check indicators. Horn does not sound when throttle is closed. | 6. Flaps—As required. Maximum extension speed 120 mph. |
| | 7. Flaps—Up after roll out. |

SHUT-DOWN CHECK

- | | |
|-----------------------------------|--|
| 1. Parking brake—Set. | 7. Master switches—Off. |
| 2. Radio and exterior lights—Off. | 8. Fuel selector valve — Off if the airplane is to remain parked for any length of time. |
| 3. Propeller—High rpm. | 9. Control lock—Installed if conditions warrant. |
| 4. Throttle—Closed. | 10. Cabin door—Closed. |
| 5. Mixture—Idle cut-off. | |
| 6. Ignition key switch—Off. | |

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 BEEHCRAFT. 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 horsepower calculator to arrive at rpm, manifold pressure and fuel pressure 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 a Glide Distance Table, Approved Maneuvers Chart and information concerning proper weight and balance of your BONANZA is found in this section. Become familiar with your BEEHCRAFT and it's 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-off65 mph
 Climb-out at 50 feet.....80 mph

Minimum Run

Take-off60 mph
 Climb-out at 50 feet.....80 mph

Obstacle

Take-off60 mph
 Climb-out65 mph

CLIMB SPEEDS





Cruising Climb Speed—25 in. Hg. @ 2500 rpm

Gear and Flaps Up.....130 mph

At 5000 ft. Altitude	GEAR & FLAP UP	GEAR DOWN	GEAR & FLAP DOWN
Best rate of climb speed	103 mph	85 mph	73 mph
Best angle of climb speed	83 mph	71 mph	64 mph

STALL SPEEDS

ANGLE OF BANK

CONFIGURATION	 0°	 20°	 40°	 60°
	Gear and Flaps Up Power Off	71.0 mph	73.0 mph	81.0 mph
Gear and Flaps Up Power On	58.0 mph	60.0 mph	66.0 mph	82.0 mph
Gear and Flaps Down Power Off	60.0 mph	62.0 mph	69.0 mph	85.0 mph
Gear and Flaps Down Power On	48.0 mph	50.0 mph	55.0 mph	68.0 mph

LANDING SPEEDS

Normal

Approach	78 mph
Contact	65 mph

Obstacle

Approach	72 mph
Contact	65 mph

AIRSPEED LIMITATIONS

Never Exceed (Glide or Dive, smooth air)....	225 mph (Red Line)
Caution Range.....	185-225 mph (Yellow Arc)
Maximum Structure Cruising Speed.....	185 mph (Level Flight or Climb)
Normal Operation Range.....	70-185 mph (Green Arc)
Flap Operating Range.....	60-120 mph (White Arc)
Maximum Design Maneuvering Speed.....	147 mph
Maximum Gear Extended Speed (Normal).....	140 mph

Engine Operations Limitations

Maximum Power Available (all operations, SL)	260 hp @ 2625 rpm
---	-------------------

ENGINE INSTRUMENT MARKINGS

Oil Temperature

Caution.....	100° F. (Yellow Line)
Normal.....	100° -225° F. (Green Line)
Maximum.....	225° F. (Red Line)

Oil Pressure

Minimum Pressure.....	30 PSI (Red Line)
Normal Operating Range.....	30 to 60 PSI (Green Arc)
Maximum Pressure.....	80 PSI (Red Line)

Manifold Pressure

Normal Operating Range.....	15 to 29.6 in. Hg. (Green Arc)
Maximum (Sea Level)	29.6 in. Hg. (Red Line)

Cylinder Head Temperature

Normal Operating Range.....	200° to 460° F. (Green Arc)
Maximum Temperature.....	460° F. (Red Line)

Tachometer

Engine Warm-up.....	1000-1200 rpm
Normal Operation.....	1750-2625 rpm (Green Arc)
Maximum.....	2625 rpm (Red Line)

Fuel Pressure

Minimum.....	1.5 PSI (Red Line)
Cruise Power (Operating Range).....	4 to 17 PSI (Green Arc)
Maximum.....	17.5 PSI (Red Line)

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 propeller in low rpm and an IAS of 90 mph. Refer to Section V for correct glide ratio procedure.

GLIDE DISTANCE

Altitude Above Ground	Zero Wind	10 MPH	20 MPH	30 MPH	30 MPH	20 MPH	10 MPH
		Head- wind	Head- wind	Head- wind	Tail- wind	Tail- wind	Tail- wind
1000	1 3/4	1 1/2	1 1/4	1 1/4	1 3/4	1 1/2	1 1/4
2000	3 1/2	3 1/4	3	2 1/2	4 1/4	4	3 1/2
3000	5 1/2	5	4 1/2	4	6 3/4	6 1/4	5 1/2
4000	7 1/2	6 3/4	6	5 1/2	9 1/4	8 1/2	7 1/2
5000	9 1/4	8 1/2	7 3/4	6 3/4	11 3/4	11	9 3/4
6000	11 1/4	10 1/4	9 1/4	8 1/4	14 1/4	13 1/4	11 3/4
7000	13 1/4	12	10 3/4	9 3/4	16 3/4	15 1/2	13 3/4
8000	15	13 3/4	12 1/2	11	19 1/4	18	16
Glide Ratio	10.12	9.24	8.36	7.48	13.20	12.32	11.00

MANEUVERS

Only the following maneuvers are approved for your BEECHCRAFT when operating in the utility category at full gross weight.

<i>MANEUVER</i>	<i>RECOMMENDED ENTRY SPEED</i>
Chandelle.....	147 mph TIAS
Steep Turns.....	147 mph TIAS
Lazy Eight.....	147 mph TIAS
Stalls (except whip stall).....	Slow Deceleration
Maximum approved entry speeds.....	147 mph TIAS

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.

AIRCRAFT EMPTY WEIGHT AND BALANCE

MODEL _____

SERIAL NO. _____

REGIST. NO. _____

COMPUTED BY _____

CHECKED BY _____

DATE _____

APPLICABLE FORM NO'S.
USEFUL LOAD WEIGHTS & MOMENTS _____

CG LIMIT WEIGHT LIMITS _____

DIMENSIONS FOR DETERMINING AXES OF REACTIONS:

B = _____ The distance from the jig point to the centerline of the main reactions. Obtain by measurement. (The jig point is usually identified in the "Datum" definition on the applicable FAA aircraft Specification or Type Certificate Data Sheet.)

I = _____ The distance from the reference datum to the jig point of the Airplane from which a plumb bob can be dropped to the ground. Obtain from the applicable FAA aircraft Specification or Type Certificate Data Sheet.

D = _____ The wheel base (or the distance between fore and aft reactions). Obtain by measurement.

E = _____ The distance from the Reference Datum to the centerline of the main reactions. $E = I + B$ (with jig point FWD of $\frac{1}{4}$ of main reactions). $E = I - B$ (with jig point AFT of $\frac{1}{4}$ of main reactions). Check Dimension with above diagram.

F = _____ The distance from the reference datum to the centerline of the nose or tail reaction. $F = E + D$ (for nose reaction weighing). $F = E - D$ (for tail reaction weighing). Check Dimension with above diagram.

WEIGHTS ARE TO BE RECORDED IN POUNDS AND TENTHS OF A POUND. REASUREMENTS ARE TO BE RECORDED IN INCHES AND TENTHS OF AN INCH. MOMENTS ARE TO BE RECORDED IN WHOLE INCH POUNDS.

ITEMS (Main, Jig Point, etc.)	SCALE WEIGHT	TAW	NET WEIGHT	MOM	MOMENT
LEFT MAIN					
RIGHT MAIN					
NO-TOTAL (BOTH MAIN)				X	=
Nose or Tail				X	=
TOTAL (AS REQUIRED)					

IF USEFUL LOAD ITEMS ARE IN AIRPLANE AS WEIGHED, THEY SHOULD BE SUBTRACTED IN SPACE BELOW.
IF ALL EMPTY WEIGHT ITEMS ARE NOT IN AIRPLANE AS WEIGHED THEY SHOULD BE ADDED IN SPACE BELOW.

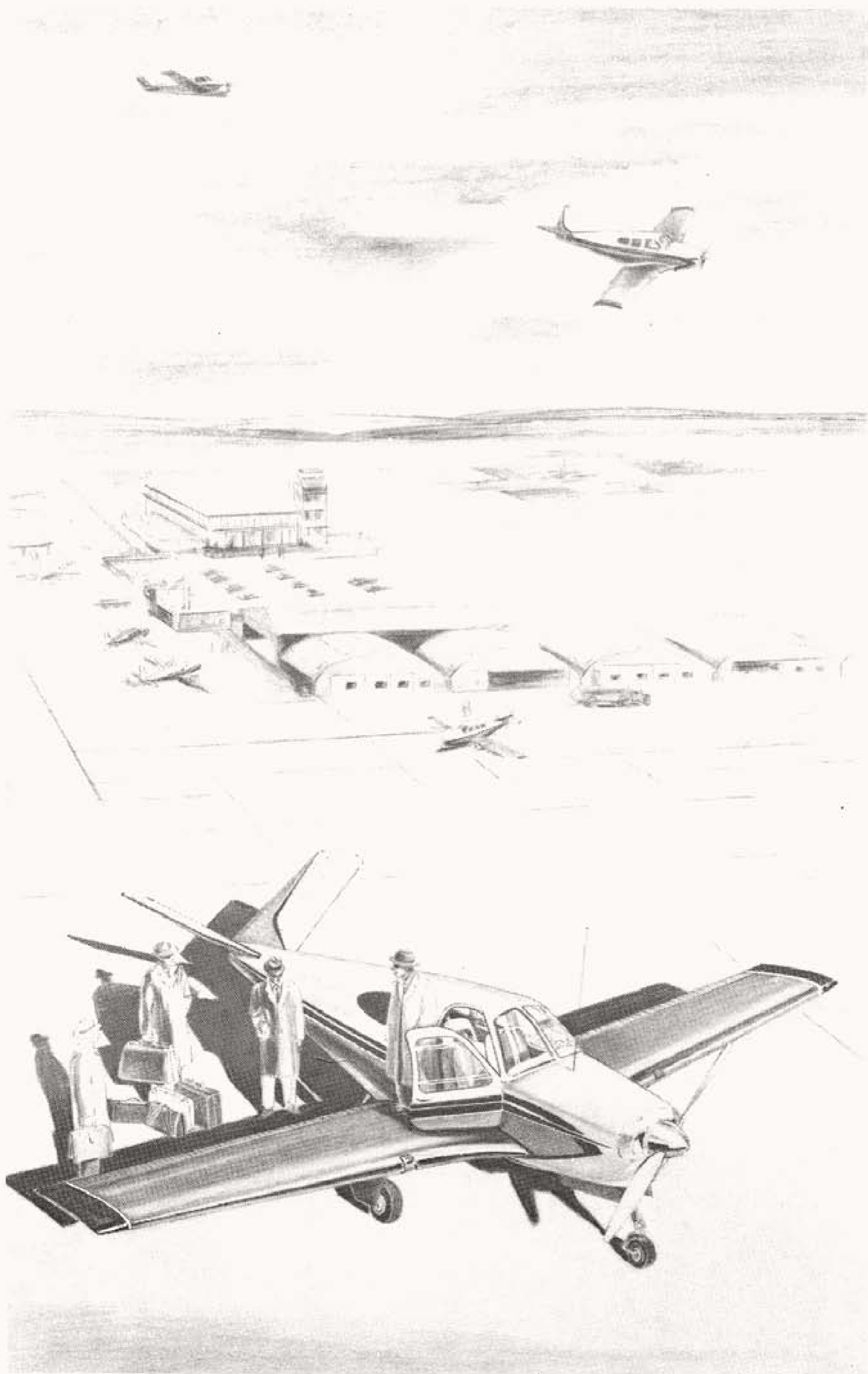
SPECIMEN
OF
SECTION IV,
CAA-APPROVED
AIRPLANE FLIGHT MANUAL

CORRECTED EMPTY WEIGHT (USE THE SPACE)

Gross Weight	Minimum Moment 100	Maximum Moment 100
2700	2144	2303
2710	2155	2311
2720	2166	2319
2730	2177	2326
2740	2188	2334
2750	2199	2342
2760	2210	2350
2770	2221	2358
2780	2232	2366
2790	2243	2374
2800	2254	2381
2810	2265	2389
2820	2276	2397
2830	2287	2405
2840	2298	2413
2850	2309	2421
2860	2320	2428
2870	2332	2436
2880	2343	2444
2890	2354	2452
2900	2365	2460
2910	2377	2468
2920	2388	2475
2930	2399	2483
2940	2411	2491
2950	2422	2499

WEIGHT CONDITION	FORWARD CG LIMIT	AFT CG LIMIT
2950 lb. (take-off or landing)	82.1	84.7
2525 lb.	77.5	85.7
2475 lb. or less	77.0	85.7

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SECTION IV

Flying Your Beechcraft

Information in this section of the handbook will pertain mostly to procedural suggestions, which are intended merely to assist you in developing a good flying technique for your BEEHCRAFT; they constitute the manner in which a good pilot would fly on an average mission under average conditions. As you become familiar with your own airplane, and the individual circumstances under which you fly it, you may find that variations in these techniques will better suit your requirements or personal preferences; remember, though, that operating "in the green" at all times is the best way to realize the most flying for your money.

Safety always has been a paramount consideration in designing and building BEEHCRAFT airplanes, and operated within its marked limits, it has ample margins of safety, in addition to the unique features designed specifically for your airplane. However, the final responsibility for safe flight falls squarely upon the shoulders of the pilot, and this responsibility is recognized by the Federal Aviation Agency; operation of an airplane in excess of its marked limits constitutes a violation of Civil Air Regulations and therefore is illegal, as well as dangerous. *Fly your BEEHCRAFT always so that your passengers will get a comfortable ride; generally, discomfort will appear well in advance of danger.*

Your BEEHCRAFT has been designed to provide the maximum in swift, economical, comfortable transportation. It is equally at home when called on as a business conveyance as when used avocationally for pleasure. It behooves the pilot in either situation, however, to be professional in his approach to flying. In this light, it is to be recognized that the "professional man," be he doctor, lawyer, engineer or dentist, must keep abreast of current developments in his field. So too, must the professional aviator keep abreast of developments within his sphere. It will be to the advantage of, if not essential to, the pilot to be aware of the rapid advances in aviation today. This professional awareness can be achieved by continued contact with the many aviation periodicals and publications.

In addition to the information below, operational check lists are grouped in Section II, Performance Specifications and Limitations in Section III and Operational Data in the form of performance graphs in Section VI. This data has been placed in separate sections for quick convenient reference purposes, since after becoming familiar with the general type of information here in Section IV and with your new BEECHCRAFT, your information needs will be confined to actual detail checks and operational information. All statistics were established by flight tests and engineering calculations and should be carefully and thoroughly studied in order to familiarize yourself with all phases of operation.

BEFORE YOU TAKE OFF

A good flying technique begins with a careful ground or pre-flight inspection, before you enter the airplane. Refer to Section II. A planned routine of starting, warm-up and taxiing checks will assure you that your airplane is operating properly while there still is an opportunity to correct any trouble which may appear. If well-organized, these checks may be made quickly, and shortly will become matters of habit; the appearance, sound and even the smell of things about your airplane will become familiar to you, and the unfamiliar will alert you that something is at least not as it has been.

Preflight Inspection

Your external inspection should start as you approach the airplane. In addition to the check list in Section II, check the general appearance: wings level, control surfaces normally positioned, no external signs of damage such as dents or scratches, no access doors open or their fasteners loose. Glance under the airplane, to check for dripping oil and dye stains from fuel leaks.

As you enter the airplane, check the cabin for loose articles which might become troublesome if you encountered turbulence. Adjust the seat, rudder pedals and control column to your own preference, then ■ slip the safety belt on and adjust it for correct fit.

Starting the Engine

Whenever possible, you should have your airplane headed into the wind when the engine is started, although it is mandatory to do so only when the wind velocity is high or gusty.

Watch the oil pressure gage as the engine starts. It should register at least 10 pounds pressure in the first 30 seconds; if it does not, stop the engine and investigate.

In very hot weather, if there is an indication of vapor in the fuel system (fluctuating fuel flow) hold the auxiliary pump switch in the "ON" position momentarily, until the system is purged.

Warm-Up

Set the throttle for proper warm-up rpm and warm the engine until the oil temperature gage moves off the peg, and the engine will accelerate without hesitation. The cowl flaps should be open. During the time that is required to bring the oil temperature into the operating range, monitor the cylinder head temperature. When the oil temperature enters the green, increase engine rpm, check magnetos and cycle propeller to flush oil into the propeller system and the engine front main bearing.

Taxiing

NEVER TAXI WITH A FLAT SHOCK STRUT!

Make sure the parking brake is released before applying power to taxi. Normally, you can turn as much as necessary by applying pressure to the rudder pedal in the direction you wish to turn, steering entirely with the nose wheel. For shorter turns, use some brake on the inside wheel; the airplane will turn in an inside wheel radius as short as two feet without sliding the nose wheel tire. Short turns, however, should be made slowly since they apply heavy side loads on the nose wheel strut.

In taxiing, bear in mind that the weight of the airplane is behind the nose wheel and pushes it; when the nose wheel strikes an obstruction or hole, almost the entire weight of the airplane is brought to bear on it. While taxiing over a rough surface, use minimum power, permitting the airplane to coast over obstructions, and use a minimum of brake pressure. Holding the control column back will minimize the loads on the nose wheel.

TAKE-OFF

As specifically pointed out in the "Before Take-Off" check list, it is the pilot's responsibility to determine that all doors and windows are locked, before he commences his take-off run. If the cabin door

is not locked, it is possible for it to come unlatched in flight. Should the door come open, the rushing air will cause a high noise level and since it occurs suddenly, the sound of the wind may be startling to those in the cabin; however, the flight characteristics of the airplane are not affected by an open door.

Usually an unlocked door will open during or just after take-off. If this happens the pilot or passengers should not become alarmed, just forget the door and return to the field in a normal manner. The door will trail in a position 3 to 4 inches open and will not buffet.

Before take-off, particularly if wind velocity is below 15 kts, assure that proper separation exists between you and preceding jet or multi-engine aircraft. Extreme turbulence exists in their wakes.

Before starting your take-off roll, make the checks, which are listed in Section II. This will be your last opportunity to check the airplane before you are airborne, and these checks should be performed carefully and thoroughly.

Prior to take-off, set in the field elevation on your altimeter and note the pressure reading in inches of mercury, displayed in the small window on the altimeter face. Compare this reading with the field altimeter setting as given to you by the controlling activity. If your Barometric Pressure setting does not coincide with the setting given to you, make a note of the difference and apply it as a standard deviation to all new altimeter settings given to you in flight.

Thus, if the field altimeter setting is 29.92 in. Hg. and the reading of your pressure setting is 29.90, when you set the field elevation on your altimeter, you have a $-.02$ correction factor. In terms of altitude, this $-.02$ correction means approximately 25 feet. Should you neglect to apply this correction to new altimeter settings received in flight, you will have an altimeter indication that is 25 feet higher than you actually are. Consider the importance of these 25 feet when approaching an obstacle, where weather restricts visibility or at night on landing final when depth perception is inhibited.

When you are ready to start the take-off run, release the brakes and as the airplane accelerates, open the throttle smoothly. For the smoothest take-offs, use just enough back pressure to bring the wings to a slightly positive angle of attack as you approach lift-off speed. Avoid using too much back pressure since, if the airplane is heavily loaded,

especially with considerable weight in the rear seat and baggage compartment, you may raise the nose too high and cause the angle of attack to become so great that, although you attain considerable airspeed the wing will remain stalled and the airplane will not leave the ground. If you find a loading with the center of gravity near the aft limit unavoidable, a few degrees of nose down trim on the take-off may assist you in breaking ground smoothly. As soon as you have established a stabilized climb, retract the landing gear.

CLIMB

As soon as the landing gear is retracted and you are in the clear, reduce power to establish your cruising climb speed. Set the elevator trim tab to relieve pressure on the column and adjust the cowl flaps to maintain cylinder head temperatures within limits. The recommended climb speed is higher than the best rate-of-climb speed, but will give you a good ground speed while climbing, with comfortable safety margins; unless the terrain obliges you to do otherwise or in the event a good tail wind is available at your cruising altitude, there is no good reason for not putting some distance behind you while climbing.

During climb, be aware of the maximum manifold pressure and in cruise observe the power configurations shown on the horsepower setting chart to avoid excessive cylinder pressures. To increase power, set rpm before throttle; when decreasing power, retard throttle, then rpm.

CLIMB POWER MANAGEMENT

With the fuel injection system, fuel flow for a given horsepower remains constant, no matter what combination of rpm and manifold pressure is used to obtain that horsepower. Thus, in a climb the simplest method of power management is constant-power; i.e., setting the propeller, throttle and mixture controls for the desired rpm and fuel flow in your first power reduction after take-off, then opening the throttle as you ascend, to maintain the correct manifold pressure. It will be necessary, however, to lean in order to maintain the proper mixture for the percent of horsepower being used. You may, of course, set the throttle and rpm and reduce fuel flow as your manifold pressure drops off; however, this method is less accurate. Using a constant-horsepower procedure, you can estimate your fuel consumption quite accurately.

In Section V "Unusual Operating Conditions" you will find a discussion of short-field take-offs and obstacle take-offs, with graphs in Section VI showing the best rate-of-climb and angle-of-climb, and the speeds at which each type of performance is achieved.

CRUISE

Flight planning, the secret of obtaining maximum use from your BONANZA, depends on a careful, detailed and objective analysis of each trip in advance. The load, route, weather, starting time, arrival time, and the capabilities of the airplane are but a few of the factors you must consider; the production and execution of a good flight plan which will successfully accomplish your mission are achievements of which any pilot may be proud.

When you have reached your desired altitude, set your power and trim for the airspeed you have selected. There are many factors to be considered in deciding how fast is fast enough: weight, altitude, the length of the flight, weather conditions, and of course, the time you have available to reach your destination. Generally speaking, lower cruising airspeeds will be more comfortable, and due to the lower power settings required will consume less fuel. On the other hand, you invested in a BEECHCRAFT to give you a means of rapid transportation and under normally good conditions, there is no reason why you should not cruise at or near the maximum allowable cruising speed, when the time saved will justify the additional fuel.

In cruising flight, you will find a constant-horsepower procedure has the same advantages that it does in a climb; you can predict your speed and fuel consumption and make accurate estimates of your range. Your selected power configuration will, of course, become a factor of the many aerodynamic variables. The graphs presented in Section VI will aid in solving your problem in aerodynamics, by giving you the required, no wind performance data for translation into your present situation.

You will find your BONANZA handles nicely in cruising flight, responding instantly to the controls. With the elevator tab and aileron trimmer, it can be trimmed hands-off, and even in rough air you can hold it on course and make good turns with the ailerons alone. Careful trimming and closing the cowl flaps completely, or as far as possible without overheating the engine, will improve over-all performance.

Your airplane's fuel system is arranged so that there is very little unusable fuel in the tanks in level flight attitude and there is no reason for not running on a given fuel cell until it first gives indication of running dry before switching. However, if the engine is allowed to stop firing, the auxiliary fuel pump should be turned on and the throttle retarded to prevent overspeeding the engine as it restarts. When the engine is again running smoothly the auxiliary fuel pump should be turned off.

INSTRUMENT FLIGHT

Equipping an airplane for instrument flight is a matter of installation, and the installation is only complete when an instrument rated pilot with recent experience takes the controls. No matter what instrumentation has been installed, the aircraft must be restricted to VFR if the pilot is not current and rated. If you don't meet these requirements, don't "install" yourself in instrument weather.

If you are a VFR pilot and an emergency exists in which you must descend through a layer of clouds, use the following procedure:

1. Contact the nearest FAA facility and get the ceiling in the area to be penetrated.
2. Notify the facility of your intention to penetrate the undercast.
3. When you are still at least 1000 feet above the clouds, slow the aircraft to 100 mph IAS, gear down, straight and level.
4. Adjust throttle and trim to produce a 100 mph, 500 ft/min. rate of descent, on the desired heading, hands off.
5. Use gentle rudder pressure to maintain your heading. Do not touch the wheel or control column until you break out below the clouds.

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 mph IAS*; (2) reducing airspeed; (3) trimming the airplane for a predetermined slow-flight speed; and (4) **WITH THE**

HANDS OFF THE WHEEL, making a turn with the rudders only, to a heading 180 degrees from the heading on which you were flying when you lost visual contact.

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 which will result, and make the necessary corrections and allowances. Lower the gear while you still are in level flight, as a preventive measure against excessive speed build-up, rather than attempting it as a corrective measure once the airplane is in a dive.

NOTE

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

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.

MANEUVERS

You will find that your BEEHCRAFT handles just as nicely in maneuvers as it does in cruising flight. With this in mind, remember that maneuver loads will increase as airspeed increases; and that the same aerodynamic cleanness which gives you efficiency also results in rapid increases in airspeed while you are in a nose-down attitude. You should become familiar with the loads you can impose on the airframe during maneuvers. The load limits are higher on your BEEHCRAFT than on any other airplane in its class. The V/G diagram in Section VI shows the loads which can be imposed on the airframe with the flight controls at different airspeeds, at gross weight. The upward-curving line on the diagram represents the positive loads at which a stall occurs at various airspeeds. Your safe operating zone is quite large, and as long as you confine your maneuvers to the recommended entry speed shown in Section III, or less, you can bring the airplane to a stall without imposing excessive loads. Also in Section III you will find a chart of approved aerobatic maneuvers.

Spins are prohibited. If an inadvertent spin occurs, apply opposite rudder and ease column forward. Avoid abrupt pull-out upon recovery.

The Bonanza demonstrates honest stall characteristics. It is gentle and well behaved throughout the stall. This holds true for all power and flight configurations. As the stall is approached, you receive warning from the stall warning indicator. At approximately 5 mph above the stall, regardless of flight attitude or configuration, the warning signal begins to sound. When the stall is more closely approached, the warning indications become continuous.

Throughout the approach and the stall itself, effective rudder control is maintained and aileron control is good. The empennage will tend to buffet if the wheel is held fully back.

After the stall occurs, there will be a definite break and unmistakable dropping of the nose. The most rapid recovery from a stall will be made if the speed is allowed to pick up 15 to 20 mph and the elevator is used gently.

INDUCTION SYSTEM ICE

One of the chief advantages of fuel injection for an aircraft engine is its freedom from induction system icing. Extensive tests have shown that the only icing problem to be expected is impact ice forming on the air intake and filter, and this problem is managed automatically by two spring-loaded doors in the side of the air intake duct just ahead of the air throttle. If the filter becomes clogged with ice, the doors will be sucked open and the engine will go on running. You will notice only a slight drop in manifold pressure due to the loss of ram effect.

FLIGHT IN TURBULENT AIR

NOTE

Unless you are a rated instrument pilot with recent instrument experience in the type airplane you are flying, stay out of IFR conditions; however, if you are caught in such conditions, lower the landing gear before entering a cloud bank.

When flight through a storm area or extremely rough air cannot be avoided, the problem basically becomes one of choosing the correct airspeed for safe operation under your present weight configuration. If you maintain a high airspeed, structural damage or complete failure may result, yet you must maintain sufficient airspeed for full control. Your safe operating range, between these two danger

zones, varies with the severity of the gusts: the stronger the gusts the narrower your safe operating range.

The airplane loaded weight also has influence on the behavior of your airplane in turbulent air and on your safe operating speeds. No single graph can adequately portray the effects of the gusts or turbulence upon any or all portions of the airplane. Lightly loaded airplanes undergo higher accelerations than heavily loaded ones, producing higher stress on the supports of the fixed weight structures, such as engines. On the other hand, heavily loaded airplanes are subjected to greater positive wing loads but less negative wing loads than lightly loaded airplanes. The extent of these differences depends also on the wing fuel loadings which, of course, cannot be predetermined. Therefore, two graphs appear, one for heavily loaded airplanes and one for lightly loaded airplanes.

The two gust intensities shown are for moderately heavy and severe turbulence. No graph is shown for mild turbulence. The 45-foot-per-second gusts are of the magnitude found near thunderstorms, while the 30-foot-per-second gusts can be encountered in frontal areas or in the vicinity of thunderstorms. Although you may operate near the design cruising speed in ordinary rough air with a reasonable margin of safety, in any turbulence severe enough to cause discomfort to your passengers, you should slow down.

LETTING DOWN

Pilot preference and weather conditions will determine the rate of descent. During the let-down, watch your engine temperatures and regulate the cowl flaps accordingly. Since you will have a combination of relatively high airspeed and reduced power settings, the engine will run cooler than in level flight, and particularly in cold weather temperatures may go below a safe minimum for full power. During your descent, keep the mixture leaned so the best power setting will be ready in case you must go around. *Operating conditions will determine the proper mixture control position for best power; however, use full rich prior to entering the traffic pattern. Refer to Section V for Balked Landing procedure.*

During the final portion of the let-down and prior to traffic pattern entry, perform the check items for "Before Landing" in Section II.

LANDING

Landing the Bonanza is a pleasure. Its excellent visibility and positive control combine with tricycle gear stability to remove all uncertainty and to provide utmost safety. In the normal full flap landing, you will note the need for (and availability of) elevator trim, and increasing “back stick in the groove” to hold the airplane off the runway. Touch down on the main gear and then gently place the nose wheel on the runway. After touch-down, raise the flaps and brake as necessary. In strong or gusty wind conditions, no-flap landings are preferable, made at a somewhat higher airspeed. Here, a power on approach may be advantageous.

SHUT DOWN

When you have parked, check the propeller in low pitch (high rpm) and pull out the mixture control to the idle cut-off position. When the blades have stopped turning, turn off all the switches and if the airplane is to remain parked for any length of time, turn off the fuel selector valve. If the brakes are cool and the weather moderate, set the parking brake. When the aircraft is to be left unhangared and unattended for any length of time, you should install the control lock and secure the cabin door. Before you leave the airplane, make sure that you have performed the shut down checks listed in Section II.

COLD WEATHER HINTS

In addition to your normal exterior inspection, remove ice, snow, and frost from the wings, tail, control surfaces and hinges, propeller, windshield, pitot tube, fuel vents, and engine breather line. Drain any water condensation from fuel sump drains to prevent them from being clogged by ice. Check the flight controls for complete freedom of movement, and complete your normal preflight procedures. *Always remove all snow, ice, or hoarfrost* from the wings before taking off. If you have no way of removing the deposit—leave the airplane on the ground! It will not blow off. These formations change the contour of the wing, destroying lift and increasing drag.

Cold engine starts normally require a more retarded throttle setting than usual. Also, moisture forms quickly on the spark plug electrodes during cold weather starts, so if you have made three or four unsuccessful starting attempts, have at least one plug removed from each cylinder. Heat the plugs to dry the electrodes, replace them, and attempt to restart the engine immediately.

Do not taxi through water or slush if it can be avoided. Water or slush splashed on the wing and tail surfaces will freeze, increasing weight and drag and perhaps limiting control surface movement.

Use the brakes sparingly; taxi slowly for best control and for aircraft protection from flying water, slush, or ice.

Run up the engine prior to take-off, then complete your normal take-off check with special emphasis on the following:

1. Pitot heat—on (if installed)
2. Close the two front seat hot air outlets, to permit a greater volume of air to pass through the defroster outlets.
3. Run propeller through its pitch range several times to flush cold oil from the actuating cylinder.

Should propeller icing be encountered during flight, and an accumulation is resulting in rough engine operation, it can sometimes be eliminated by rapidly increasing and decreasing rpm.

During longer flights in cold weather, propeller operation will be more smooth and the propeller will respond more readily and accurately to changes in power or load if it is exercised occasionally. Once power settings are established and the airplane trimmed, the movement of the pitch change mechanism to maintain constant rpm is so slight that congealed oil in the propeller cylinder becomes a possibility. Exercising the propeller flushes the cold oil from the cylinder. When exercising the propeller, reduce the manifold pressure approximately two inches below the selected cruise setting, then smoothly cycle the propeller through a range of approximately 200 rpm above and 200 rpm below the selected cruise setting. After completing the

exercise, return to your original power setting. The best indication of the frequency the propeller should be exercised is the rate of rpm change. If the rpm changes rapidly, you may extend the interval, if it changes slowly, the exercising frequency should be more often.

Throughout your descent, monitor cylinder head temperature and manifold pressure. Should you experience overcooling, decrease your rate of descent, lower the gear and add power. Remember, however, manifold pressure increases automatically with decreased altitude.

SECTION V

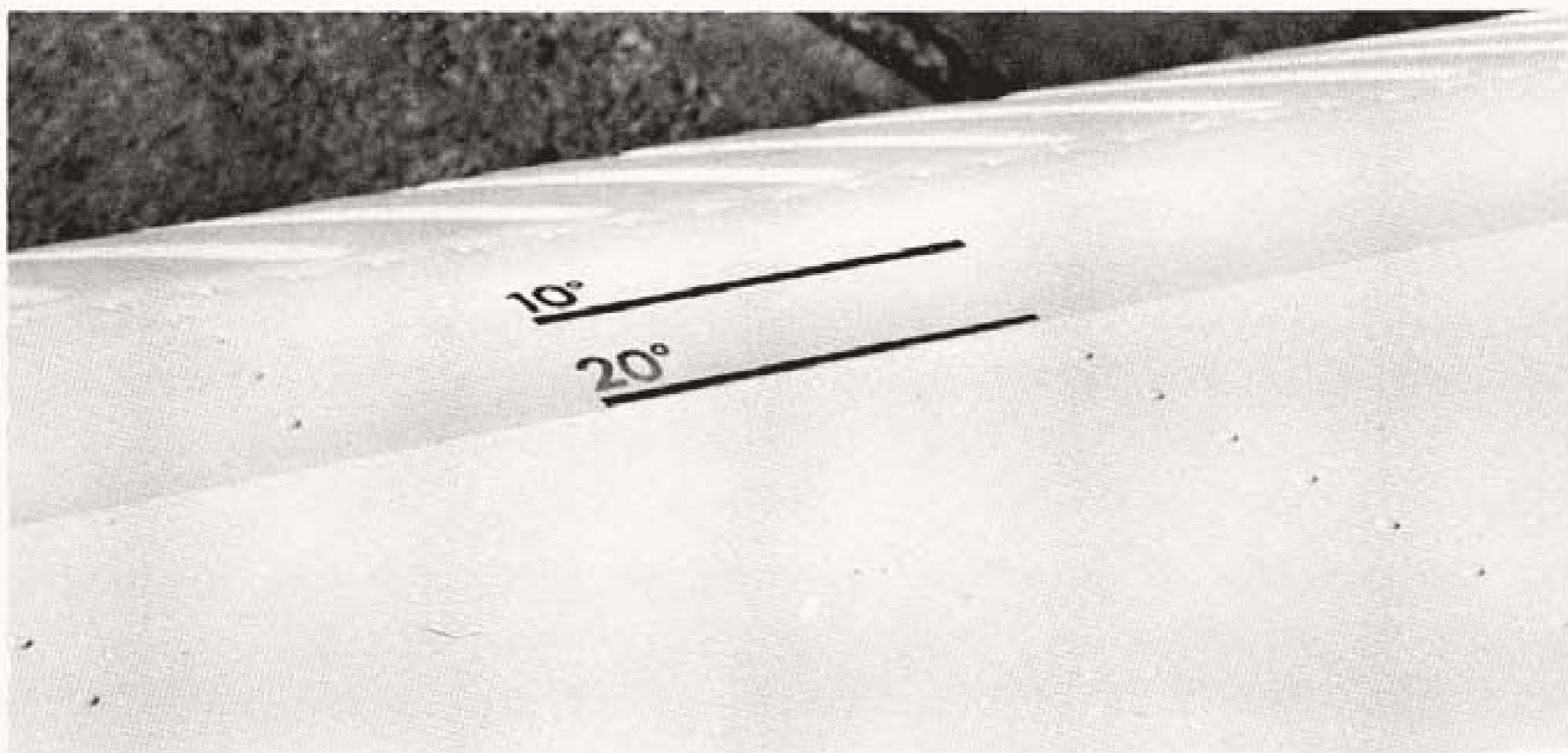
Unusual Operating Conditions

Information in this section of your handbook is presented to enable you to form in advance a definite plan of action for coping with any unusual situation which could reasonably occur in the operation of your airplane. A careful reading of this section will prove invaluable not only in knowing what to do in a particular situation, but also in formulating your own plan of action for any other situation you feel may be encountered.

The performance graphs covering the information in this section can be found in Section VI; performance specifications and limitations in Section III.

SHORT FIELD TAKE-OFF

For a minimum run take-off, use 20 degree flaps. Extension can be judged quite accurately from the pilot's position by lowering the flaps until the 20 degree line on the leading edge of the left flap



lines up with the wing trailing edge. *Never use over 20 degree flaps for take-off.* Keep the cowl flaps open, hold the airplane with the brakes and run the engine up to full power; then release the brakes. During the ground run some right rudder will be required, but do not use brakes. At lift-off speed, smoothly and rapidly apply back pressure on the control wheel to assume a nose-high attitude so that

you break ground as soon as minimum flying airspeed is reached! As soon as you break ground, retract the gear and drop the nose slightly to gain a safe airspeed. Retract flaps only after reaching a safe altitude, and continue with the normal take-off and climb procedure.

OBSTACLE CLEARANCE TAKE-OFF

When you must obtain maximum altitude in minimum horizontal distance, use the best angle of climb speed shown on the graph for your altitude. *As with any airplane, the best angle of climb is achieved only slightly above stalling speed, you should consider this an emergency technique.*

Use the same procedures as for a minimum-run, or short field, take-off to the point of assuming a nose-high attitude. Do not assume the nose-high attitude until reaching minimum flying airspeed. Clear the ground, retract the gear, and as soon as your selected airspeed has been reached, hold it to obtain the maximum angle of climb until the obstacle is cleared. Then accelerate to normal climb speed, retract flaps only after reaching a safe altitude, and continue with the normal take-off and climb procedure.

MAXIMUM ENDURANCE

As an *emergency* measure, if circumstances demand that you either stay aloft as long as possible or travel as far as possible, you may decrease your fuel consumption by leaning the mixture as far as possible. As you lean past best power, airspeed will drop and the engine will roughen slightly. Advance the mixture just enough to stabilize the airspeed. *Bear in mind that in doing so you run the possible risk of reduced engine life or damage to the engine.*

BALKED LANDING

Make the decision to go around as early as possible in the landing approach to provide a safe margin of airspeed and altitude. The go-around procedure is a normal maneuver and does not become an emergency procedure unless it is started too late. Accuracy of judgment and early recognition of the need to go around are important; these are developed by practice. The go-around procedure is as follows:

1. Throttle—take-off power.
2. Landing gear—up when fully airborne.
3. Cowl flaps—open.
4. Mixture—best power; below 3,000 feet, use full rich.

5. Airspeed—best angle of climb speed.
6. Trim—hold forward pressure on the column until you have time to retrim.
7. Flaps—up, after gaining safe altitude.
8. Elevator trim tab—reset as needed.
9. Continue normal climb procedure.

With the application of full power, particularly with considerable trim and a loading near the forward center of gravity limit, the elevator forces may become quite heavy. However, do not attempt to retrim the airplane until you are in the clear.

If circumstances permit you to watch their positioning, bringing the flaps up to 20° as soon as you have applied power will be of some benefit in gaining speed, without sacrifice of lift. Do not attempt to raise the flaps, however, if you are in traffic or have obstacles ahead which must be cleared.

CROSSWIND LANDING

Landing in a crosswind presents no special problem except the elimination of drift correction, at the proper moment, to avoid touching down in a skid. Generally, less flap should be used, since stall and ground handling characteristics in a strong crosswind are less desirable with full flaps. Approach the runway with crab, but eliminate most of the crab on nearing the runway. Replace the crab with an upwind wing-low attitude. Touch down easily onto the low main wheel while flying airspeed remains and allow the airplane to settle smoothly to the runway to preserve directional control. If excessive crab should remain just prior to touchdown, eliminate it as much as possible at the point of touchdown by the use of rudder. If excessive skidding appears imminent, make a coordinated turn to realign with the runway and drop your upwind wing to correct the tendency to drift.

GLIDING RATIO

The gliding distance table in Section III gives the horizontal distance for glide. Maximum glide distance is obtained with the propeller in the low rpm position and maintaining an optimum airspeed as indicated on the gliding distance table. In all cases, $\frac{1}{8}$ mile has been subtracted from no wind and head wind glides to get you to your field with 50 feet altitude, and $\frac{5}{8}$ mile has been subtracted from tail wind glides to allow for a turn into the wind, ending the turn at 50

feet altitude. Whether you choose to land with your wheels up or down depends on the field you are going into and how much time you have to look it over. A wheels-up landing will use up less distance on the ground, and the damage done frequently will be less than that resulting from a collision or by running into a ditch or hole at high speed.

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. Avoid a gear-up landing on soft ground, due to the tendency of sod to roll up into chunks and damage the underside of the fuselage. Use the following procedure:

1. Safety harness—secured.
2. Flaps—as required.
3. During flare out—close throttle, move mixture control to IDLE CUT-OFF, and turn fuel selector valve to the OFF position.
4. Just before touchdown—all switches OFF.
5. Get clear of the airplane as soon as it stops.

ESCAPE

The rear windows may be used for emergency exit by pulling the pin from the opening mechanism and opening the window.

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. The following procedure should be used:



1. Landing gear circuit breaker—OFF.
2. Landing gear switch—down position.
3. Remove the safety boot from the handcrank handle (at the rear of the front seat), move the handle into the cranking position, and turn it counter-clockwise as far as possible.
4. Check mechanical indicator to ascertain that gear is down.

ENGINE FAILURE

Engine failure due to mechanical causes is seldom encountered, however complete failure would probably be due to failure of fuel flow and/or ignition. Failure due to carelessness or improper operating techniques should be guarded against by constantly observing the operating limitations. Land as soon as possible if engine failure is indicated.

Immediately on noting any condition which would point to imminent engine failure, such as loss of power, loss of fuel pressure, rough running engine, etc., slow the airplane down, and if altitude permits, proceed as follows:

1. Switch fuel tanks—check selector visually.
2. Switch on boost pump.
3. Throttle—open about $\frac{1}{2}$ inch beyond present setting.
4. Mixture control—check, full rich.
5. Propeller—full high rpm.
6. Check ignition switch BOTH, battery and generator switches ON.

Should the engine fail completely and if sufficient altitude remains, attempt a restart using the following procedure:

1. Move mixture control to idle cut-off; turn fuel selector valve handle to off position for a few seconds to clear engine. Throttle may be opened until ready to restart.
2. Turn fuel selector valve handle to fullest tank—adjust throttle approximately $\frac{1}{4}$ inch open—move mixture control to full rich.

If the engine still fails to start, shut it down and prepare for a forced landing as follows:

1. Mixture control — IDLE CUT-OFF.
2. Throttle—closed.
3. Ignition switch—OFF.
4. Fuel selector—OFF.
5. As speed drops, lower nose and maintain airspeed for best glide distance. For maximum glide, if possible, propeller should be in high pitch (low rpm).

ENGINE FIRE DURING FLIGHT

In case of fire in the engine compartment while in flight, pull the emergency smoke control, located on the outboard side of the circuit-breaker panel, to seal off all heating and ventilating openings and prevent smoke and fumes entering the cabin. Shut down engine as follows and make a forced landing:

1. Mixture control — IDLE CUT-OFF.
2. Fuel selector valve handle—OFF.
3. Ignition switch—OFF.
4. Battery and generator switches —OFF. If electrical system is not functional, gear may be lowered manually.
5. Throttle—closed.
6. Do not attempt to restart engine.

TERRAIN FLYING

Besides being aware of lower take-off, climb, and landing performance at higher field elevations, you should prepare yourself for unexpected weather conditions and other phenomena which prevail over mountainous, high altitude country.

Standing waves, which occur under the right combination of meteorological and terrain conditions, present severe updrafts, downdrafts, and turbulence. The intensity of the turbulence is variable and may be in the order of that experienced in thunderstorms.

Air flowing over ridges and down slopes produces areas of reduced atmospheric pressure. Since your altimeter and rate of climb indicator are barometric instruments—and the main thing that interests a barometric instrument is pressure—your altimeter will show a reading higher than you actually are, and your rate of climb indicator may be showing a climb when actually you may be losing altitude. Also, the closer you are to a ridge, the greater the error is.

Another factor to consider is heavy rain, which causes a film of water on the windshield and changes its refractive characteristics. Under these conditions, a distinct ridge may appear to be lower than it actually is.

Under adverse weather conditions, allow considerably more altitude clearance than normal, when flying over rugged terrain. For further information on this subject, it is suggested that you read "*Terrain Flying*," obtainable from the Superintendent of Documents, Washington, D.C.

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.

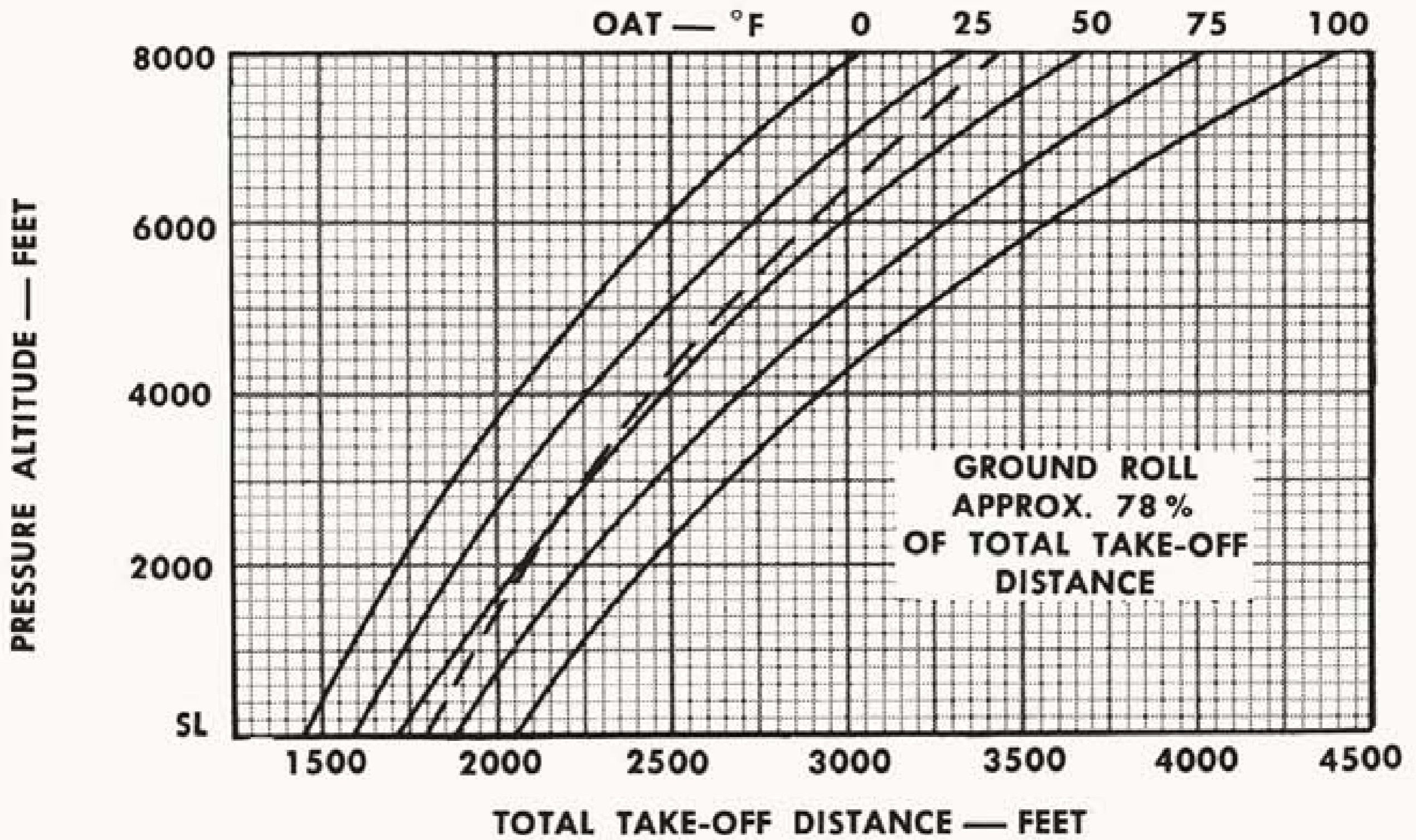
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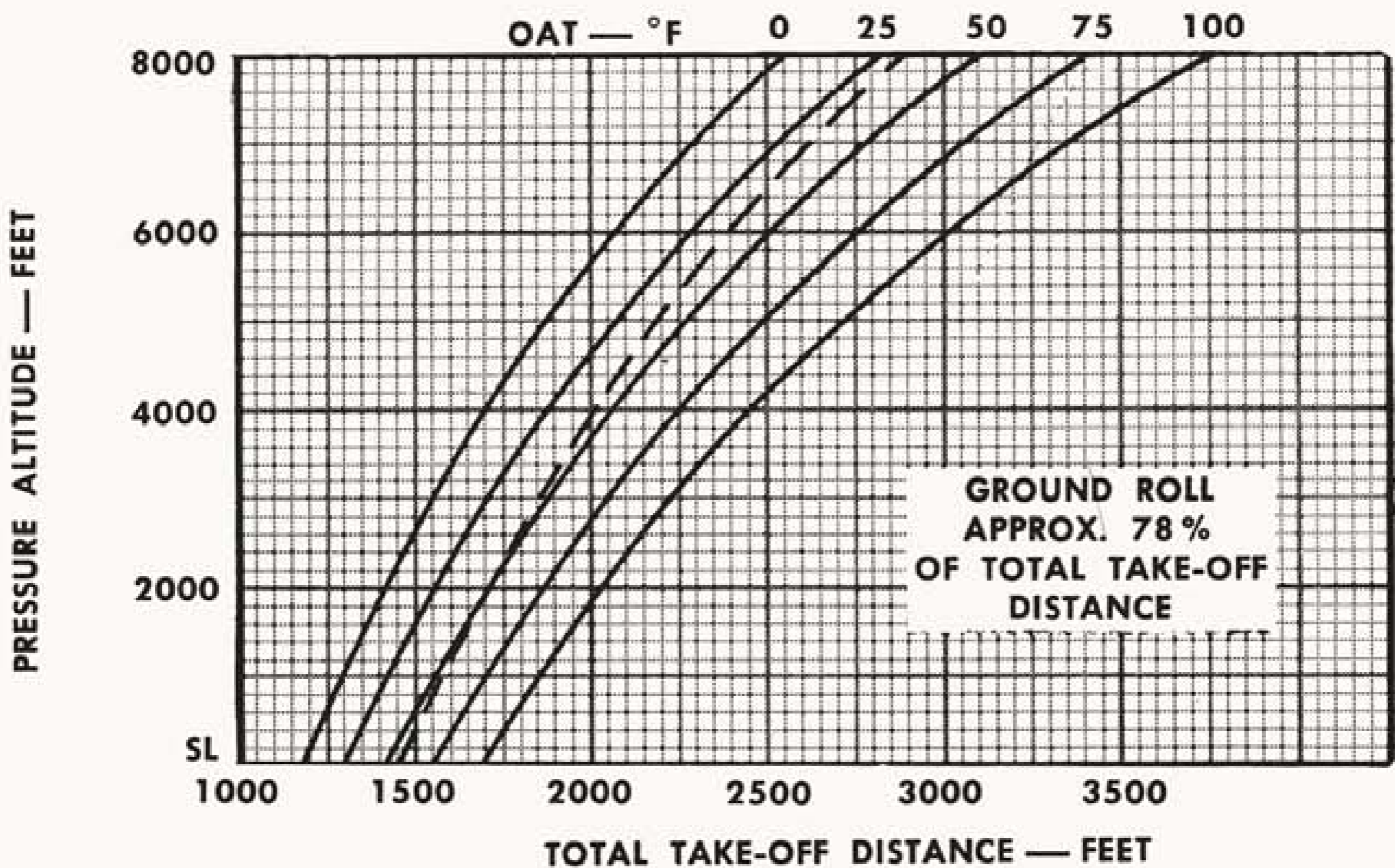
NORMAL TAKE-OFF

DISTANCE OVER 50 FEET
 GROSS WEIGHT 3125 POUNDS
 PAVED, DRY, LEVEL RUNWAY
 FLAPS UP
 TAKE-OFF POWER
 — — STD. TEMP.

NO WIND

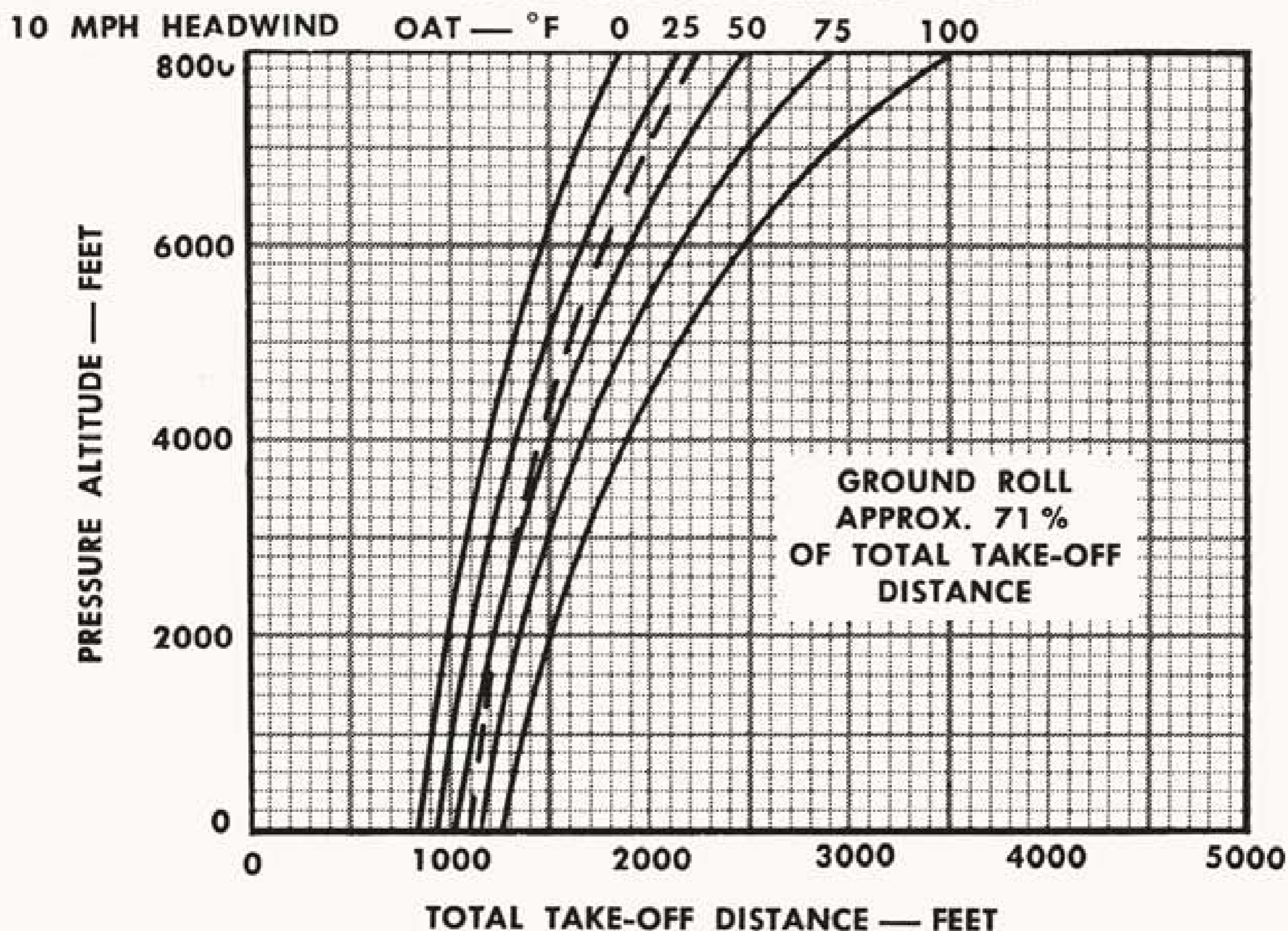
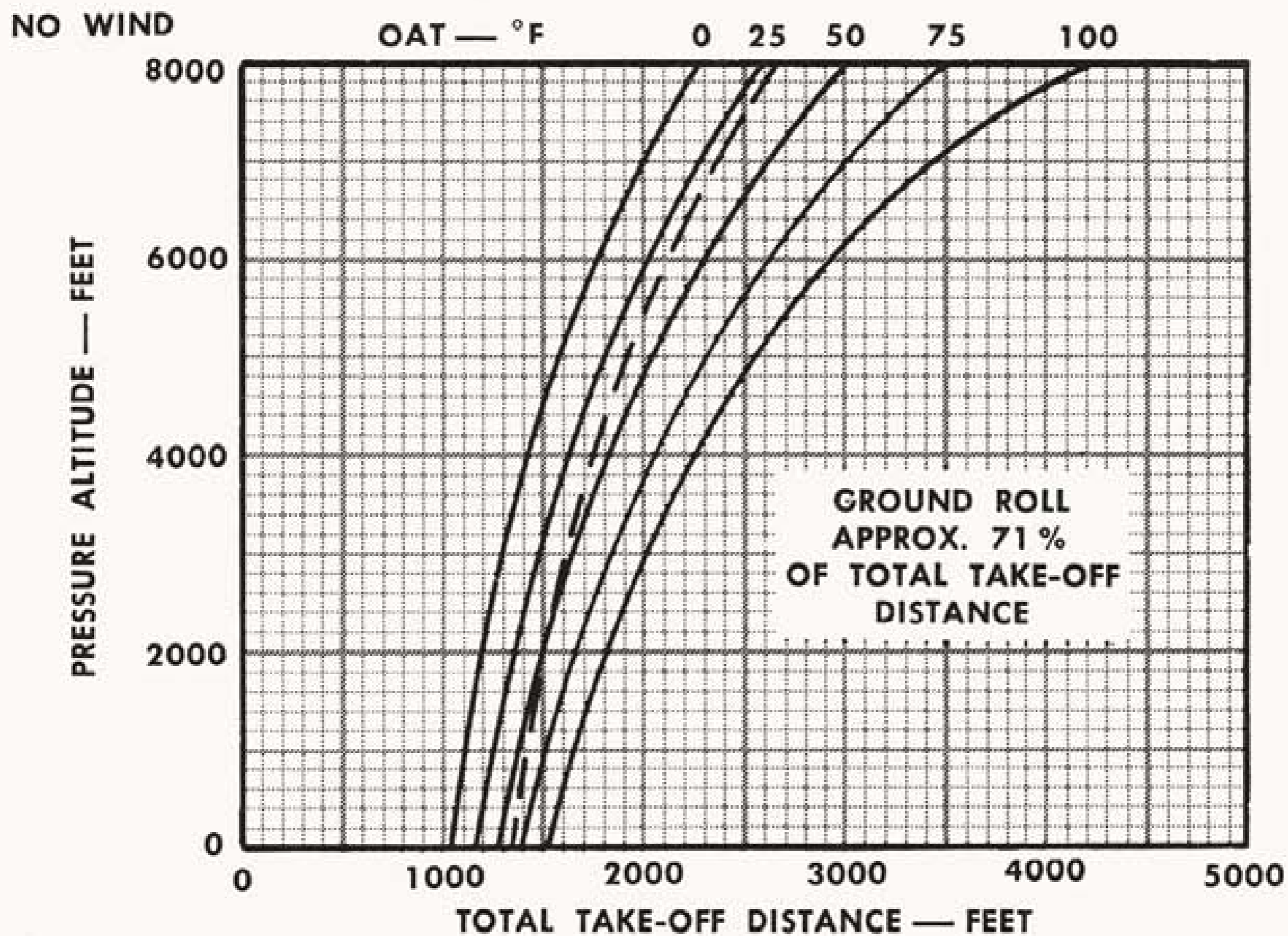


10 MPH HEADWIND

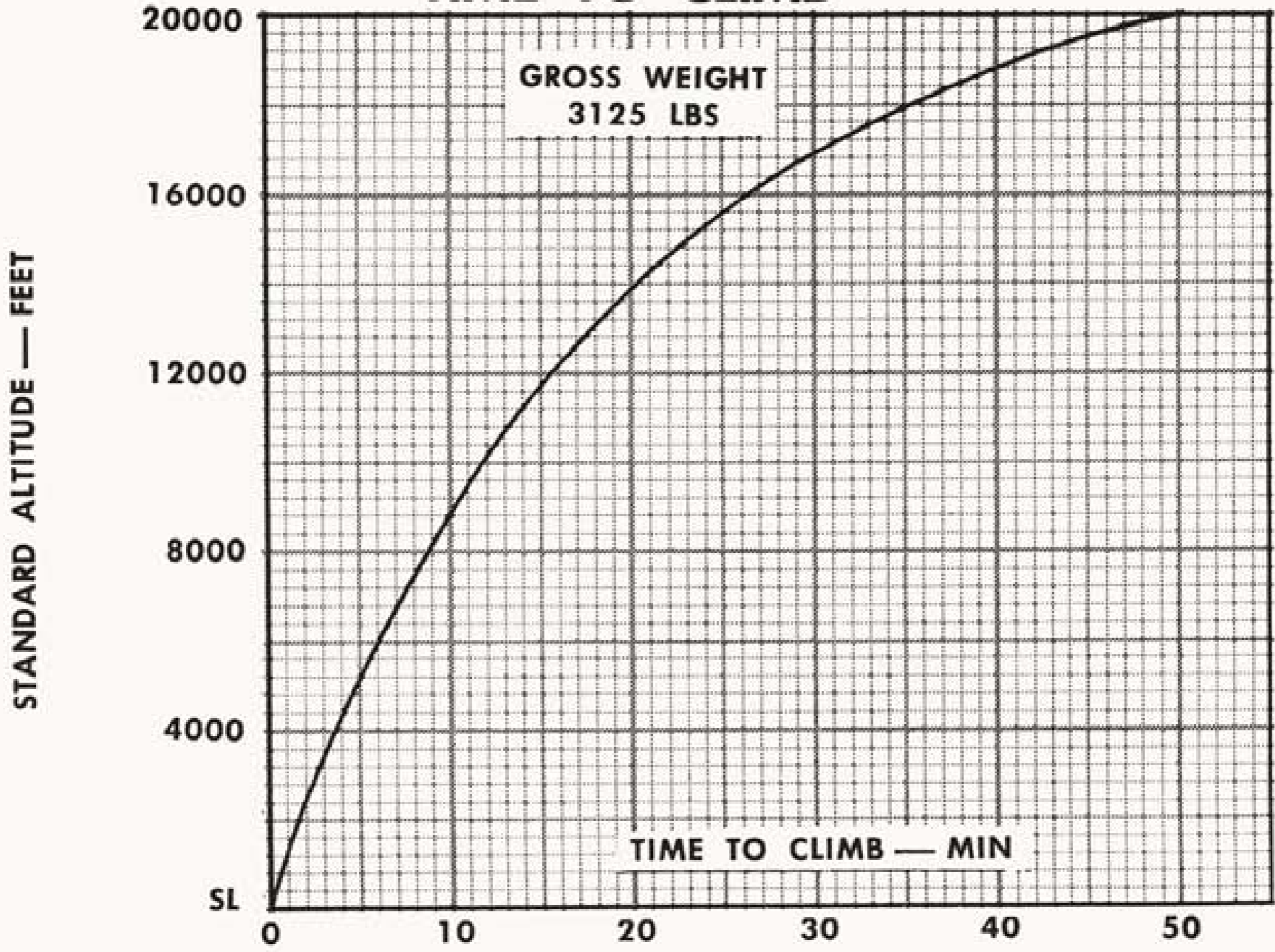


SHORT FIELD TAKE-OFF

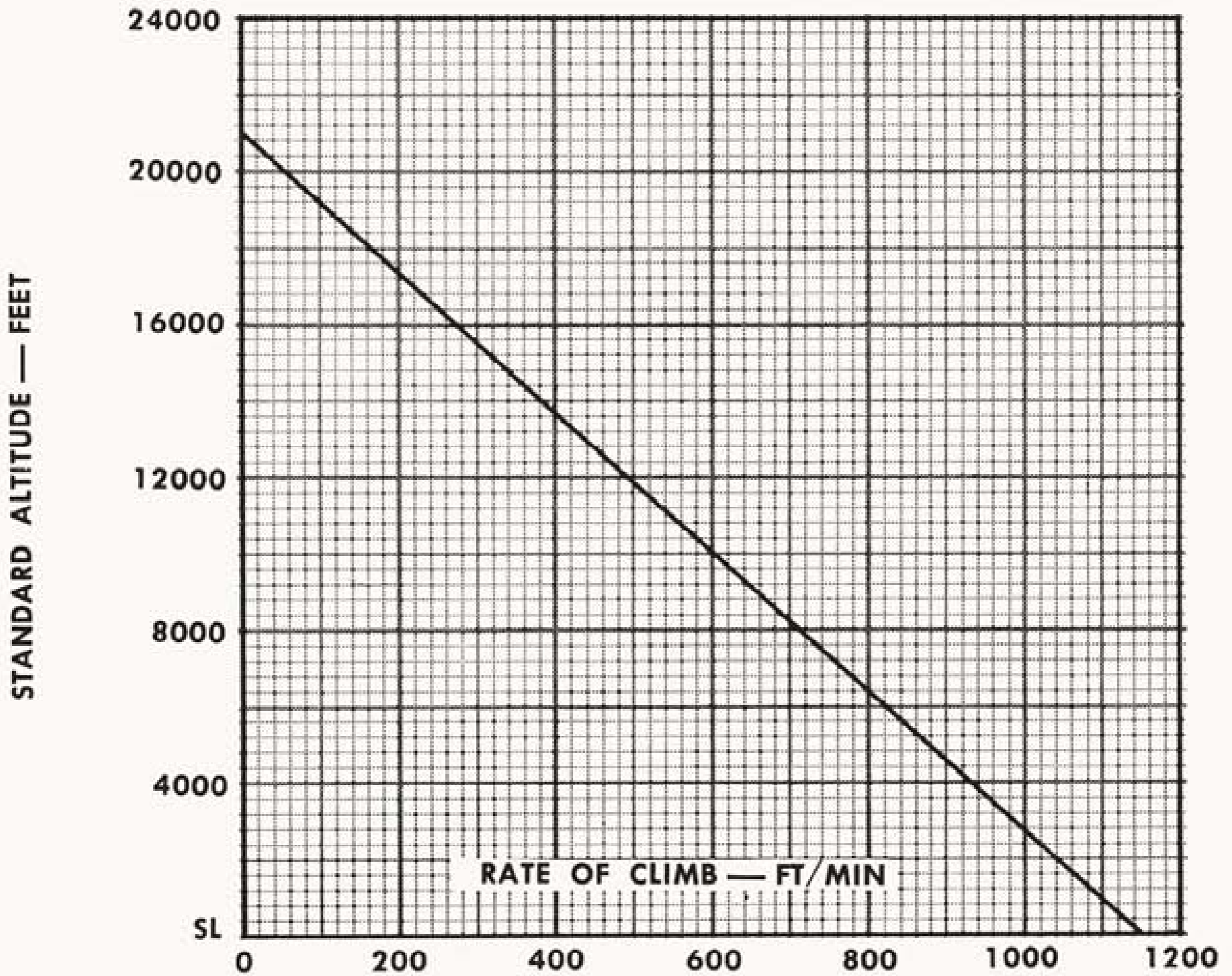
TAKE-OFF DISTANCE OVER 50 FEET
GROSS WEIGHT 3125 POUNDS
TAKE-OFF POWER
TAKE-OFF SPEED = 65 MPH (IAS)
FLAPS 20 DEGREES
PAVED, DRY, LEVEL RUNWAY
— — STD. TEMP.



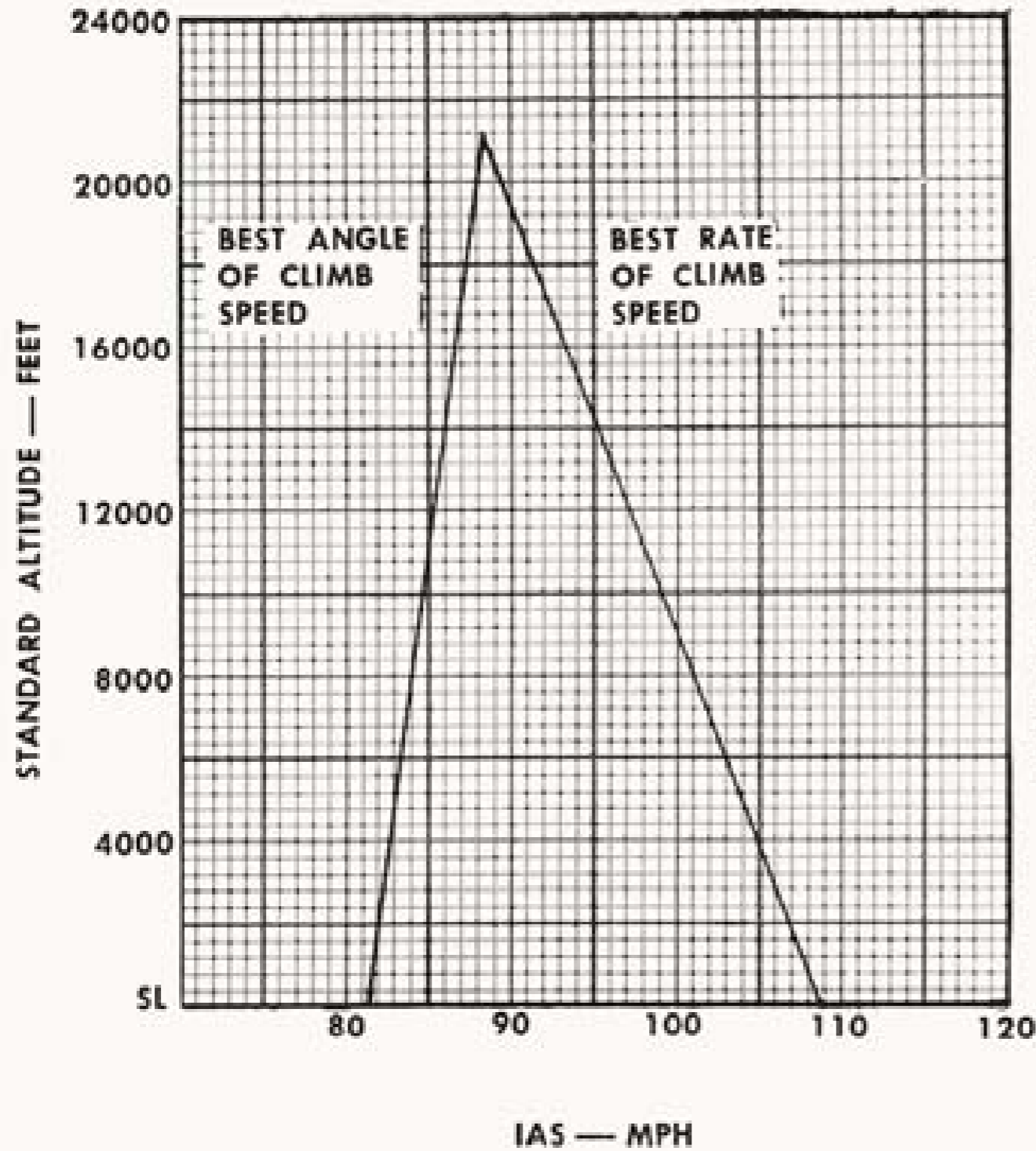
TIME TO CLIMB



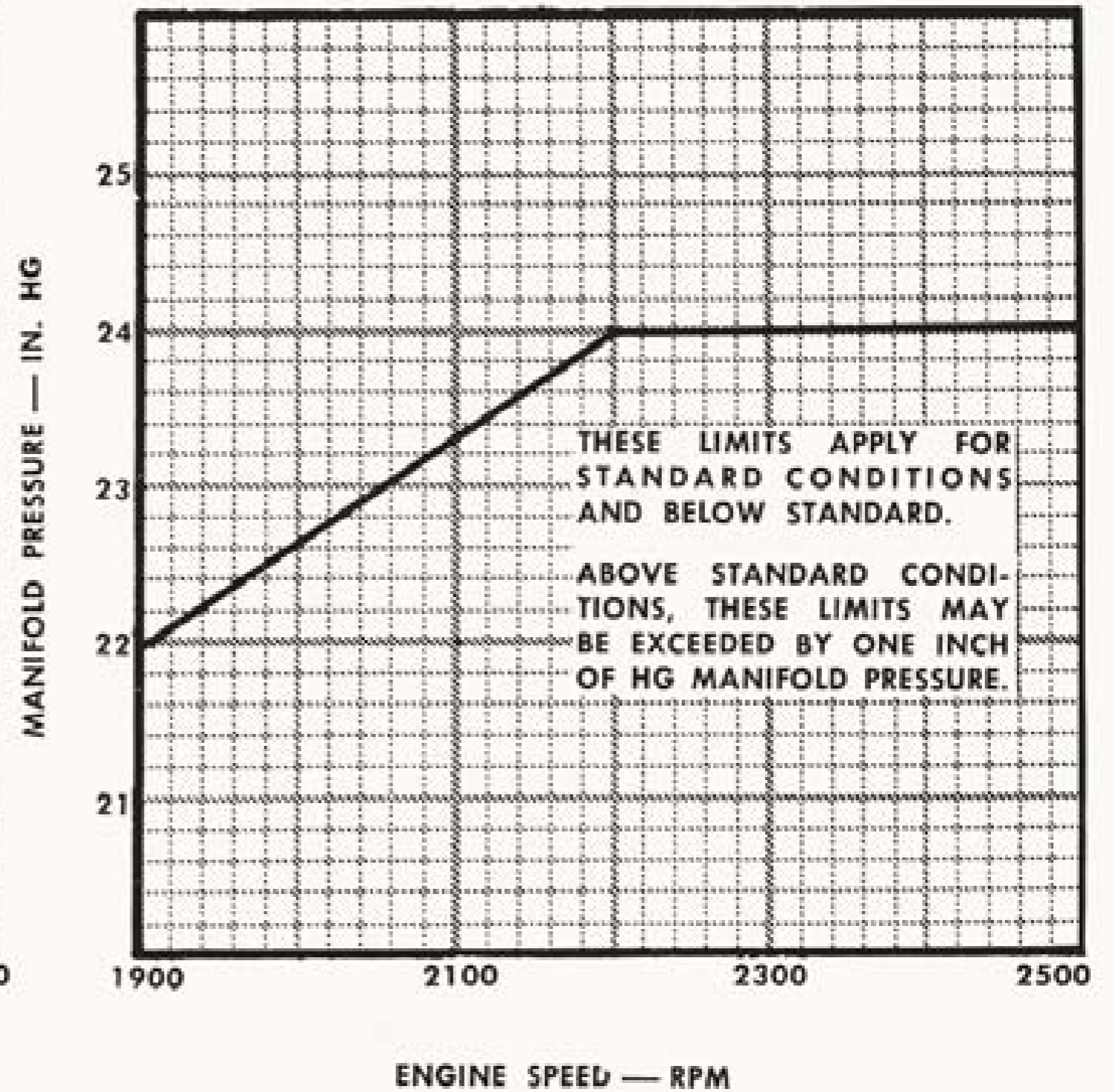
NORMAL CLIMB



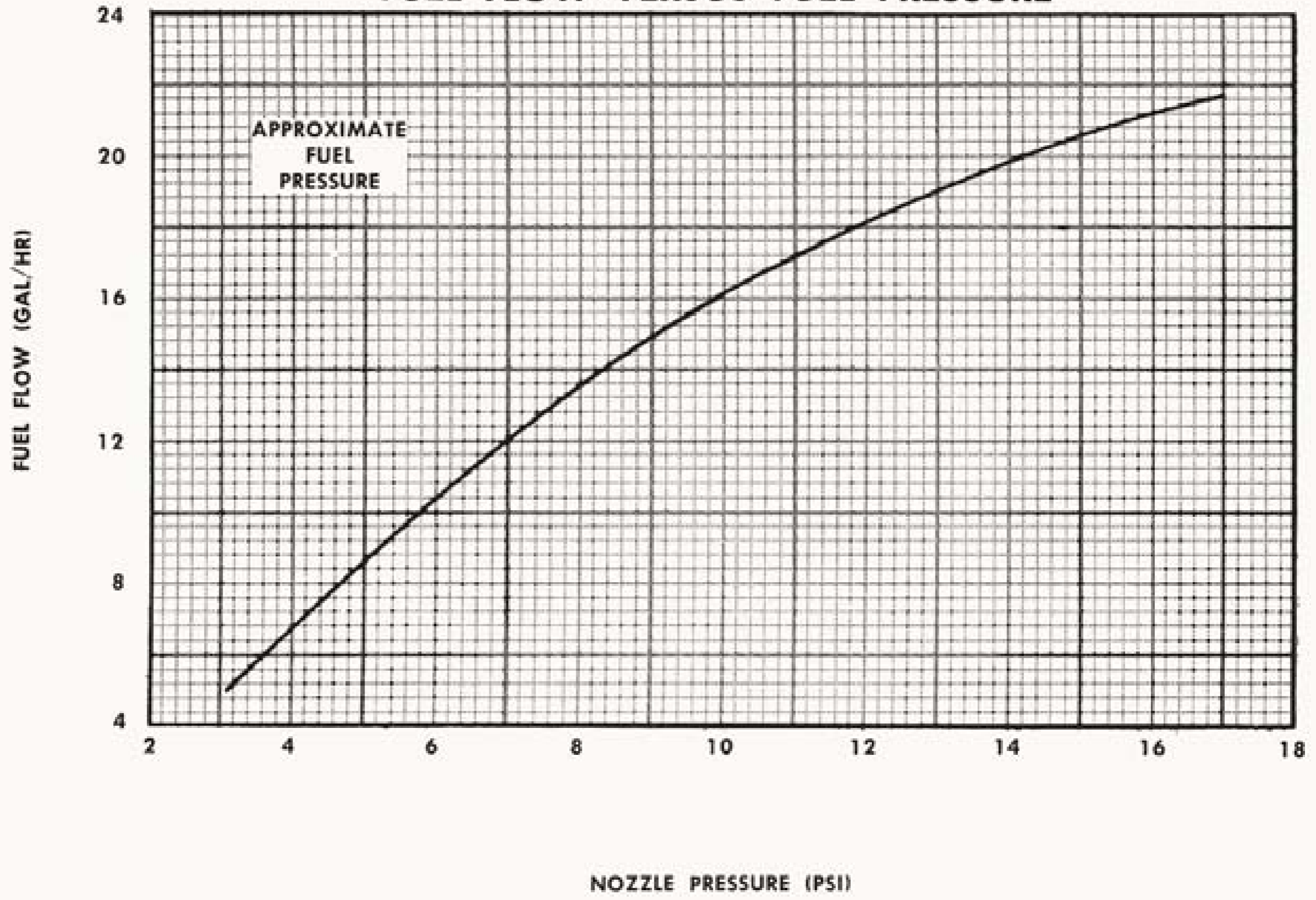
OPTIMUM CLIMB AIRSPEEDS



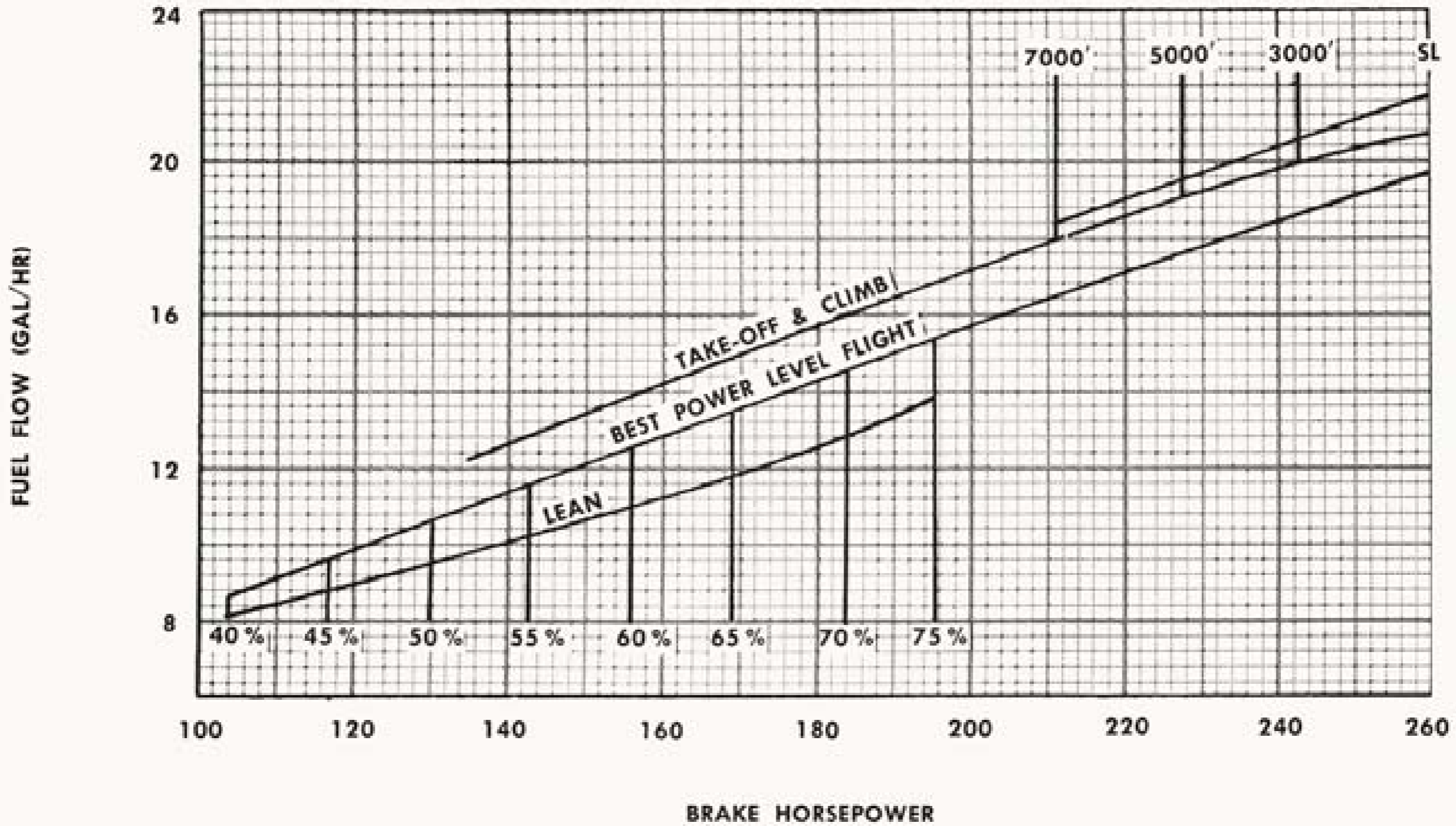
MANIFOLD PRESSURE VS. RPM



FUEL FLOW VERSUS FUEL PRESSURE



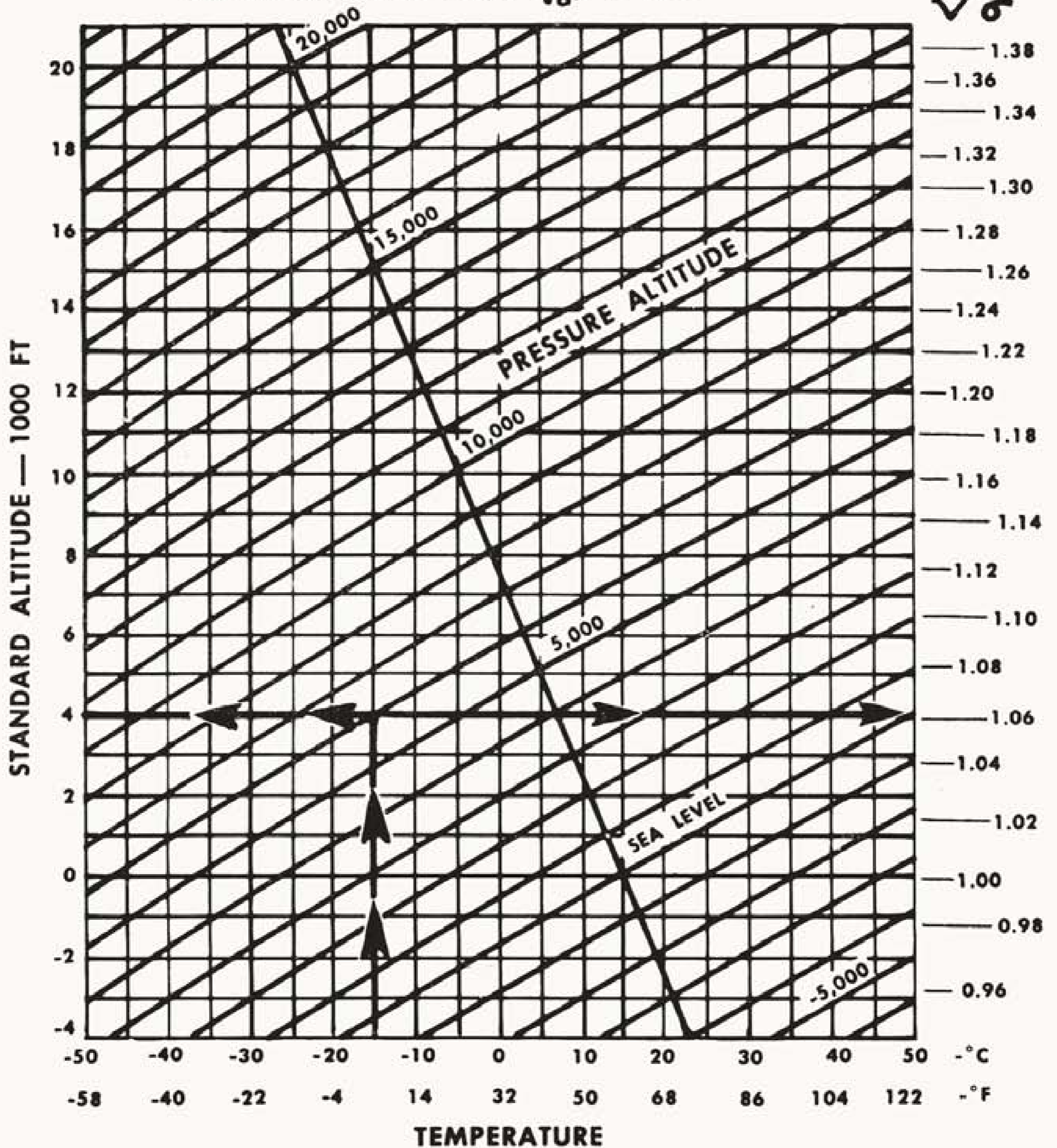
FUEL CONSUMPTION VERSUS HORSEPOWER



ALTITUDE CONVERSION

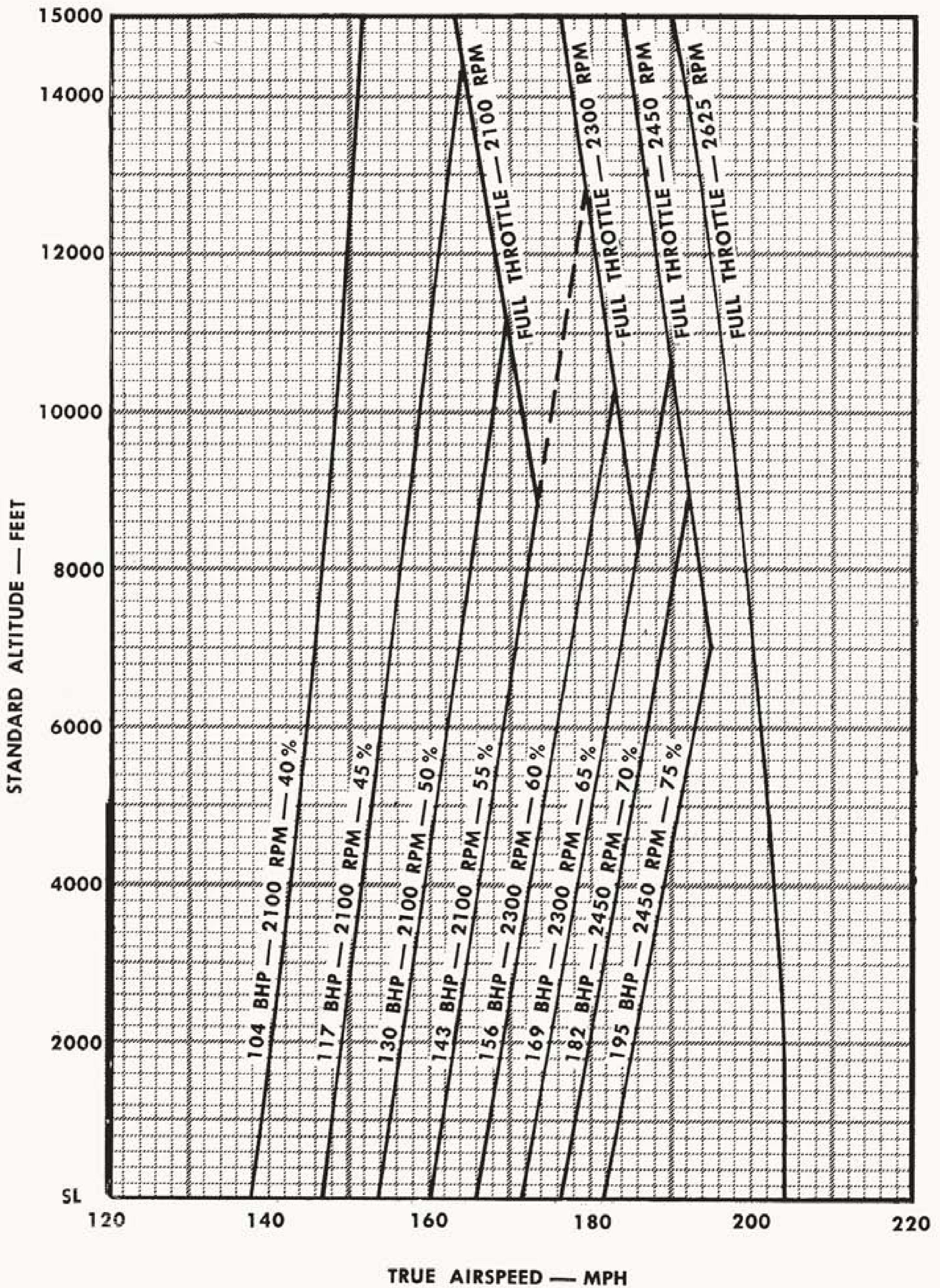
EXAMPLE: IF AMBIENT TEMP. IS -15°C AND PRESSURE ALT. IS 6000 FEET, THE STANDARD ALT. IS 4000 FEET AND $\frac{1}{\sqrt{\sigma}}$ IS 1.06

$$\frac{1}{\sqrt{\sigma}}$$



CRUISE OPERATION

GROSS WEIGHT 3125 LBS

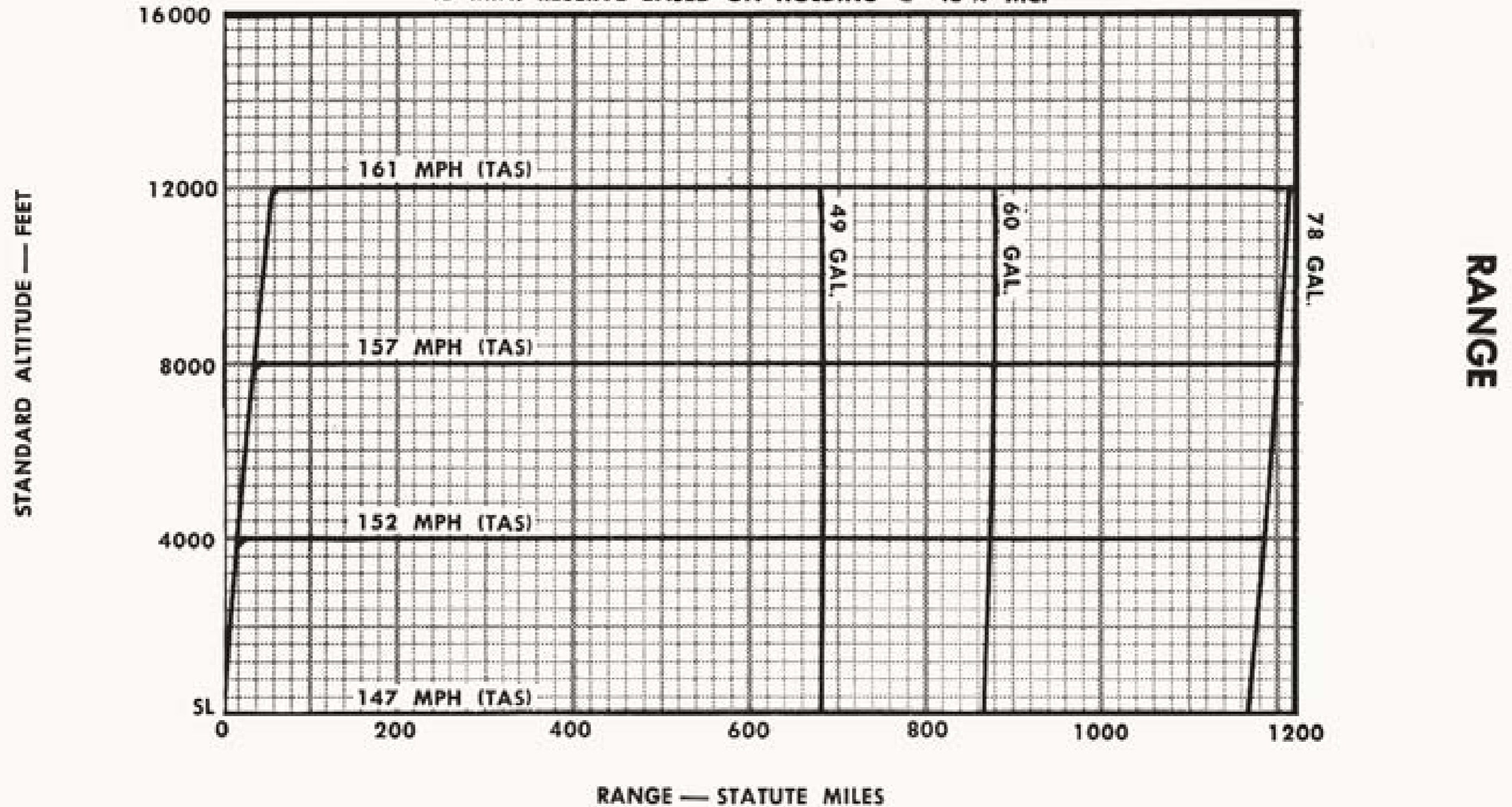


45% MAXIMUM CONTINUOUS POWER
 GROSS WEIGHT 3125 LBS.
 FUEL CONSUMPTION 8.8 GAL/HR

CLIMB POWER — 2500 RPM @ 25 IN. HG. TO 4000 FT.

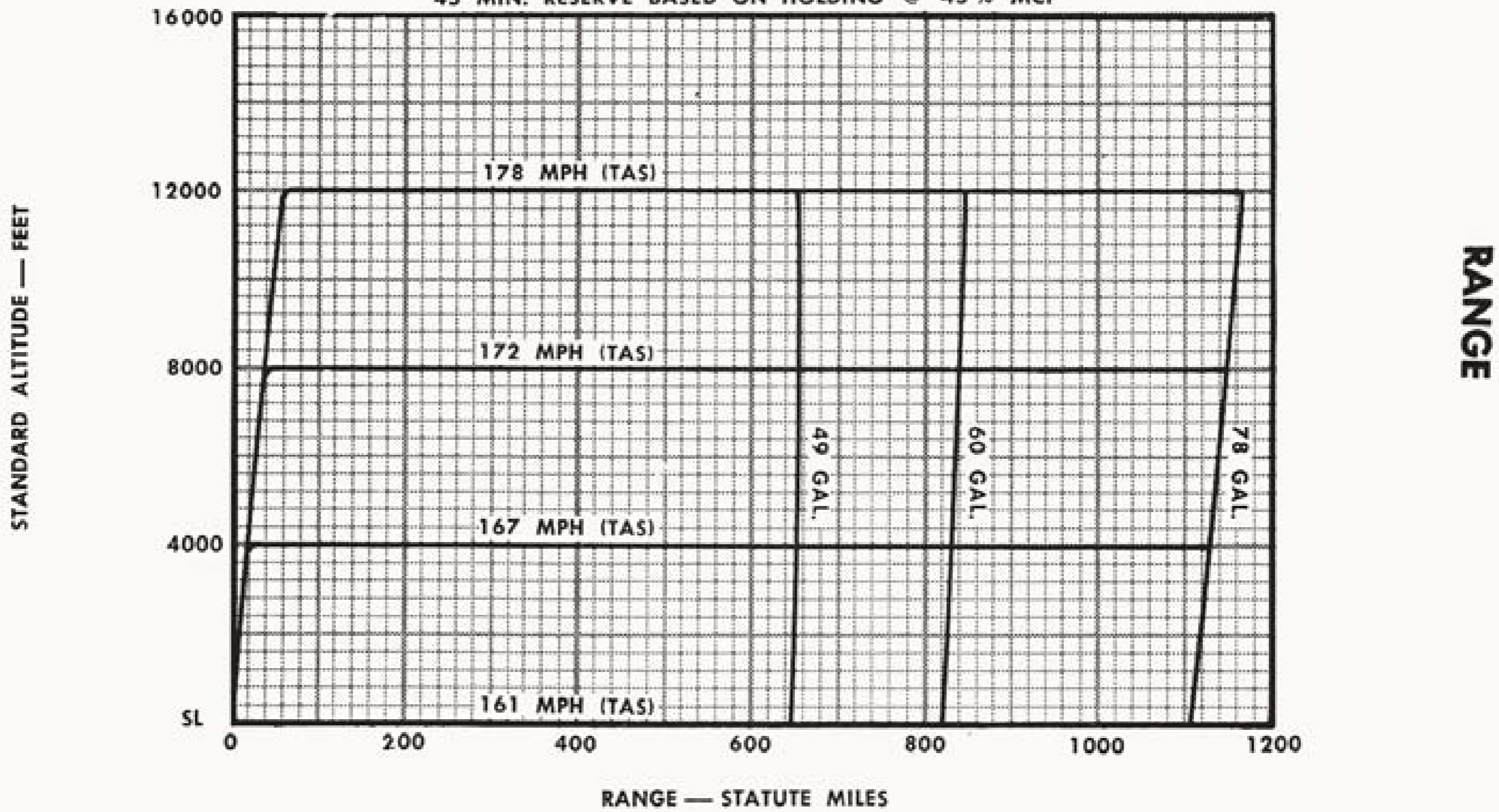
— 2500 RPM @ F.T. ABOVE 4000 FT.

45 MIN. RESERVE BASED ON HOLDING @ 45% MCP



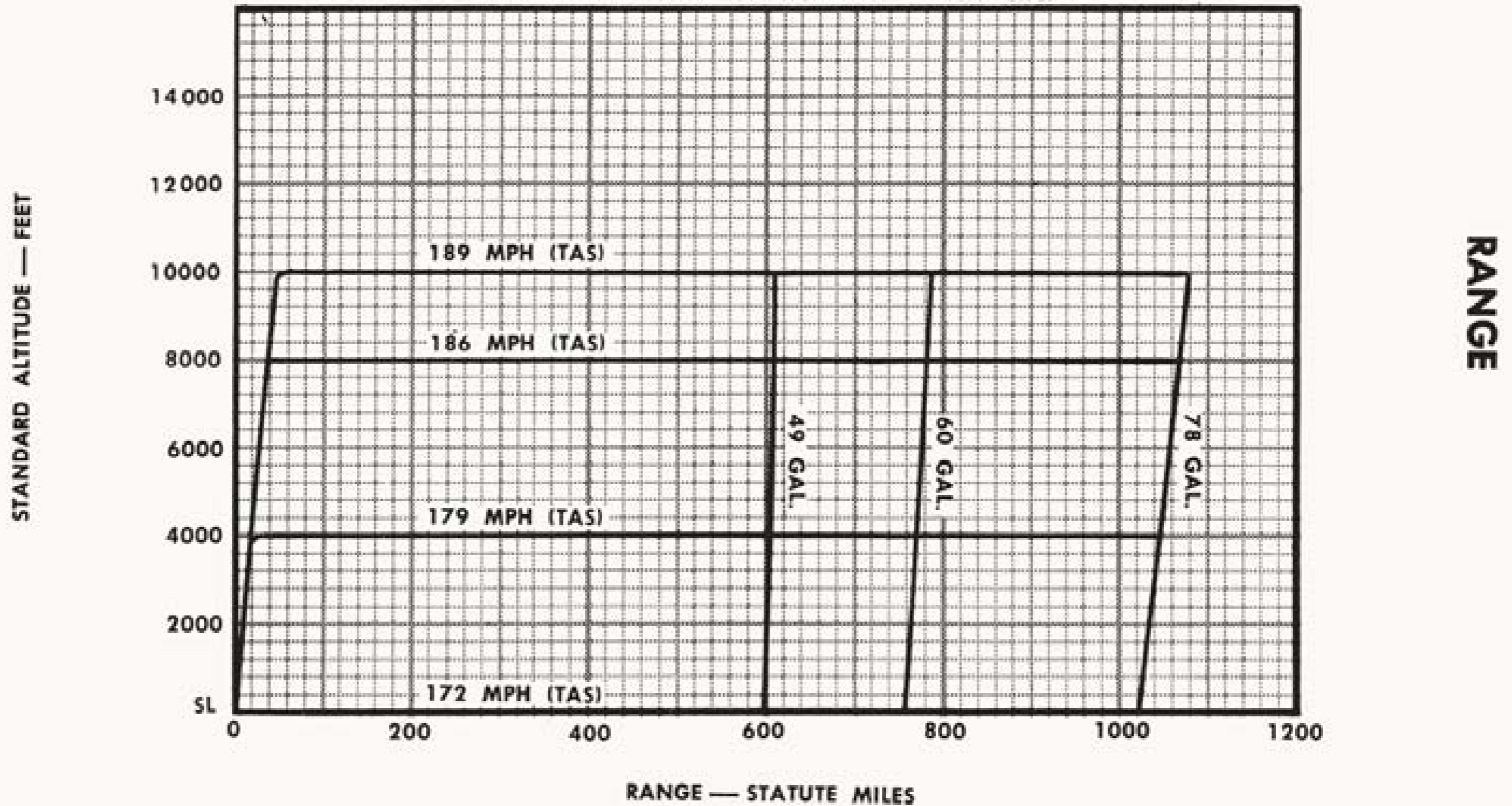
55% MAXIMUM CONTINUOUS POWER
GROSS WEIGHT 3125 LBS.
FUEL CONSUMPTION 10.2 GAL/HR

CLIMB POWER — 2500 RPM @ 25 IN. HG. TO 4000 FT.
— 2500 RPM @ F.T. ABOVE 4000 FT.
45 MIN. RESERVE BASED ON HOLDING @ 45% MCP



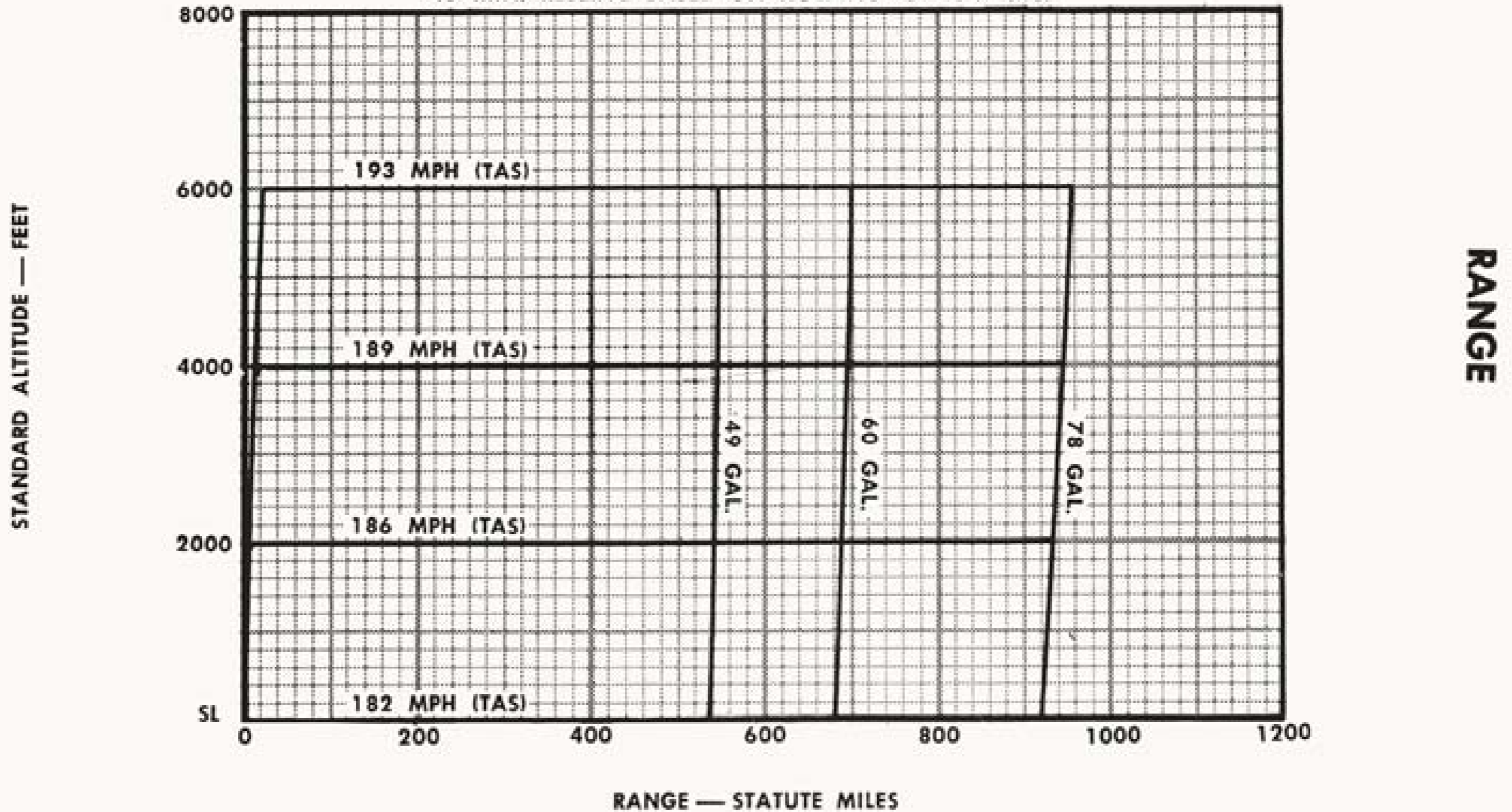
65% MAXIMUM CONTINUOUS POWER
GROSS WEIGHT 3125 LBS.
FUEL CONSUMPTION 11.8 GAL/HR

CLIMB POWER — 2500 RPM @ 25 IN. HG. TO 4000 FT.
— 2500 RPM @ F.T. ABOVE 4000 FT.
45 MIN. RESERVE BASED ON HOLDING @ 45% MCP

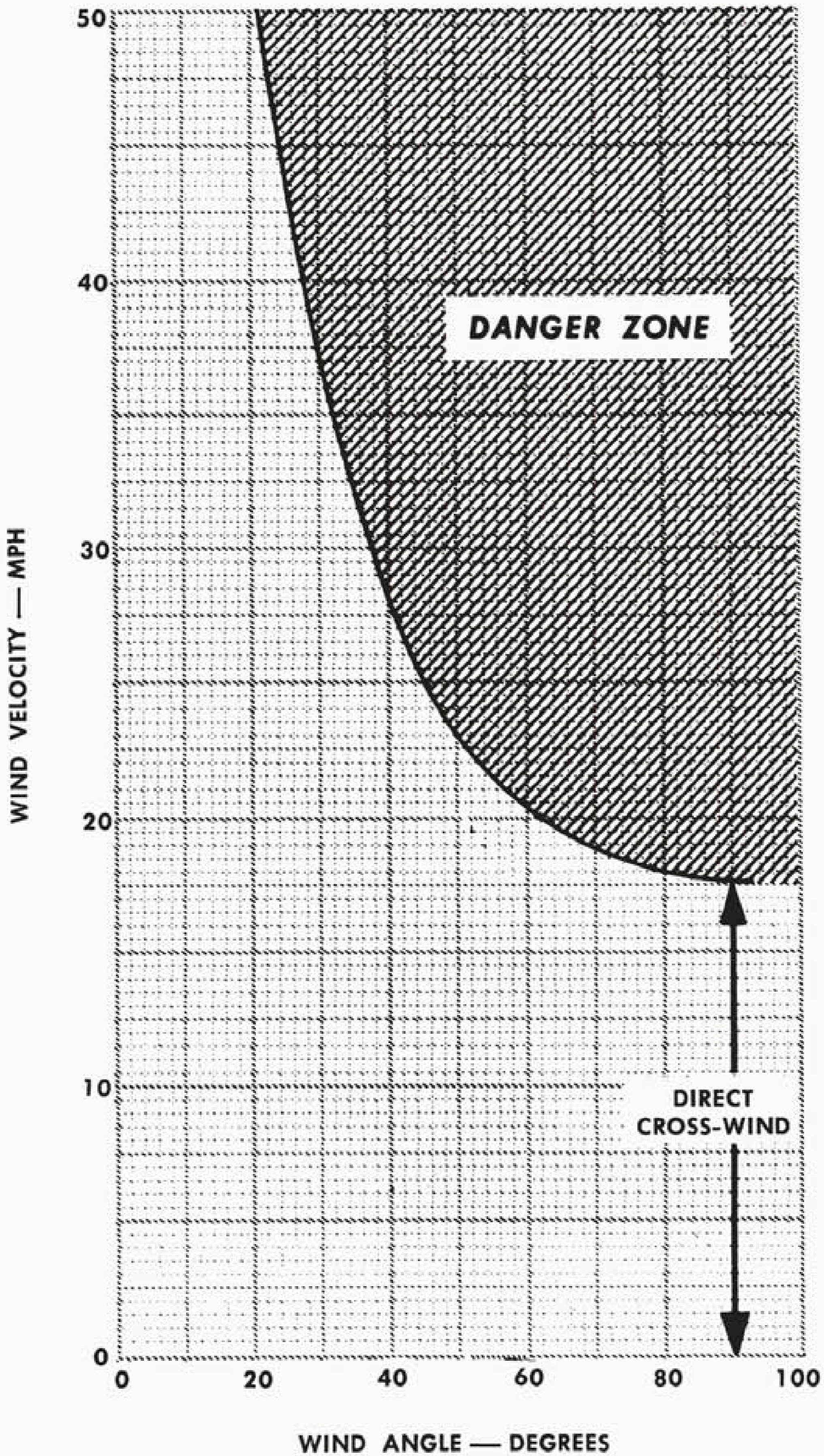


75% MAXIMUM CONTINUOUS POWER
GROSS WEIGHT 3125 LBS.
FUEL CONSUMPTION 13.8 GAL/HR

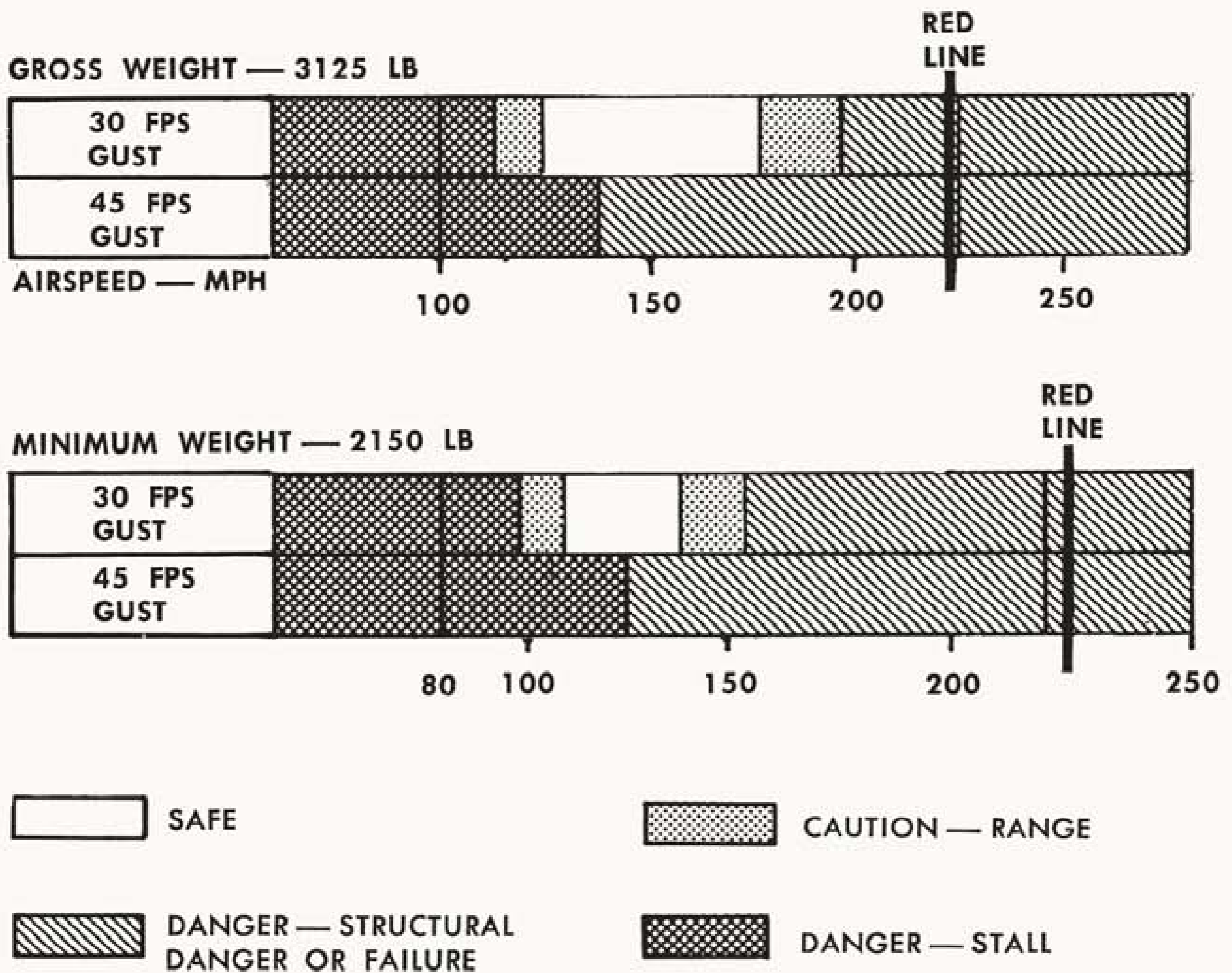
CLIMB POWER — 2500 RPM @ 25 IN. HG. TO 4000 FT.
— 2500 RPM @ F.T. ABOVE 4000 FT.
45 MIN. RESERVE BASED ON HOLDING @ 45% MCP



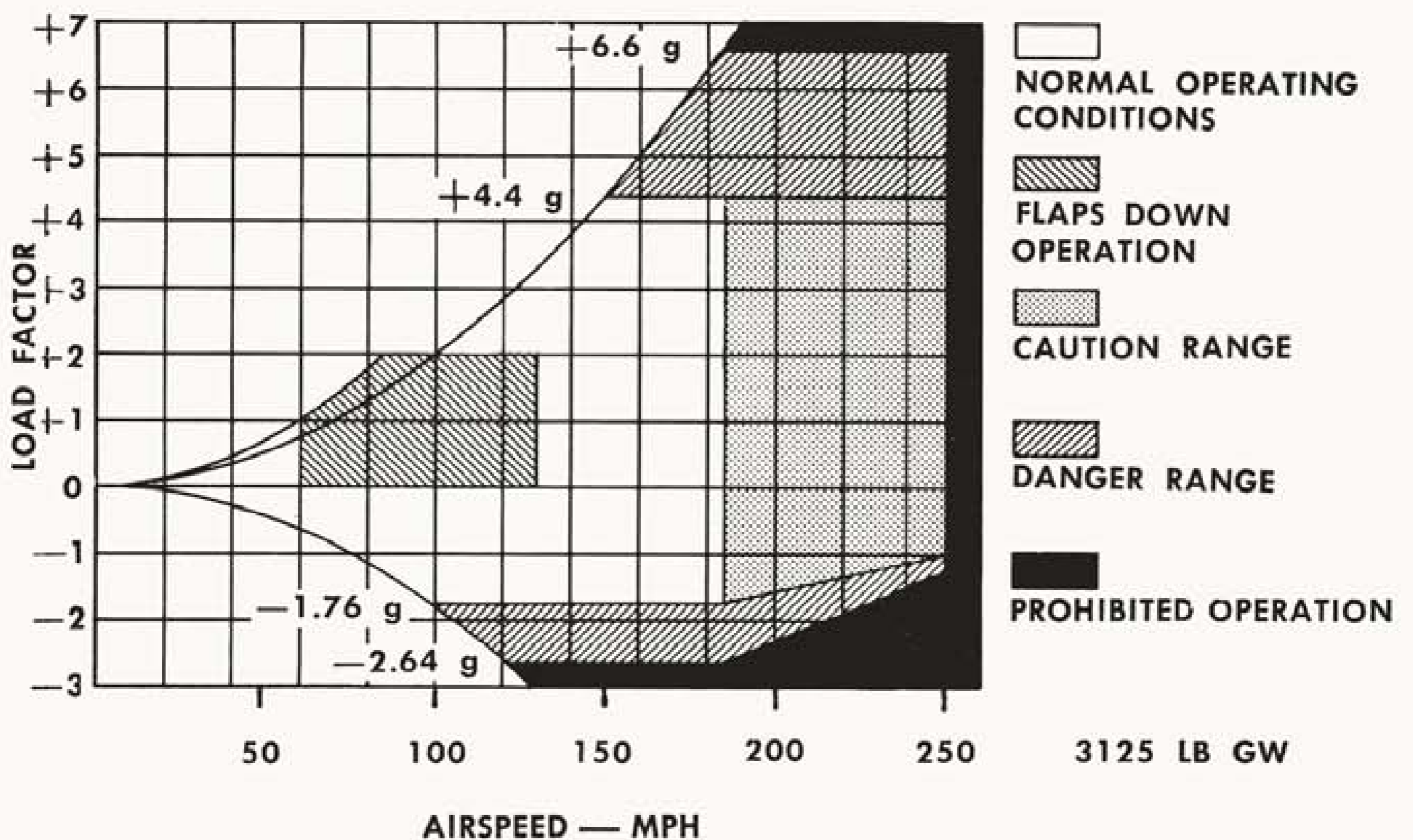
MAXIMUM SAFE CROSSWIND VELOCITIES



TURBULENT AIR PENETRATION SPEEDS



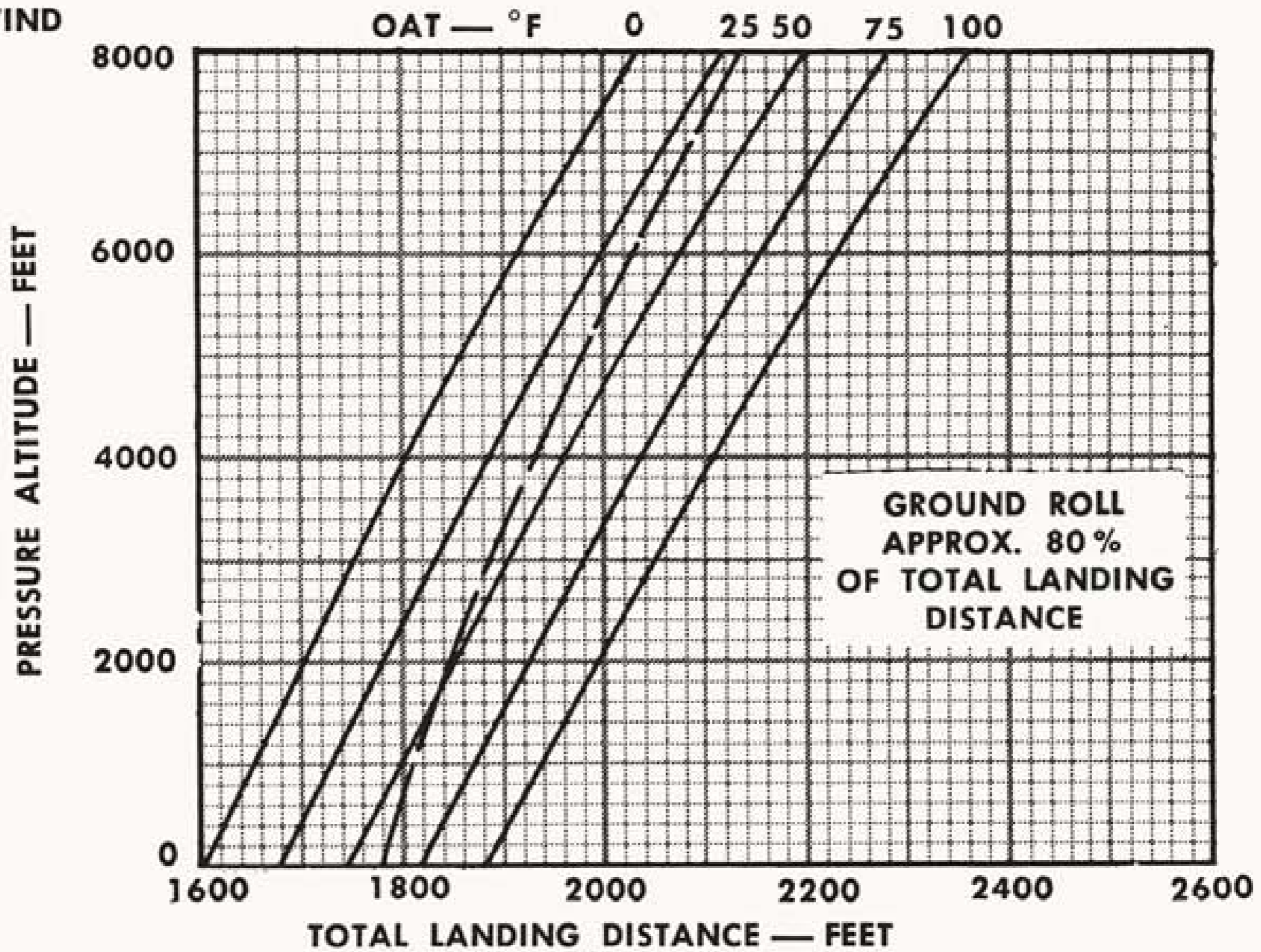
V-n DIAGRAM



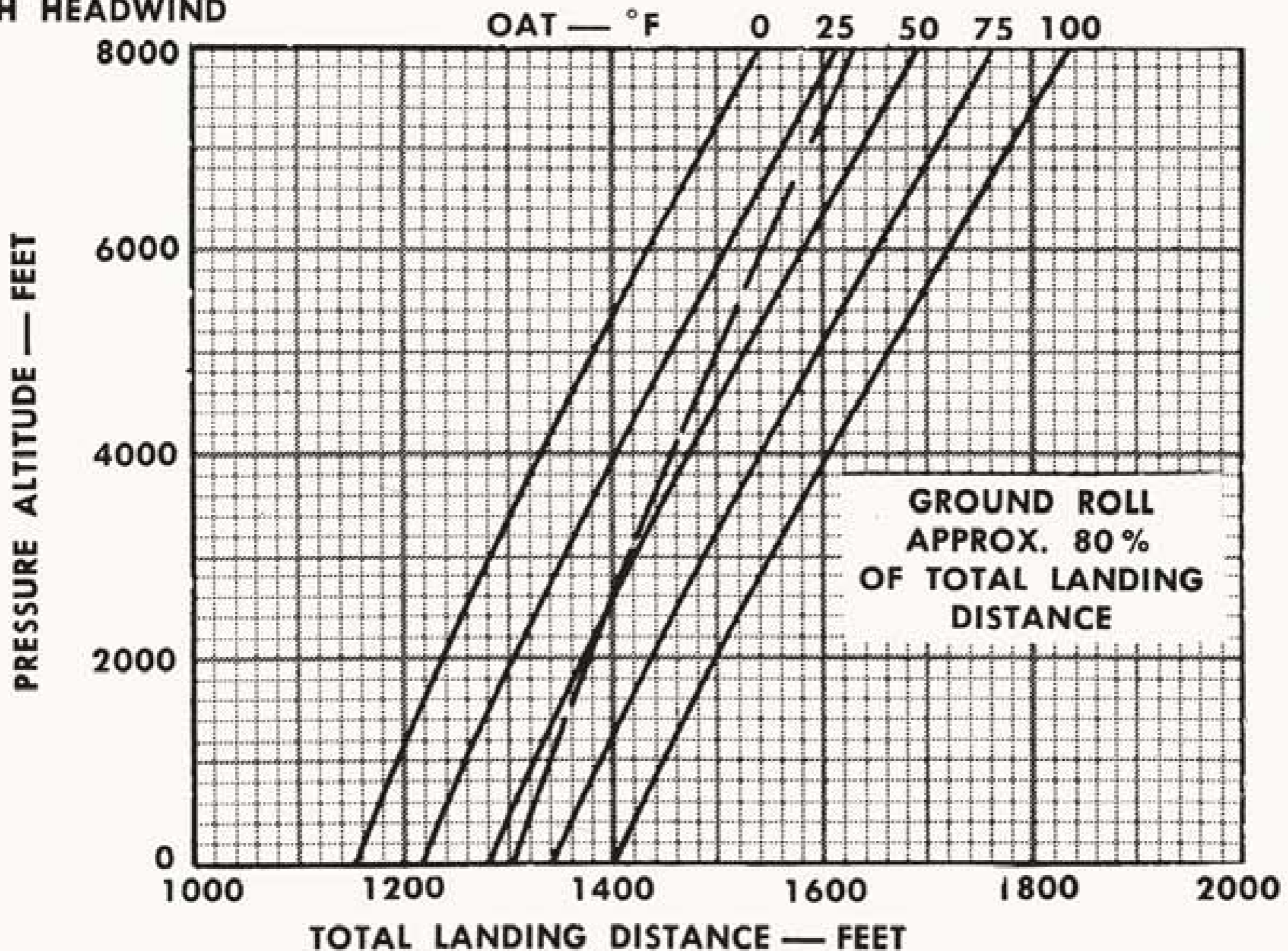
NORMAL LANDING

DISTANCE OVER 50 FEET
 GROSS WEIGHT 3125 POUNDS
 PAVED, DRY, LEVEL RUNWAY
 APPROACH SPEED 78 MPH (IAS)
 FLAPS 30 DEGREES
 — — STD. TEMP.

NO WIND



10 MPH HEADWIND

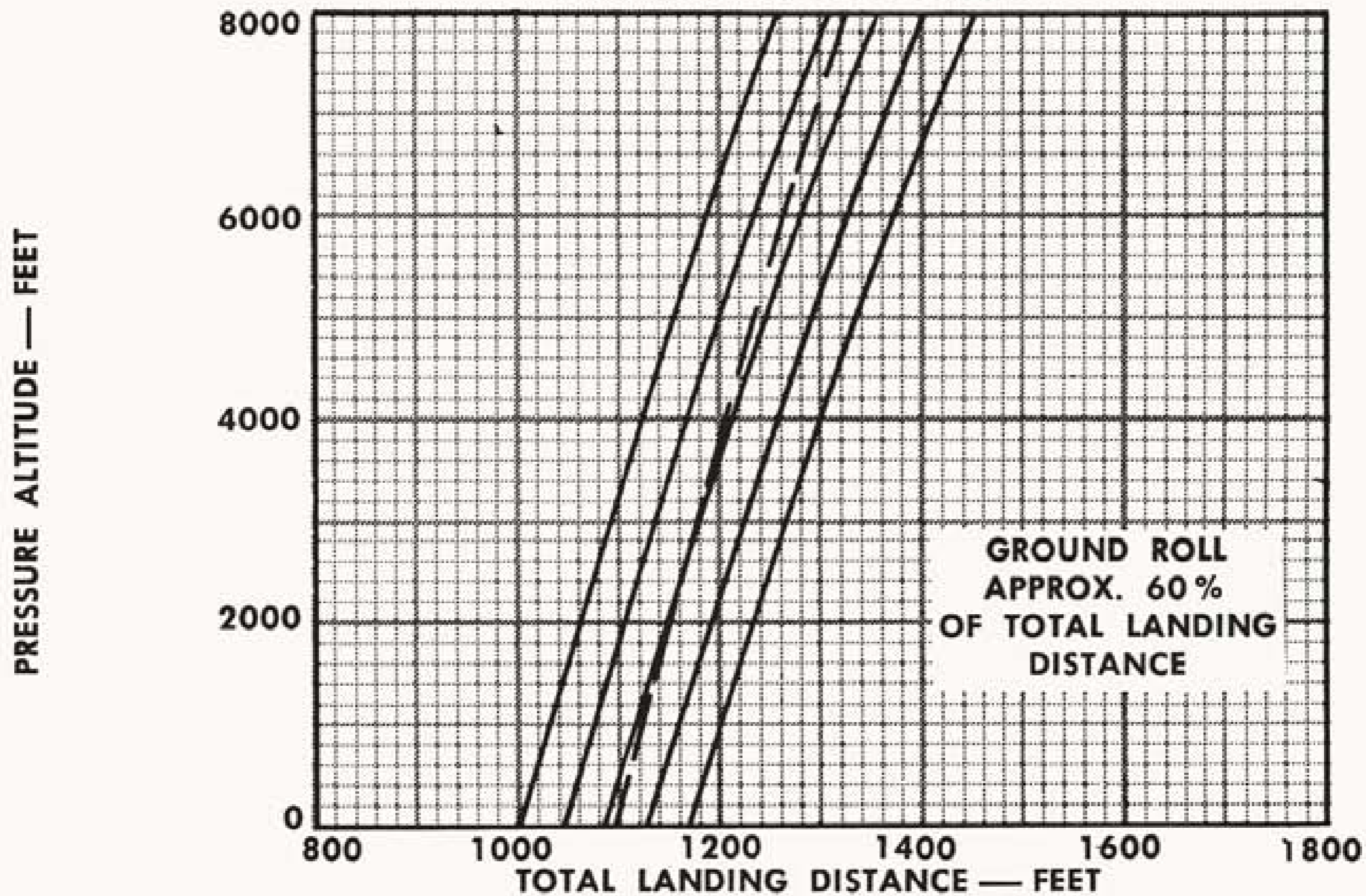


SHORT FIELD LANDING

DISTANCE OVER 50 FEET
 GROSS WEIGHT 3125 POUNDS
 PAVED, DRY, LEVEL RUNWAY
 APPROACH SPEED 72 MPH (IAS)
 FLAPS 30 DEGREES
 — — STD. TEMP.

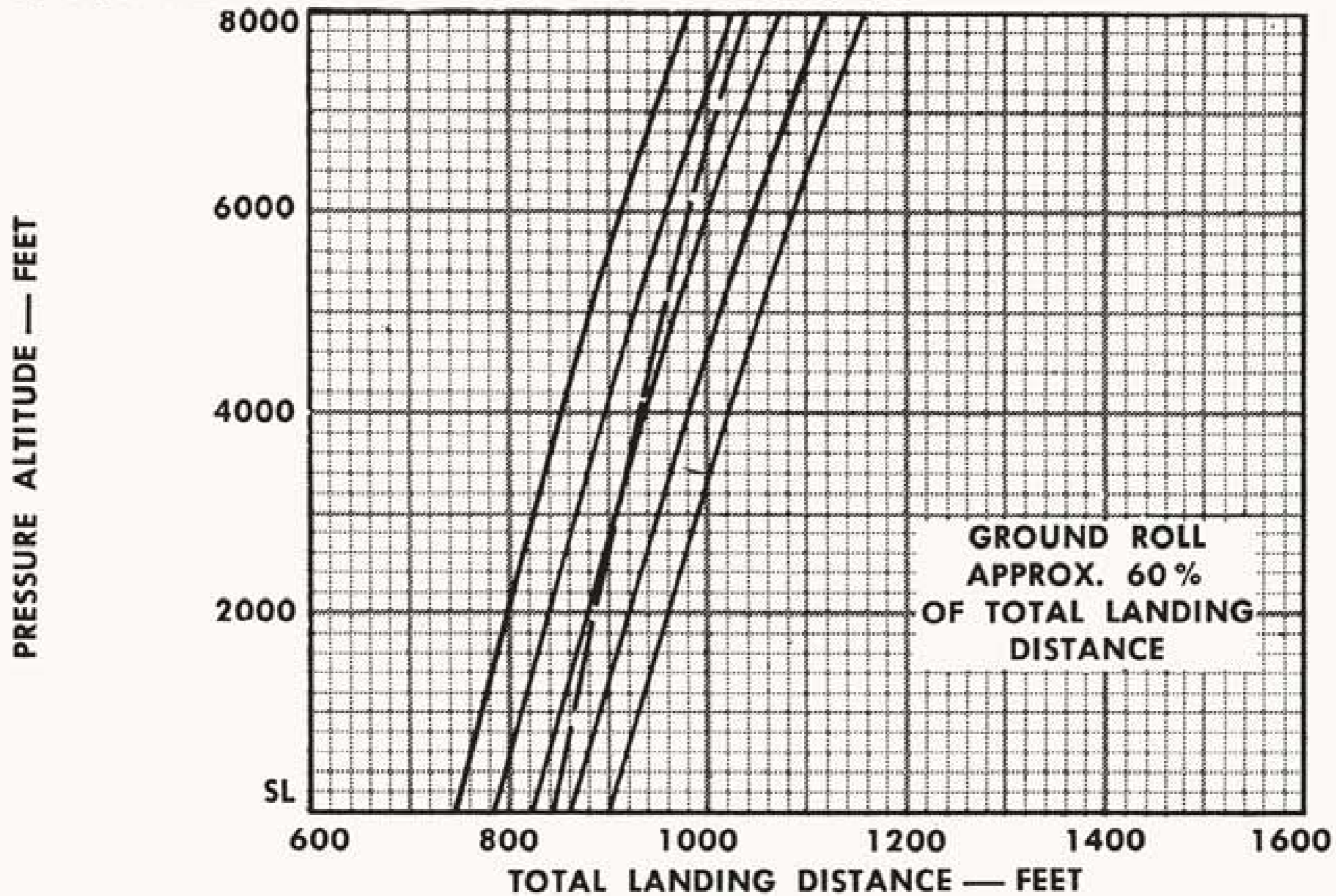
NO WIND

OAT — °F 0 25 50 75 100



10 MPH HEADWIND

OAT — °F 0 25 50 75 100



SECTION VII

Servicing and Maintenance

PREVENTIVE MAINTENANCE

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 twofold: 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 BEEHCRAFT Certified Service Station.

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

BEEHCRAFT CERTIFIED SERVICE

Aware of our responsibility to our customers to insure that good servicing facilities are available to them, Beech Aircraft Corporation and BEEHCRAFT 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 BEEHCRAFT airplanes; to maintain a complete and current file of BEEHCRAFT service publications; and to carry in stock a carefully pre-determined quantity of genuine BEEHCRAFT parts. In addition, key personnel must have factory training in BEEHCRAFT servicing techniques, as well as FAA certificates in engine, airframe and radio maintenance. A Certified Service Station must be a FAA approved repair station or employ an A&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 BEEHCRAFTS.

BEEHCRAFT SERVICE PUBLICATIONS

To bring the latest authoritative information to BEEHCRAFT distributors, dealers and Certified Service Stations, and to you as the owner of a BEEHCRAFT, the Customer Service Division of Beech Aircraft Corporation publishes and revises as necessary the Owner/Flight Manuals, Shop/Maintenance Manuals and parts catalogs for all BEEHCRAFT airplanes, as well as Service Bulletins and Service Letters. All of these publications are available from your BEEHCRAFT distributor or dealer.

BEEHCRAFT CUSTOMER SERVICE

Should a special problem arise concerning your airplane, your BEEHCRAFT 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 airplane 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 BEEHCRAFT airplanes.

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

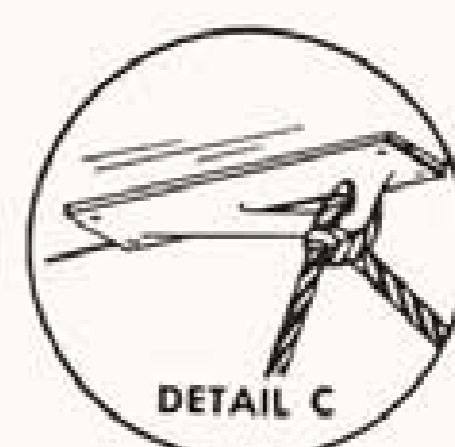
GROUND HANDLING

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 your airplane 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 clearances 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 antennas you have installed; their height should be checked and noted on the drawing for future reference.

Tie Down

If you leave your airplane parked outdoors, wheel chocks should be placed both fore and aft of each main wheel and a vertical tail post secured to the tail skid. A $\frac{3}{4}$ -inch rope should be passed through the tail skid and each end secured to stakes located approximately five



feet from the base of the vertical tail post. The stakes should be placed perpendicular to the center line of the airplane. The tail tie-down ropes should have very little slack. Ties to the wing-mooring lugs should be made in the conventional manner.

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 to prevent damage to the landing gear door. 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.

NOTE

Allow no one to be on or in the aircraft when it is on the main wheel jack.



Towing

Your airplane can be maneuvered into a hangar, or on the ramp, with the hand towbar included in the loose equipment kit. To tow the airplane, attach the hand tow bar to the tow lugs on the nose gear lower torque knee. One man can easily move the airplane on a smooth and level surface with the tow bar.

In the hangar or where movement is restricted, two men can pivot the airplane on the main wheels; one man should be positioned where he can push on the wing leading edge or hold the wing tip, and the other should handle the tow bar.

CAUTION

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

SERVICING

The following service procedures will keep your BEECHCRAFT 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 BONANZA'S like yours.

External Power Receptacle

The external power receptacle, if installed, should be used for making checks of radio and other electrical equipment, without the necessity of using battery power. The power receptacle is connected to the starter relay and when a power unit or battery cart is connected, the electrical system is energized.

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 internal, automatic grounding devices. 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.

Propeller Blade Maintenance

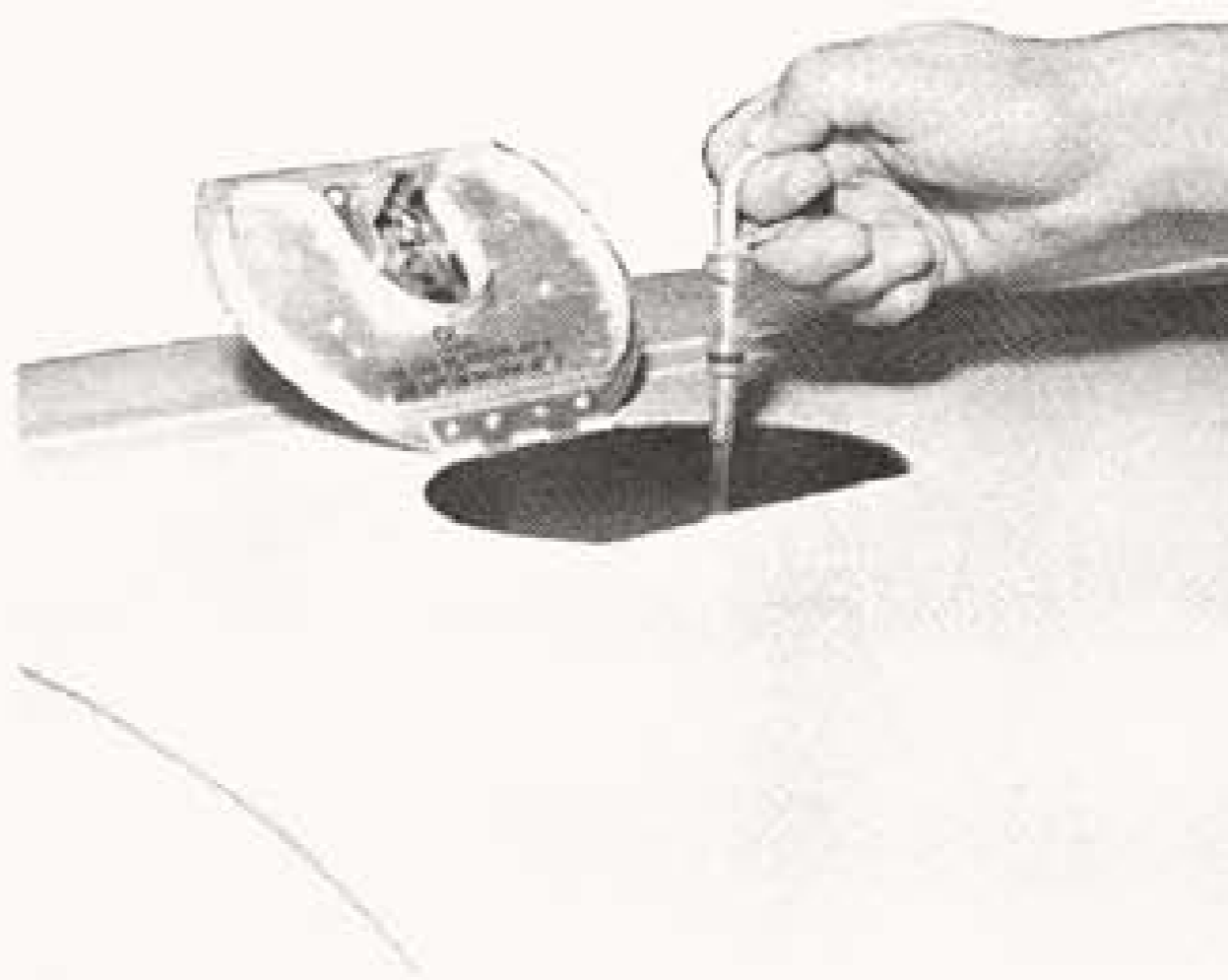
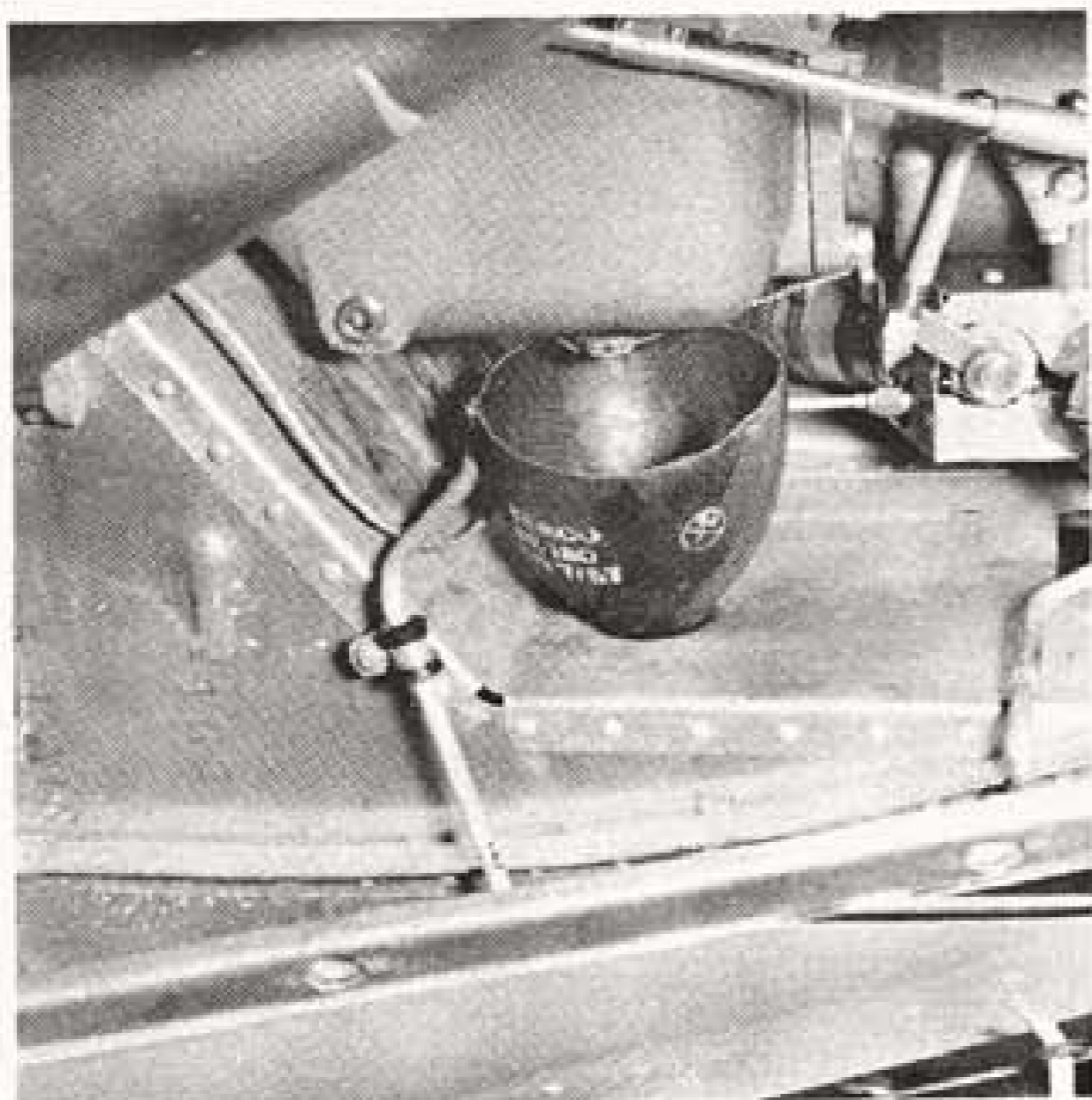
Due to the high stresses to which propeller blades are subjected, their careful maintenance is vitally important. The daily pre-flight inspection, particularly of the leading edge of each blade from the tip inboard to just beyond the 33-inch station (the crosswise mark on the back of the blade) should never be slighted and all nicks and scratches should be repaired before taking off. Nicks and scratches set up concentrations of stress which can exceed the strength of the blade material and cause a crack to appear in the blade.

Fortunately, good blade maintenance is a simple matter and need consume little time if it is done regularly. Using a fine file and emery cloth, carefully smooth out and polish all nicks and scratches; proper dressing of the sharp edges will relieve stress concentrations. The

method and limits for this type of repair are explained in the Model 278 Propeller Handbook.

Oil System

The oil level should be checked daily or before every flight and replenished as necessary. The oil should be changed every 25 hours under normal operating conditions. Under adverse weather conditions or continuous high power settings, the oil should be changed more frequently. To drain the engine sump, remove the right hand engine access plate, unsafety and remove the sump drain plug at the low



point of the engine sump just aft of the engine air intake. Before draining the sump, run up the engine until the oil reaches operating temperature to assure complete draining of the oil. Use the funnel provided with the loose equipment kit to carry the oil into a container under the nose.

Use engine oil as indicated in the consumable materials chart, Section VII.

Fuel System

The leading edge of each wing houses either a 25 gallon (standard) or a 40 gallon (optional) fuel cell which is to be serviced with 100/130 octane fuel or the next higher grade fuel. In the standard configuration, the total fuel capacity is 50 gallons; in the optional, 80 gallons.

CAUTION

The grounding jack is located just above the leading edge of the wing in the fuselage. Before re-

fueling, make certain the airplane and fuel dispensing unit are properly grounded. Failure to do so creates a fire hazard.

NOTE

Do not allow the fuel cells to remain completely empty for any length of time, since this may result in cracking and checking of the inner liner of the cell. If fuel cells are to be left empty for longer than a week, a thin coating of light engine oil should be sprayed, flushed or rubbed on the inner liner of the cells.

The fuel strainer on the bottom of the fuel selector valve should be removed and cleaned periodically. Ordinarily, the finger strainers in the fuel cell outlets should not require cleaning unless there is a definite indication of foreign solid material in the cells, or the airplane has been stored for an extended period.

Servicing Shock Struts

The shock struts are filled with dry compressed air and hydraulic fluid (see consumable materials chart item 2). The inflation check should be made with the airplane empty except for fuel and oil. To service the strut proceed as follows:

1. 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, otherwise it may blow off, causing injury to personnel or damage to equipment.

2. Slowly loosen the filler plug, make certain that all air has escaped, and remove the filler plug.
3. With the strut deflated, jack the strut barrel and block it 1 to 2 inches from the fully compressed position for the main shock struts, and $\frac{1}{4}$ -inch for the nose shock strut.
4. Fill the strut to the level of the filler plug with hydraulic fluid.
5. Remove the block from the strut and with the strut in the fully compressed position allow the excess oil to drain out.
6. Clean the filler plug, reinstall in the shock strut, and wipe off excess fluid.

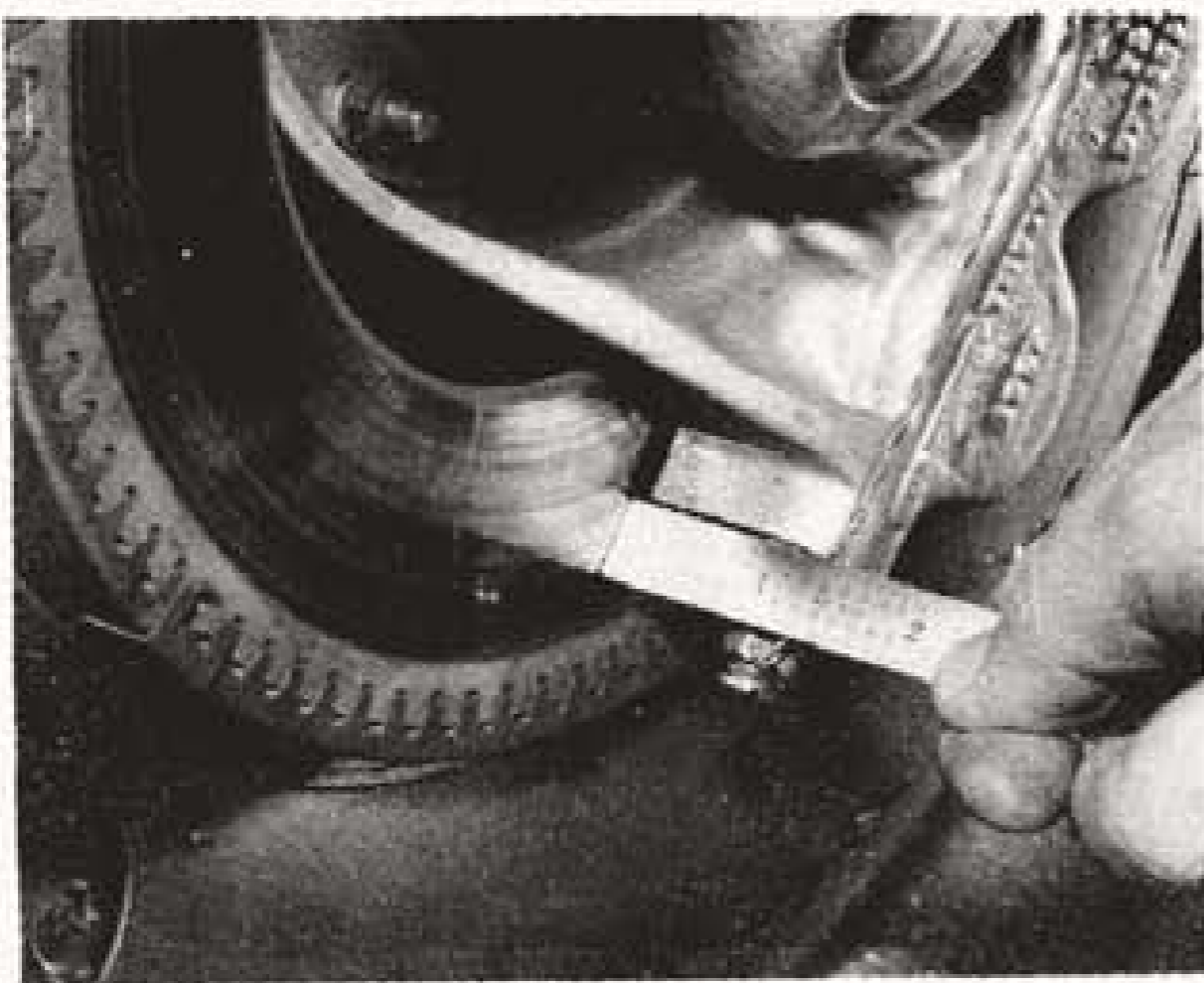
7. Inflate the shock strut, until 3 inches of the piston is exposed for the main shock strut, and 3½ inches for the nose shock strut.

CAUTION

If a compressed air bottle containing air under extremely high pressure is used, care should be taken not to over-inflate the strut.

8. Rock the airplane gently to prevent sticking or binding the strut.
9. Remove all foreign material from the exposed piston of the shock strut with a cloth moistened with hydraulic oil.

Servicing the Brakes



Your BEECHCRAFT is furnished with Goodyear two-spot hydraulic brakes. No adjustments are required, since the brake pistons simply move outward to compensate for lining wear. The piston should be checked periodically for small nicks or sharp edges which could damage the brake discs. Worn, dished, or distorted brake discs should be re-

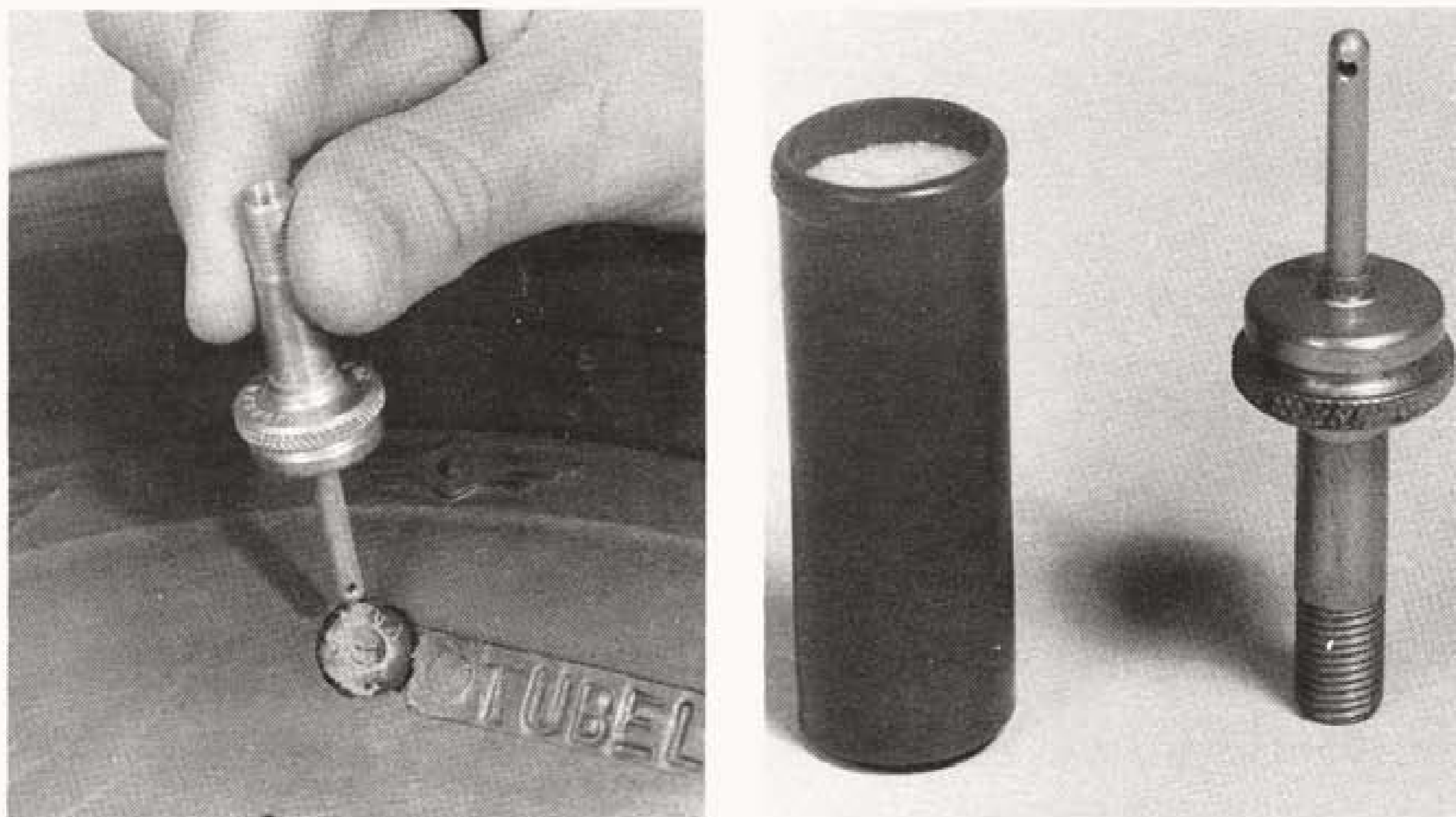
placed. The brake fluid reservoir, located on the forward side of the firewall, should be checked occasionally; maintain a visible fluid level on the dipstick (attached to the reservoir cap) at all times by adding hydraulic fluid (consumable materials chart, item 2) as necessary.

In service, the brake discs will lose their green (prime) color and become bright, then will assume a light straw color as the result of heat. These changes in color are normal and need not be a cause for concern. A glazed appearance of the brake linings also is normal; the glaze actually improves the effectiveness of the brakes.

The brake lining wear is indicated by the position of the steel brake disc on the wheel drive keys. Replace linings when the distance from the brake housing (at widest section) to the disc reaches ¼ inch with the brakes applied. Replace the steel brake disc when the thickness is .225 or below, measured at the thinnest section. Also replace the disc when the distance from the key to disc key slot reaches .040.

Servicing the Tubeless Tires

Your new airplane is equipped with tubeless tires on the main and nose landing gear wheels. A new wheel, which does not have a valve



stem hole, has been especially designed for the sidewall inflating tubeless tire.

The new tire cannot be used on tube-type wheels, and tube-type tires cannot be used on wheels designed for sidewall inflating tubeless tires.

Inflation

Inflation may be accomplished by the following method. Lubricate the end of the inflating needle by pressing it against the lubrication pads in the carrying case. With the end of the inflating needle, work glycerine around the guide hole of the tire valve located in the side of the tire.

CAUTION

The needle and the valve opening should be well lubricated before the needle is inserted. Never insert the needle into a dry valve.

Insert the inflating needle into the tire valve opening with a rotating motion.

CAUTION

Do not force the needle; if the needle does not enter easily, relubricate needle and valve.

Tubeless tire is inflated in the usual manner. The 5.00-5 nose wheel tire is inflated to 40 psi, and the 6.50-8 main wheel tires to 30 psi.

The inflating needle should be removed immediately after inflating the tire. The inflation valve kit is stored in the "Zip Lip" bag furnished for its protection.

Servicing the Battery

- A 12-volt, 33-ampere hour battery is located forward of the firewall on the right-hand side of the airplane. To service the battery, loosen
- the Dzus fasteners and open the right-hand cowling. Add distilled water as necessary, do not fill battery over $\frac{1}{2}$ inch above the separators. Periodically, check the specific gravity of each cell in accordance with specifications placarded on the battery. The battery should be kept fully charged: a fully charged battery will resist freezing and will give a longer service life.

To re-charge the battery without removing it from the aircraft, connect a suitable external power source to the external power receptacle and turn the battery master switch on. If the battery is extremely weak, it must be removed and pre-charged before it will be able to close the battery solenoid, thus completing the charging circuit.

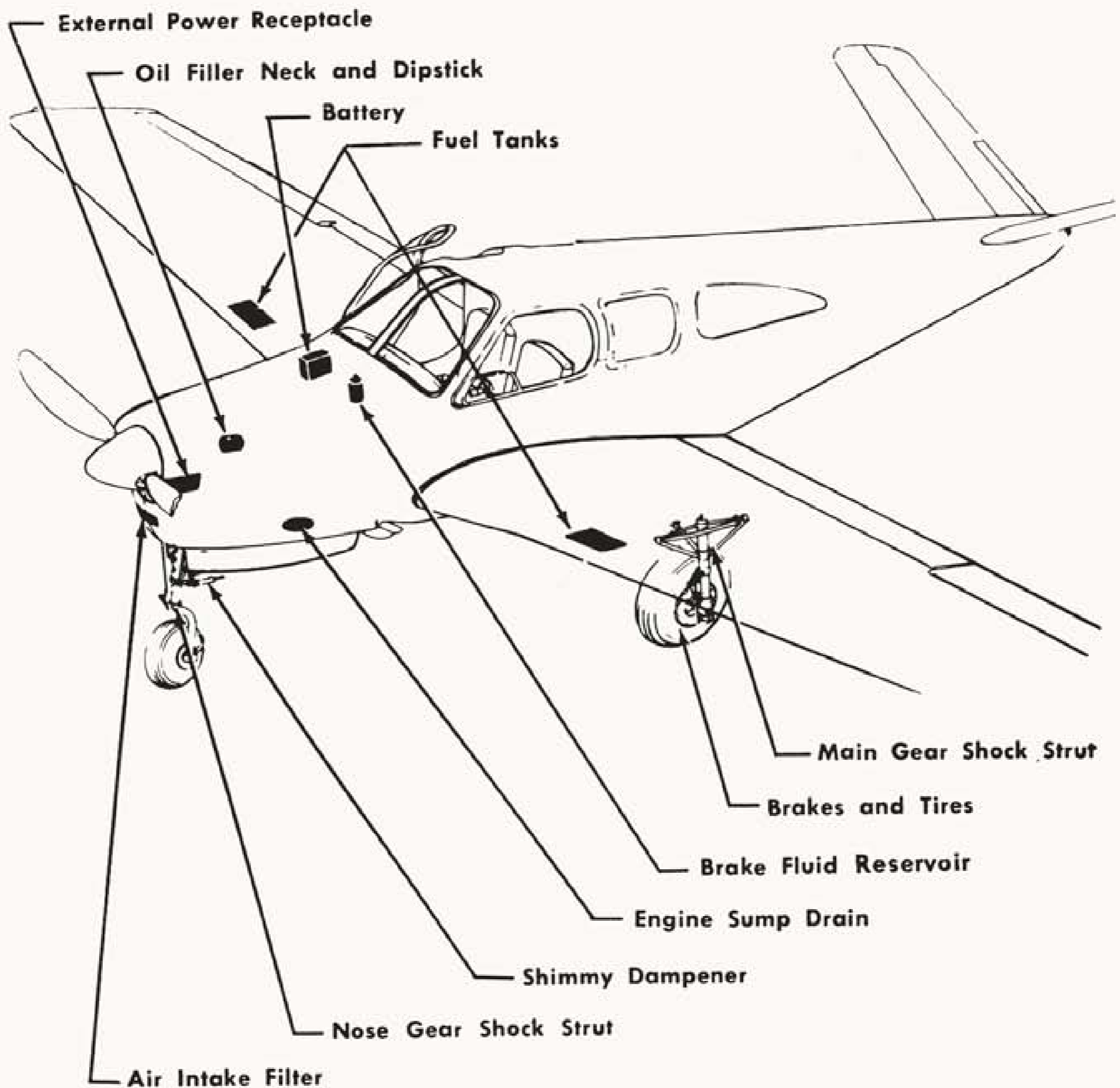
Engine Air Intake Filter

The engine air intake supplies air to the air metering section of the fuel injection system. The air filter is located in the nose cowling and should be inspected before the first flight of the day for accumulated foreign matter. If dirty, the filter should be removed and cleaned. To remove the filter, remove the nose cowling grille, loosen the four wing nuts holding the air filter in place and remove it through the nose cowling. Clean with naphtha, Stoddard solvent or unleaded gasoline and blow dry with compressed air.

Preservation of Rubber Seals

If the rubber seals around doors, windows and cowlings begin to stick, coat them with Dow Corning No. 7 Compound. Only a thin coating of the silicone compound need be applied, and care should be taken to avoid getting it on painted metal surfaces, since repainting will be difficult once the silicone has been applied. To give a satisfactory coating, saturate a swab or small cloth and wipe lightly over the sur-

SERVICING POINTS



face to be coated. If it is necessary to re-cement any of the seals, this should be done prior to coating them with silicone.

Servicing the Shimmy Dampener

To check the fluid level in the shimmy dampener, insert a 1/16-in. diameter wire through the hole in the disc at the end of the piston rod, until it touches the bottom of the hole in the floating piston. Mark the wire, remove and measure the depth of insertion. When the shimmy dampener is full, the insertion depth is 2-3/16 inches. When empty,

the reading is 3-1/16 inches. To add hydraulic fluid, remove the dampener and proceed as directed in the Shop Manual. Consult the Consumable Materials Chart for the proper grade of hydraulic fluid to be used.

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 period of 60 to 90 days after delivery. This will give the paint a chance to cure by the natural process of oxidation. Waxes and polishes seal the paint from the air and prevent curing. If it is necessary to clean the painted surface before the expiration of the 90-day curing period, use cold or lukewarm (never hot) water and a mild soap. Never use detergents or harsh alkaline soaps. 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 or abrasive 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.

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. Do not use water to clean fabric surfaces, since it will spot the upholstery surface and will remove the flame-resistant chemical with which the cloth is impregnated. However, if it should be necessary to use water in any form as a cleaner, the entire area should be cleaned to minimize water stain.

Commercial foam-type cleaners or shampoos can be used to condition rugs, fabrics or upholstery and to remove stains. In using these com-

mercial cleaners you should follow closely the instructions noted on the container.

Cleaning Windshield and Windows

Since the Plexiglass used in the windshield and windows can be very 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 hexane, naphtha, or methanol. Rinse with clean water and avoid prolonged rubbing.

NOTE

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

INSPECTIONS

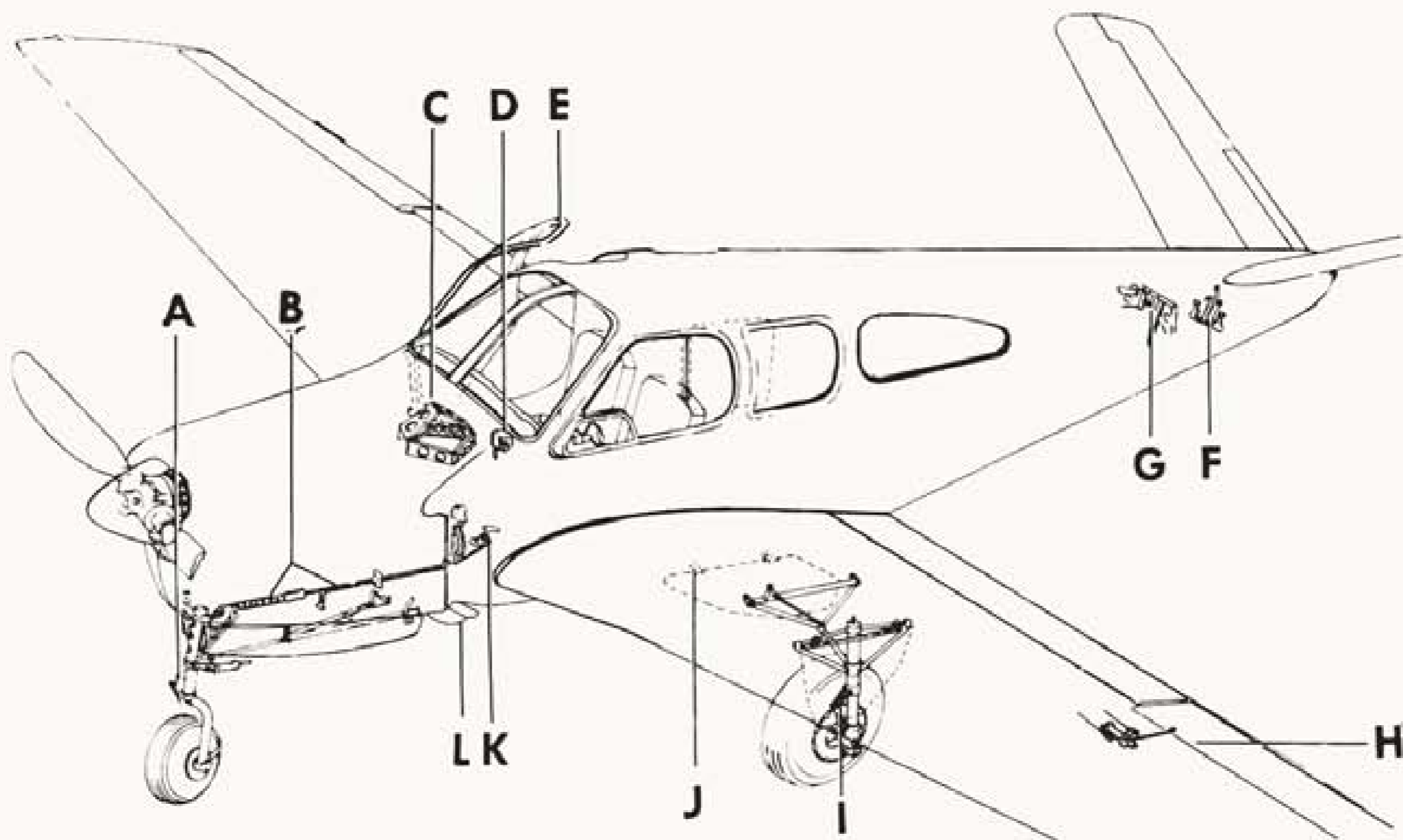
Correct servicing being half the secret of preventive maintenance, the other half is inspection. Proper servicing will prolong the life of your BEEHCRAFT and careful, regular inspections will not only assure that servicing has been done correctly, but will disclose minor troubles so they can be corrected before they become malfunctions. In addition to the daily pre-flight checks which are made on your aircraft you should have your airplane checked, at intervals, by your BEEHCRAFT Certified Service Station.

These checks by experienced BEEHCRAFT personnel, will assure you of more dependable trouble-free operation.

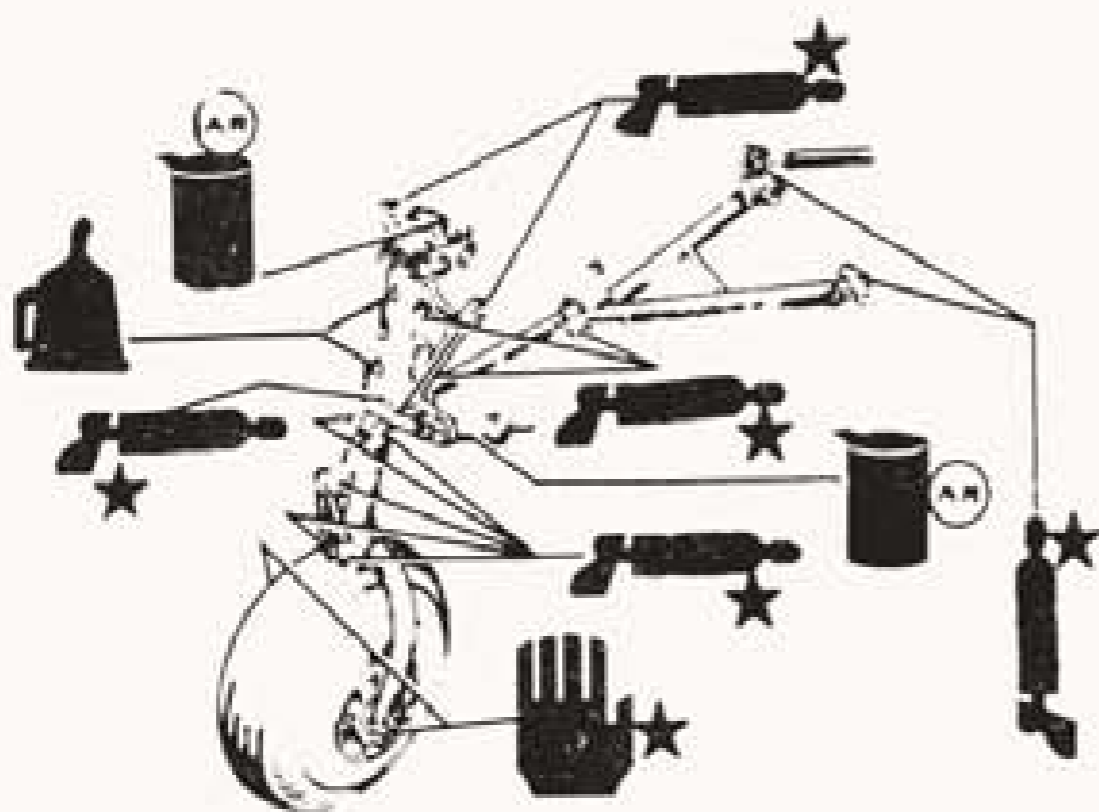
ABOUT THOSE KEYS

When you took delivery of your new BONANZA you were provided with four keys. Duplicates can be made from these keys to insure that you always have a key when you need it. If the keys are separated and one of them should be lost you can always have a duplicate made from the one you still have on hand. If both keys should be lost a locksmith can prepare a new key working from the lock on your BONANZA. Beech Aircraft Corporation does not keep a record of lock numbers on delivered airplanes.

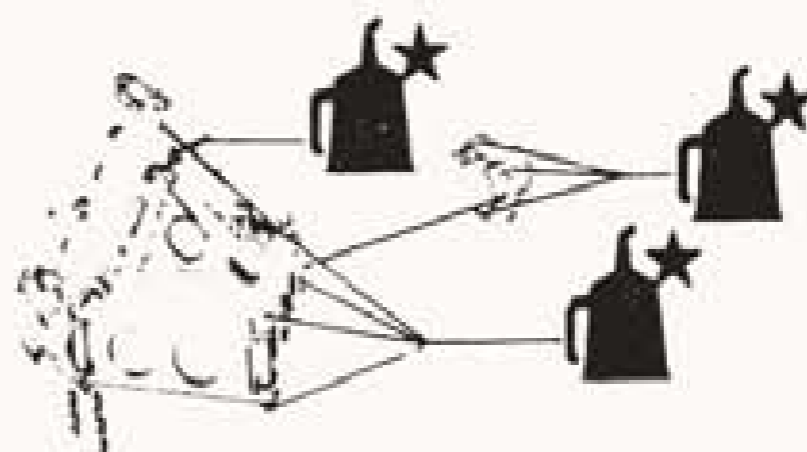
LUBRICATION POINTS



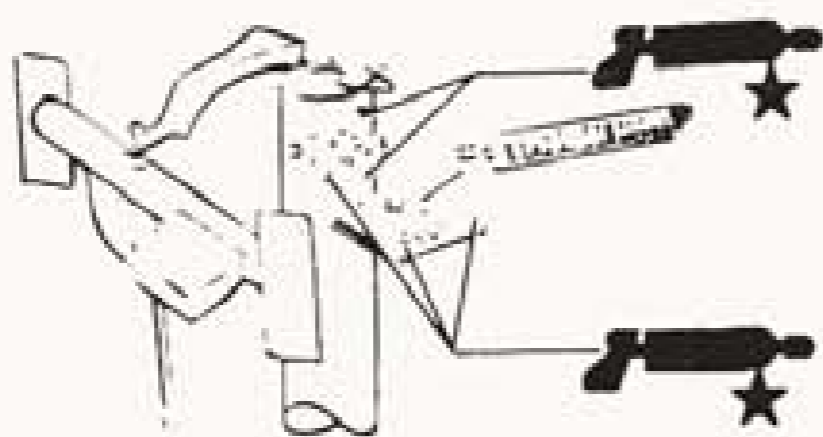
(A) NOSE LANDING GEAR



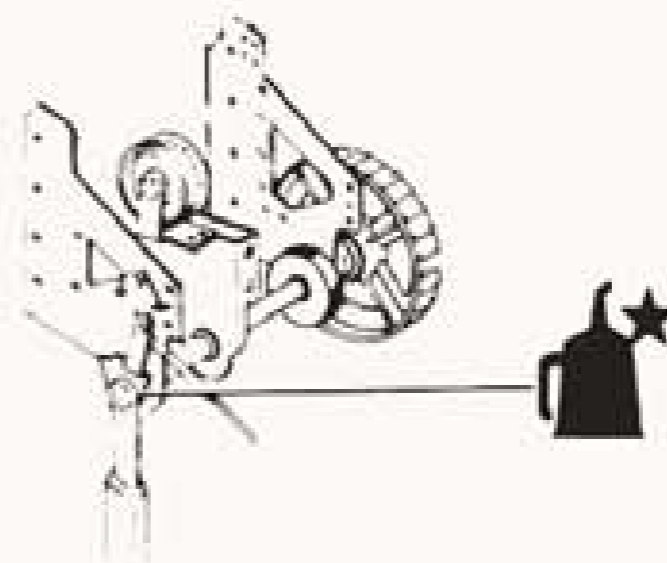
(C) CONTROL COLUMN



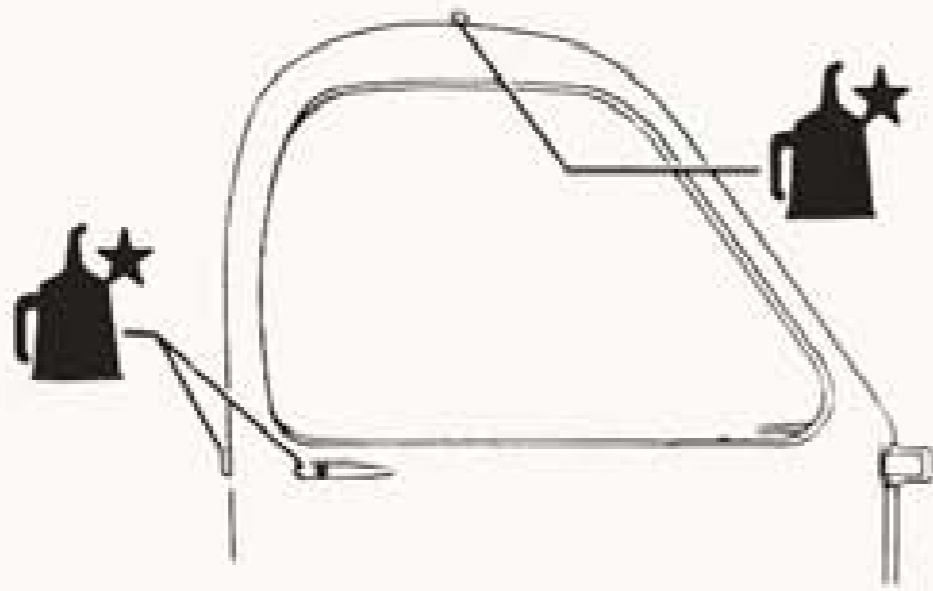
(B) STEERING MECHANISM



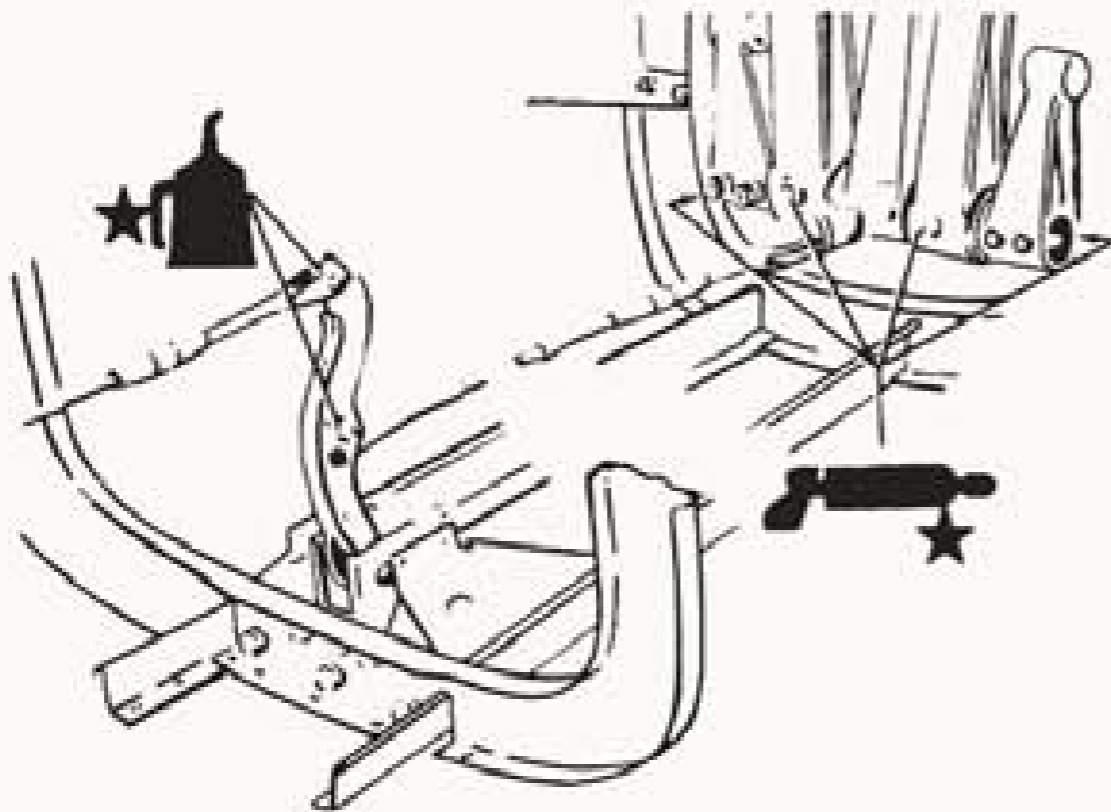
(D) TRIM TAB CONTROL



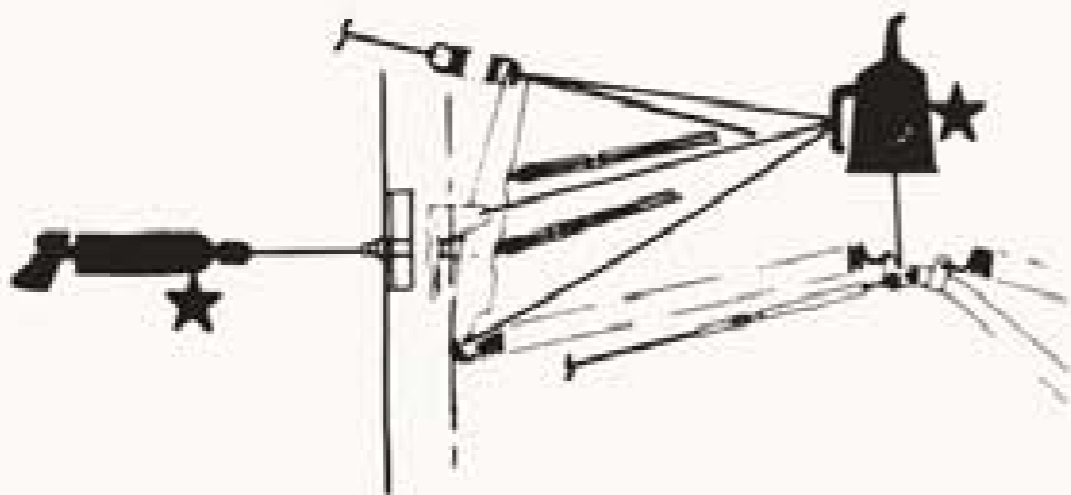
(E) DOOR LATCH



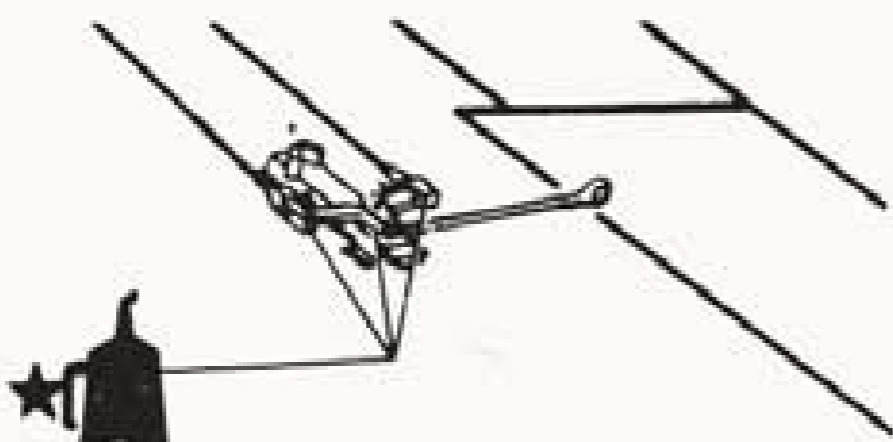
(F) DIFFERENTIAL CONTROL ASSEMBLY



(G) ELEVATOR TAB

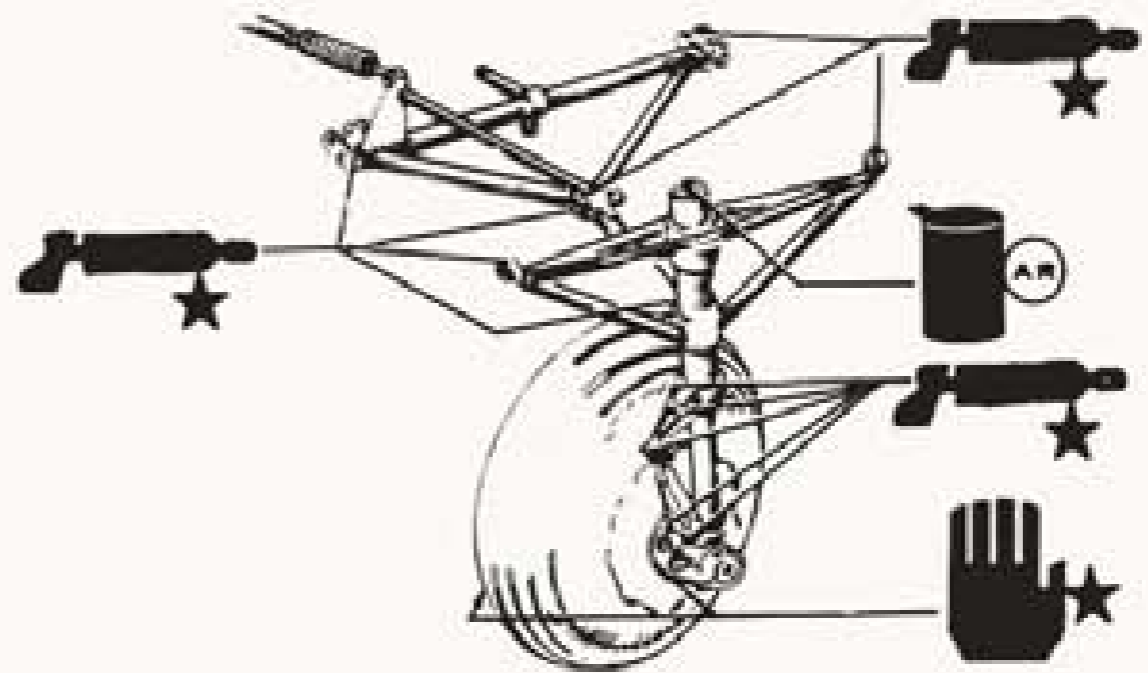


(H) AILERON CONTROL LINKAGE



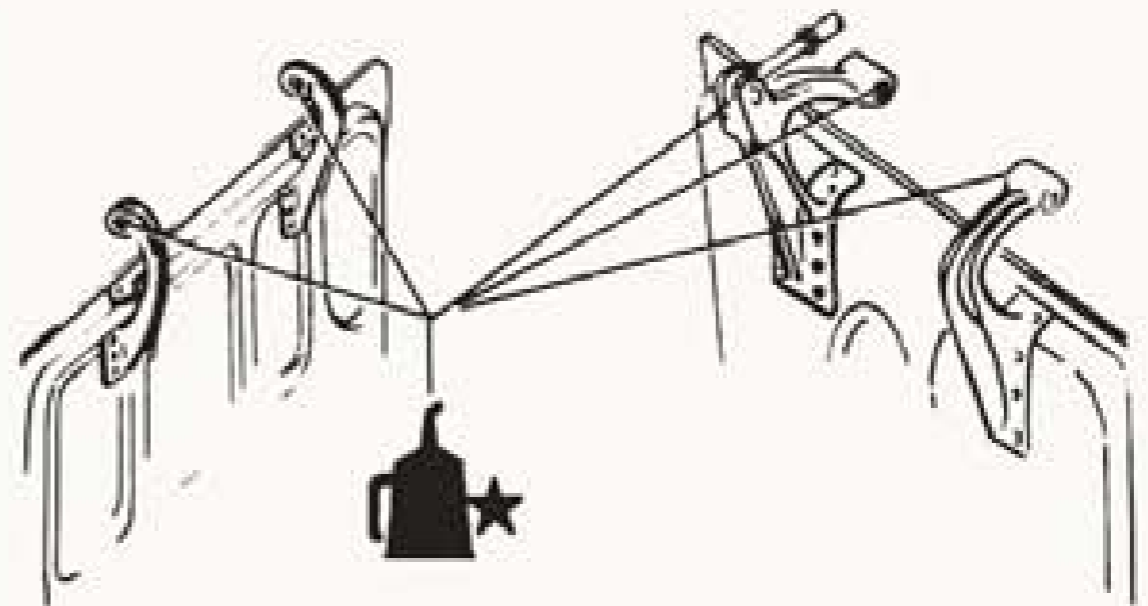
RIGHT AND LEFT SIDE

(I) MAIN LANDING GEAR



RIGHT AND LEFT SIDE

(J) MAIN LANDING GEAR DOORS

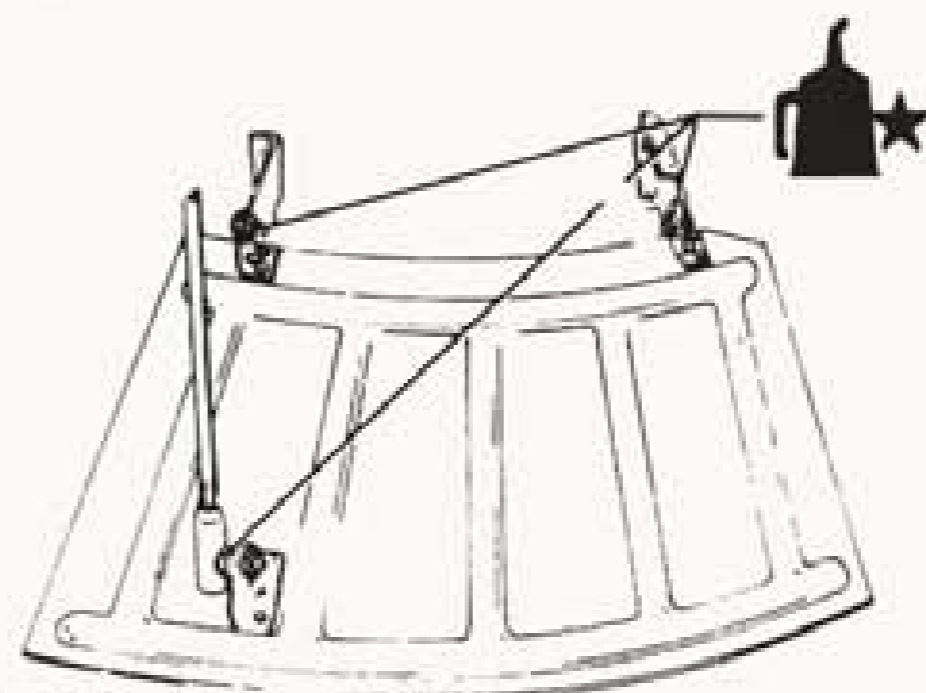


(K) CONTROL PEDAL



RIGHT AND LEFT SIDE

(L) COWL FLAP HINGES





RIGHT AND LEFT SIDE

NOTE: Landing gear components may require lubrication every 25 or 50 hours, depending on operation.

★ 100 hours (AR) As Required

- 1  HAND OR PACK
- 2  HYDRAULIC FLUID

- 3  ZERK FITTING
- 4  SQUIRT CAN

NOTE: Numbers refer to items in consumable materials chart.

CONSUMABLE MATERIALS CHART

ITEM	NOMENCLATURE	LUBRICANT
1.	Lubrication Grease (High Temperature)	MIL-L-3545
2.	Hydraulic Fluid	MIL-H-5606
3.	Lubrication Grease (General Purpose)	MIL-G-7711
4.	Lubricating Oil	SAE No. 20
5.	Engine Oil	SAE No. 30 (Below 40°F.) SAE No. 50 (Above 40°F.)
6.	Fuel, Engine	100/130 Octane
NOTES		
<p>1. MIL-G-7711 grease may be used in the place of MIL-G-3278 grease in all normal climates. In extremely cold climates, MIL-G-3278 grease may be used.</p> <p>2. 100/130 octane fuel or next higher grade only.</p> <p>3. Do not expose painted surfaces to MIL-G-7711 or MIL-L-3278 greases. The paint will become discolored as a result of a chemical reaction.</p>		

LAMP REPLACEMENT GUIDE

LOCATION	NUMBER
Wing Navigation Lights.....	#1512
Tail Light.....	#93
■ Landing Lights.....	#4509 - #4522
Cabin Dome Light.....	#89
■ Overhead Instrument Light.....	#1003 - #89
Tab Position Indicator Light.....	#53
Landing Gear Visual Indicator Light.....	#53
Compass Light.....	#330
Stall Warning Light.....	AN3121-1813
Rotating Beacons.....	A-7079-12
Landing Gear Position Light.....	AN3121-1813
Fuel Pump Placard Light.....	AN3121-1813
Direction Indicator Light.....	AN3136-323

CONTROL SURFACE CHART

AILERON

Aileron Cable Tension (with cable control)	40 +5 -0 lbs.
Aileron up travel.....	20° ± 2°
Aileron down travel.....	20° ± 2°

ELEVATOR

Elevator cable tension.....	25 +5 -0 lbs.
Elevator up travel.....	22½° +0° -1°
Elevator down travel.....	19° +2° -1°

ELEVATOR TAB

Elevator tab cable tension	
Control to bellcrank.....	15 +5 -0 lbs.
Bellcrank to tab horn.....	30 +5 -0 lbs.
Elevator tab up travel.....	10° ± 2°
Elevator tab down travel.....	23° +2° -0°

RUDDER

Rudder cable tension.....	25 +5 -0 lbs.
Left hand rudder up travel.....	23° ± 1°
Left hand rudder down travel.....	26° ± 1°
Right hand rudder up travel.....	26° ± 1°
Right hand rudder down travel.....	23° ± 1°

COMBINED RUDDER AND ELEVATOR OVER-ALL TRAVEL

Left hand up.....	44° ± 2°
Left hand down.....	37° ± 2°
Right hand up.....	42° ± 2°
Right hand down.....	40° ± 2°

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