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Beechcraft Queen Air 80

OWNER'S MANUAL

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*Title	A2	July 26, 1963
*List of Effective Pages	A2	July 26, 1963
i		Original
ii thru iii	A1	January 15, 1963
iv		Original
1-1 thru 1-9		Original
1-10	A1	January 15, 1963
1-11 thru 1-13		Original
1-14 thru 1-15	A1	January 15, 1963
1-16 thru 1-23		Original
1-24 thru 1-25	A1	January 15, 1963
2-1 thru 2-2		Original
2-3 thru 2-4	A1	January 15, 1963
2-5		Original
3-1 thru 3-9		Original
4-1 thru 4-4		Original
4-5 thru 4-6B	A1	January 15, 1963
4-7	A1	January 15, 1963
4-8 thru 4-10		Original
4-11	A1	January 15, 1963
4-12 thru 4-14		Original
4-15	A1	January 15, 1963
4-16		Original
5-1 thru 5-6		Original
5-7 thru 5-8	A1	January 15, 1963
5-9 thru 5-13		Original
*5-14 thru 5-15	A2	July 26, 1963
6-1	A1	January 15, 1963
6-2		Original
6-3	A1	January 15, 1963
6-4 thru 6-5		Original
6-6	A1	January 15, 1963
6-7 thru 6-23		Original
6-24 thru 6-27	A1	January 15, 1963
6-28 thru 6-31		Original
7-1 thru 7-2	A1	January 15, 1963
7-3 thru 7-9		Original
7-10 thru 7-11	A1	January 15, 1963
7-12 thru 7-13		Original
7-14 thru 7-15	A1	January 15, 1963
7-16 thru 7-19		Original
7-20	A1	January 15, 1963
7-21 thru 7-25		Original

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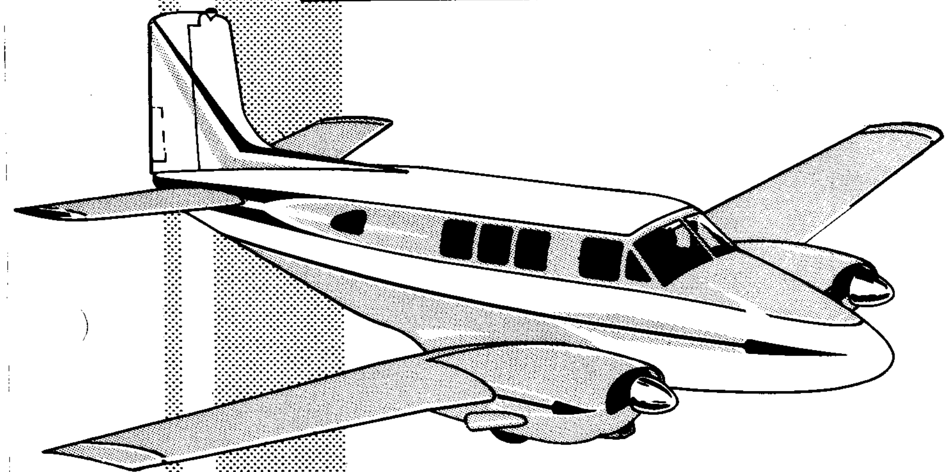
*Title	A1	January 15, 1963
*List of Effective Pages	A1	January 15, 1963
i		Original
*ii thru iii	A1	January 15, 1963
iv		Original
1-1 thru 1-9		Original
*1-10	A1	January 15, 1963
1-11 thru 1-13		Original
*1-14 thru 1-15	A1	January 15, 1963
1-16 thru 1-23		Original
*1-24 thru 1-25	A1	January 15, 1963
2-1 thru 2-2		Original
*2-3 thru 2-4	A1	January 15, 1963
2-5		Original
3-1 thru 3-9		Original
4-1 thru 4-4		Original
*4-5 thru 4-6B	A1	January 15, 1963
*4-7	A1	January 15, 1963
4-8 thru 4-10		Original
*4-11	A1	January 15, 1963
4-12 thru 4-14		Original
*4-15	A1	January 15, 1963
4-16		Original
5-1 thru 5-6		Original
*5-7 thru 5-8	A1	January 15, 1963
5-9 thru 5-14		Original
*6-1	A1	January 15, 1963
6-2		Original
*6-3	A1	January 15, 1963
6-4 thru 6-5		Original
*6-6	A1	January 15, 1963
6-7 thru 6-23		Original
*6-24 thru 6-27	A1	January 15, 1963
6-28 thru 6-31		Original
*7-1 thru 7-2	A1	January 15, 1963
7-3 thru 7-9		Original
*7-10 thru 7-11	A1	January 15, 1963
7-12 thru 7-13		Original
*7-14 thru 7-15	A1	January 15, 1963
7-16 thru 7-19		Original
*7-20	A1	January 15, 1963
7-21 thru 7-25		Original

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

Beechcraft Queen Air

Model 65



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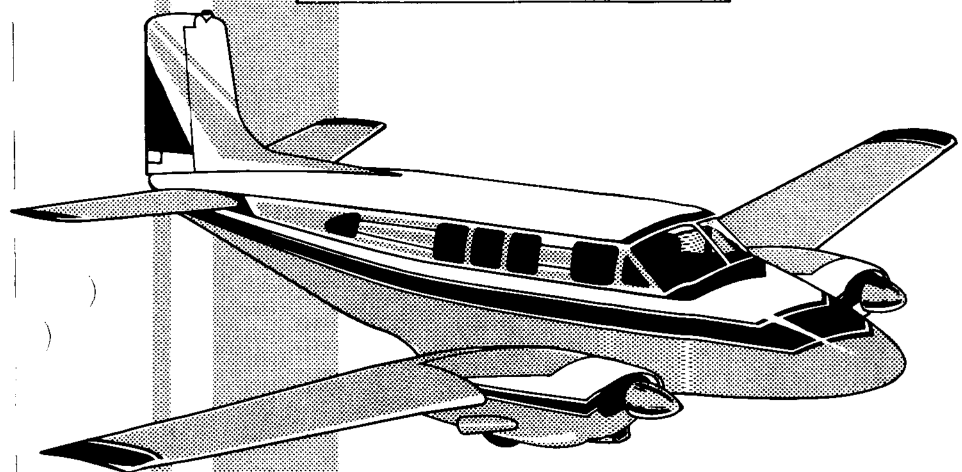
*Title	A_1	November 20, 1962
*List of Effective Pages	A_1	November 20, 1962
i		Original
*ii through iii	A_1	November 20, 1962
iv through vi		Original
1-1 through 1-5		Original
*1-6	A_1	November 20, 1962
1-7		Original
*1-8 through 1-9	A_1	November 20, 1962
1-10 through 1-25		Original
2-1 through 2-5		Original
3-1 through 3-2		Original
*3-3	A_1	November 20, 1962
3-4 through 3-7		Original
*3-8	A_1	November 20, 1962
3-9		Original
4-1 through 4-4		Original
*4-5	A_1	November 20, 1962
4-6 through 4-11		Original
*4-12 through 4-16	A_1	November 20, 1962
*5-1	A_1	November 20, 1962
5-2 through 5-9		Original
*5-10 through 5-12	A_1	November 20, 1962
5-13 through 5-14		Original
6-1 through 6-28		Original
7-1 through 7-4		Original
*7-5 through 7-6A	A_1	November 20, 1962
*7-7 through 7-8	A_1	November 20, 1962
7-9 through 7-11		Original
*7-12 through 7-15	A_1	November 20, 1962
7-16 through 7-19		Original
*7-20 through 7-21	A_1	November 20, 1962
7-22		Original
*7-23 through 7-25	A_1	November 20, 1962

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

Beechcraft Queen Air

Model 65



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LIST OF EFFECTIVE PAGES

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*Title	A_3	November 15, 1962
*List of Effective Pages	A_3	November 15, 1962
i		Original
*ii through iii	A_3	November 15, 1962
iv		Original
v	A_1	February 20, 1961
vi		Original
1-1 through 1-3		Original
*1-4	A_3	November 15, 1962
1-5	A_1	February 20, 1961
*1-6	A_3	November 15, 1962
1-7	A_1	February 20, 1961
*1-8 through 1-9	A_3	November 15, 1962
1-10	A_1	February 20, 1961
1-11 through 1-12		Original
1-13 through 1-17	A_1	February 20, 1961
1-18 through 1-22		Original
1-23 through 1-24	A_1	February 20, 1961
1-25		Original
2-1 through 2-2		Original
2-3 through 2-4	A_1	February 20, 1961
2-5		Original
3-1		Original
3-2	A_1	February 20, 1961
*3-3	A_3	November 15, 1962
3-4 through 3-8		Original
*3-9	A_3	November 15, 1962
4-1		Original
4-2	A_1	February 20, 1961
4-3 through 4-4		Original

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

LIST OF EFFECTIVE PAGES (Cont'd)

*4-5	A_3	November 15, 1962
4-6 through 4-8		Original
4-9 through 4-11	A_2	October 20, 1961
*4-12 through 4-16	A_3	November 15, 1962
*5-1	A_3	November 15, 1962
5-2 through 5-5	A_2	October 20, 1961
5-6		Original
5-7 through 5-8	A_1	February 20, 1961
5-9		Original
*5-10 through 5-12	A_3	November 15, 1962
5-13		Original
5-14	A_1	February 20, 1961
6-1	A_1	February 20, 1961
6-2 through 6-13		Original
6-14 through 6-21	A_1	February 20, 1961
6-22 through 6-28		Original
7-1 through 7-2		Original
7-3	A_1	February 20, 1961
7-4		Original
*7-5 through 7-6A	A_3	November 15, 1962
*7-7 through 7-8	A_3	November 15, 1962
7-9		Original
7-10	A_1	February 20, 1961
7-11		Original
*7-12 through 7-15	A_3	November 15, 1962
7-16 through 7-19		Original
*7-20 through 7-21	A_3	November 15, 1962
7-22		Original
*7-23 through 7-25	A_3	November 15, 1962

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Beechcraft Queen Air 80

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Title	Original
List of Effective Pages	Original
i through vi	Original
1-1 through 1-25	Original
2-1 through 2-5	Original
3-1 through 3-9	Original
4-1 through 4-16	Original
5-1 through 5-14	Original
6-1 through 6-31	Original
7-1 through 7-25	Original

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

Table of Contents

..... *As the owner of a new*

Queen Air 80 *you should*

Know about your Queen Air 80 performance and economy

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

Get acquainted with your airplane

Read all of this manual carefully to become familiar with your new airplane's operating characteristics.

Read your Beechcraft

NEW AIRPLANE WARRANTY

.... *And when your*

Queen Air 80 *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.

"The operation, care and maintenance of your airplane after its delivery to you is your responsibility. Your authorized Beechcraft Sales and Service Outlets have all the current recommmended modification, service and operational procedures designed to get maximum utility and safety from your airplane."

Keep your airplane looking and running like new

General Specifications

POWER PLANTS

Two, Lycoming, 6 cylinder, IGSO 540; rated at 380 hp @ 3400 rpm for take-off and 360 hp @ 3200 rpm for maximum continuous operation; incorporating Bendix fuel injection system with manual mixture controls and fuel flowmeter; driving Hartzell, 3-bladed, full feathering, aluminum alloy, constant speed hydraulically controlled, 93" diameter propellers.

PERFORMANCE — TRUE AIRSPEED, STANDARD ALTITUDE

Maximum Take-Off Weight .... 8,000 lbs.
Maximum Landing Weight .... 7,600 lbs.
High Speed at 11,500 feet .... 219 kts/252 mph

TAKE-OFF DISTANCE — 65% Flaps

Ground Run .... 1,060 ft.
Total over 50 ft. obstacle .... 1,450 ft.

RATE OF CLIMB AT SEA LEVEL

Two Engines (8,000 lbs.) .... 1,500 fpm

Single Engine (Maximum Continuous Power)
8,000 lbs. .... 275 fpm
7,700 lbs. .... 330 fpm
7,000 lbs. .... 460 fpm

Single Engine (Take-Off Power)
8,000 lbs. .... 335 fpm
7,700 lbs. .... 395 fpm
7,000 lbs. .... 530 fpm
6,500 lbs. .... 645 fpm

CEILING

Service Ceiling @ 8,000 pounds
Two engines (100 fpm) .... 29,100 ft.
Single engine (50 fpm) .... 12,500 ft.

Absolute Ceiling @ 8,000 pounds
Two engines .... 30,500 ft.
Single engine .... 13,900 ft.

MAXIMUM CRUISING SPEED (Average Weight)

(a) at 70% power (2750 rpm @ 15,000 feet) .... 200 kts/230 mph
(b) at 65% power (2750 rpm @ 17,000 feet) .... 198 kts/228 mph

MAXIMUM RANGE (Average Weight) Includes allowances and 45 minute reserve	180 gal.	230 gal.
At 45% mc power at 10,000 feet	960 miles	1,320 miles
MAXIMUM ENDURANCE (No Reserve)		
At 32% mc power at 5,000 feet	9.7 hrs.	12.4 hrs.

STALLING SPEED (Zero Thrust)

Clean .... 82.5 kts/95 mph
Gear down, Full Flaps .... 67 kts/77 mph

LANDING DISTANCE — 100% Flaps — 7,600 pounds

Ground Run	1,160 ft.
Total over 50 ft. obstacle	2,070 ft.

The above performance figures are the result of flight tests of the Model 65-80 Queen Air conducted by Beech Aircraft Corporation under factory-controlled conditions and will vary with individual aircraft and the numerous factors affecting flight performance.

TYPE

Six to nine place, high performance, all-metal, low-wing, monoplane with retractable, tricycle landing gear; full panel, flight and engine instruments; powered by twin, fuel injection engines.

WEIGHTS

Gross Weight	8,000 pounds
Empty Weight (including standard equipment, unusable fuel and oil)	4836 pounds
Weight available for passengers, baggage, fuel, oil and optional equipment	3164 pounds

WING AREA AND LOADINGS

Wing Area	277.06 sq. ft.
Wing Loading at gross weight	28.9 lbs./sq. ft.
Power Loading at gross weight	11.1 lbs./hp.

DIMENSIONS

Wing Span	45 ft. 10.5 in.
Length	35 ft. 3 in.
Height to top of fin	14 ft. 8 in.

CABIN DIMENSIONS

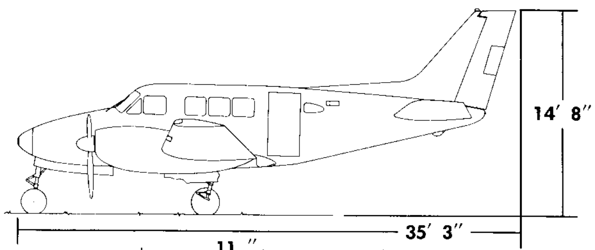
Length	108 in.
Width	54 in.
Height	57 in.
Entrance Door	27 in. x 51¾ in.
Baggage Compartment Volume	29 cu. ft.
Electronics Compartment Volume	21.5 cu. ft.

ENGINE EQUIPMENT (Per Engine)

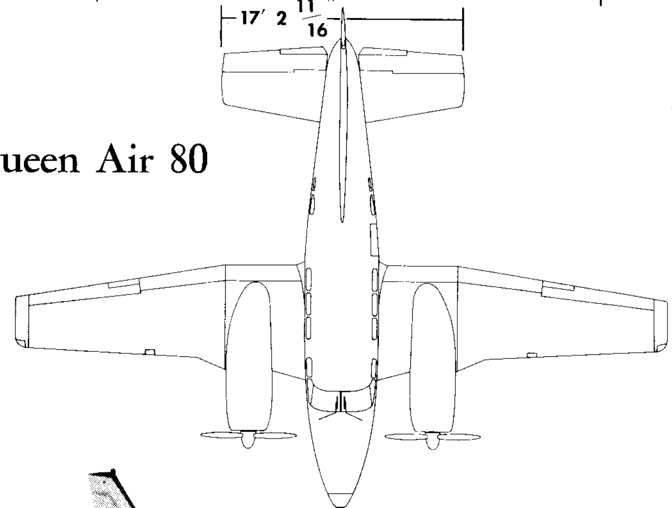
- Electric Engine Primer
- Two Electric Submerged Fuel Boost Pumps
- Electric Engine Starter
- Engine Driven Fuel Pump
- Augmentor Tube Exhaust System
- 28V DC Generator, 50 amp standard; (100 amp generator or 125 amp alternator-rectifier optional)
- Vacuum Pump
- Propeller Governor
- Tachometer Generator
- Fuel Injection System
- Low Tension Ignition

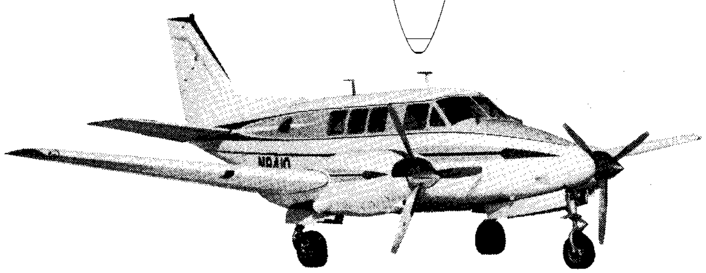
FUEL AND OIL CAPACITY

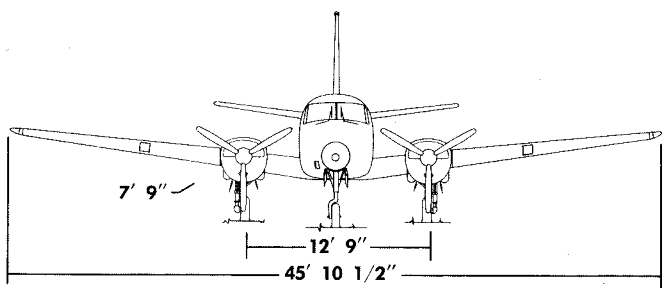
Fuel Capacity in Standard Wing Tanks	180 gal.
Fuel Capacity with Optional Auxiliary Wing Tanks	230 gal.
Oil Capacity (Total)	8 gal.



Queen Air 80







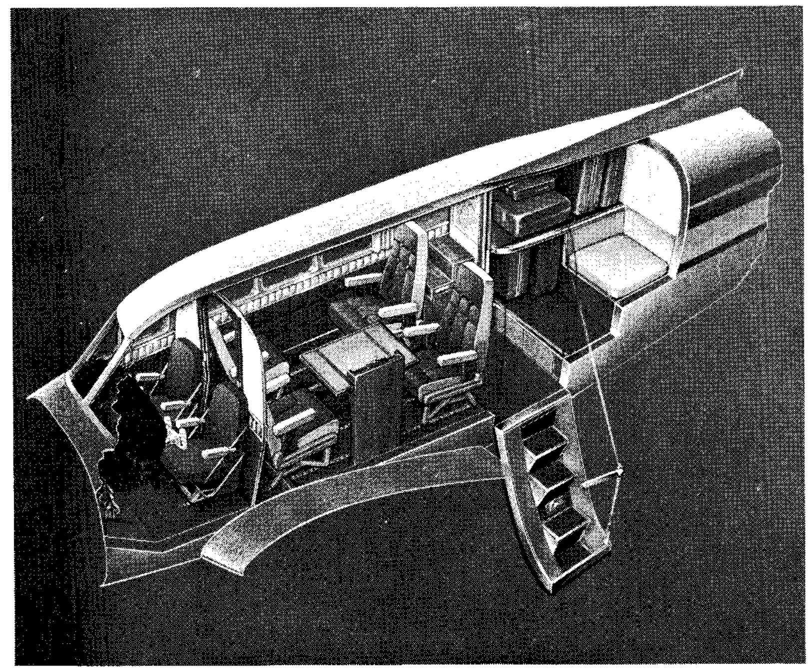
SECTION I

Descriptive Information

SECTION I

Your new BEECHCRAFT Queen Air 65-80 is a six to nine-place, low wing monoplane. The all metal, semi-monocoque airframe structure is of aluminum, magnesium and alloy steel, riveted and spot welded for maximum strength. Although the Queen Air is licensed as a "Normal" category airplane, its structural integrity approaches the load requirements for "Utility" class certification.

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

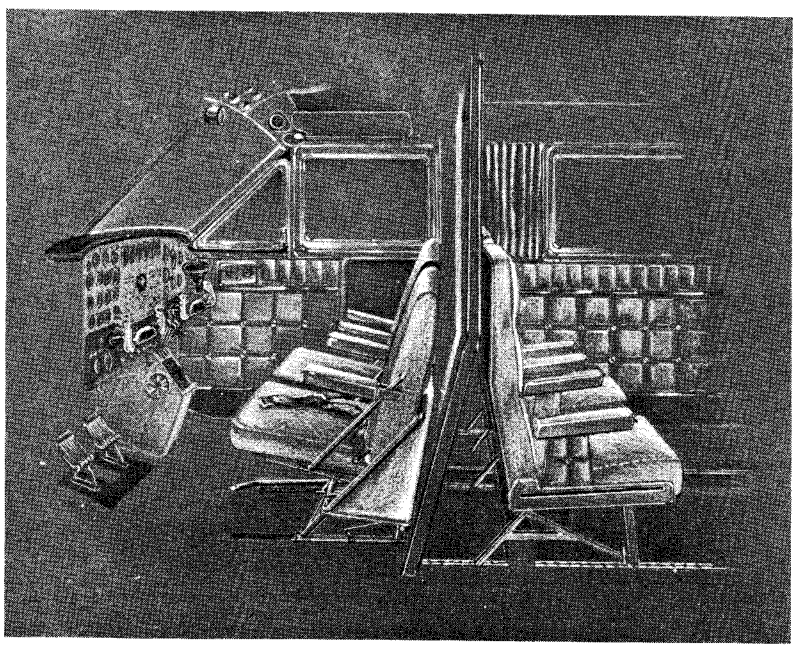


FLIGHT CONTROLS

Duplicate sets of flight controls are provided in the cockpit, permitting complete control of the aircraft from either the pilot or copilot's seat. Control of the rudder as well as nose wheel steering is provided by fore and aft adjustable rudder pedals. The fore and aft adjustment of each rudder pedal is determined by the individual pilot and is set by means of a spring loaded adjustment lever on each pedal. Dual control columns operate the elevators and matched wheels control the ailerons.

The primary flight surfaces of the Queen Air are operated through push-pull rods and conventional closed-circuit cable systems, terminating at bell cranks. The preformed, carbon steel cables run over phenolic pulleys with sealed ball bearings which ordinarily need no lubrication to insure friction-free action and long life.

Trim tabs on rudder, elevator and left aileron are adjustable from the center pedestal through closed circuit cable systems which drive



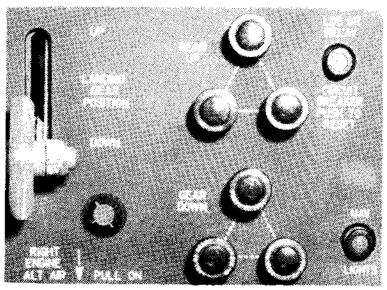
jackscrew-type actuators. Position indicators for each of the trim tabs are located near their respective controls. The elevator and aileron tabs incorporate anti-servo mechanisms; as the control surface is displaced from the neutral, the tab moves in the same direction, increasing the effective control surface area and the force necessary to displace it. The rudder tab incorporates servo action, slightly decreasing the effective control area but substantially decreasing the force necessary to displace it. The electrically operated, slotted, full trailing edge wing flaps, consisting of two sections for each wing, extend from the fuselage to the aileron on each side. A reversible motor drives four separate jackscrews through flexible shafts to actuate the four sections simultaneously. Flap motor operation is controlled by a three-position switch (placarded "UP", "OFF", and "DOWN") in the subpanel center. The flap position indicator located to the right of the switch indicates flap position in per cent of travel. Flap limit switches, mounted on the right inboard flap, in conjunction with dynamic brake action, limit flap travel within the specified range. A 15-ampere, push-pull circuit breaker on the extreme right subpanel protects the flap motor in case of overload.

LANDING GEAR

The Queen Air's extra-strong electrically operated landing gear incorporates the advantages obtainable only with tricycle type landing gear. Maximum visibility plus nose wheel steering combined with minimum stopping distance and longer brake and tire life rank high among these advantages as applied to ground handling operations. The gear is operated by a 28-volt, dc, landing gear motor which is of the split-field, series-wound type, located on the forward side of the main center section spar. One field of the split-field motor drives the motor in each direction. To prevent over-travel of the gear, the motor also acts as a dynamic brake; a relay simultaneously breaks the power circuit to the motor and makes a complete circuit through the armature and the unused field winding. The motor then acts as a generator and the resulting mechanical load on the armature stops the gear almost instantly.

The landing gear motor is controlled by the gear extension switch located to the right of center on the subpanel (placarded "UP" and "DOWN"). When the extension lever is positioned, either "UP" or

"DOWN," the main gear actuators are driven by torque shafts from the motor gearbox located on the forward side of the right main spar. The nose gear is driven by a chain from a sprocket on the main gear torque shaft. A spring-loaded friction clutch between the gearbox and the torque shaft protects the system in the event of mechanical malfunction while a 50-amp, push-to-reset circuit breaker beside the pilot's seat protects the system from electrical overloads.



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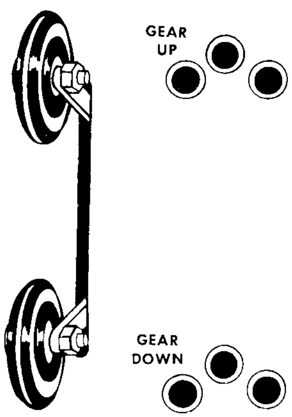
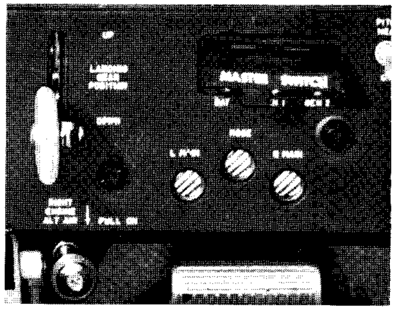
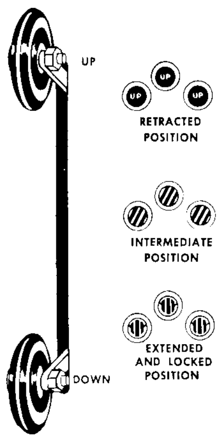




PRIOR TO LC81



The landing gear position is indicated by the extension handle and the three window indicator (aircraft prior to LC-81) or the appropriate triple light indicator (subsequent aircraft). When the landing gear is retracted, the word, "UP" appears in each of the three windows or the triple lights glow in the upper indicator, depending on the model involved. When the

The landing gear position indicators are actuated by one set of normally closed and another set of normally open, microswitches installed at the knee of each of the three landing gear drag braces. To provide maximum assurance of positive and reliable gear position indication, one position switch on each drag brace is wired directly to its individual indicator light in the triple light triangles.

The other switch on each drag brace is wired in parallel with the corresponding switch on each of the other drag braces and in series to the throttle warning horn switches. Due to the physical location of the switches, therefore, should one or more of the drag braces fail to lock in the down position when the throttle is retarded, an unsafe light indication will be received but more noticeably, the throttle warning horn will sound. When the throttle is retarded below a manifold pressure sufficient to maintain safe flight with the gear not down and locked, the circuit is closed and the warning horn sounds its alarm to inform the pilot that all three of the landing gears are not down and locked.

Slotted down-lock hook attachments, fitted to each of the drag braces, act as positive, mechanical, down locks, while the jackscrew in each actuator holds the gear in the retracted position.

Direct linkage to the rudder pedals allows the nose wheel to be turned through 14° to the left of center and 12° to the right. When rudder control is augmented by brake, the nose wheel can be deflected up to 48° to either side of center. Spring mechanisms in the linkage dampen the transmission of excessive shock loads to the rudder pedals. When retracted, the nose wheel is automatically centered and the steering linkage becomes inoperative.

The single disc, hydraulic brakes of the main gear incorporate three pressure cylinders which respond to fluid pressure from the master cylinders. Toe pressure on either set of rudder pedals actuates the system. Dual parking brake valves, between the master cylinders and the brakes, are actuated by pulling the parking brake handle which is located on the extreme left subpanel. To set the parking brakes, pull the brake handle out and apply pressure to the toe brakes. The parking brakes are released by pushing the brake handle fully in. To prevent rolling after release of the parking brakes, hold toe pressure on the rudder pedals.

To prevent accidental gear retraction on the ground, a safety switch on the left main strut breaks the control circuit whenever the strut is compressed. ***Never rely on the safety switch to keep the gear down while taxiing or on landing or take-off roll.*** Always check the position of the landing gear handle.

When either or both throttles are retarded below an engine setting sufficient to sustain flight, with the gear not down and locked, a warning horn will sound intermittently. During single engine operation the horn can be silenced by advancing the throttle of the inoperative engine.

The Queen Air's landing gear incorporates Beech air-oil type shock struts that are filled with both compressed air and hydraulic fluid. Their correct inflation should be insured before each flight. ***Even brief taxiing with a deflated strut can cause severe damage.***

POWER PLANTS

Your BEECHCRAFT is powered by two, 6 cylinder, Lycoming, supercharged, IGSO 480 series, horizontally opposed engines, equipped with Simmonds SU-series fuel injection. These engines are rated at 340 hp at 3,400 rpm for take-off and 320 hp @ 3200 rpm for maximum continuous operation. The engines are supercharged by single stage, single speed, centrifugal blowers which operate at 11.27 times crankshaft speed. The power plants utilize a two stage augmentor exhaust system to assure adequate cooling in all power regimes and to provide additional thrust while eliminating the need for cowl flaps. The Simmonds fuel injection system injects fuel into the supercharger blower (virtually eliminating induction system icing from fuel vaporization) and includes automatic altitude and temperature compensators. The system also incorporates manual fuel mixture enrichment for high power requirements such as climbs at high altitudes. The controls for this enrichment system, located on the pilot's pedestal, will automatically cut off when the throttles are retarded.

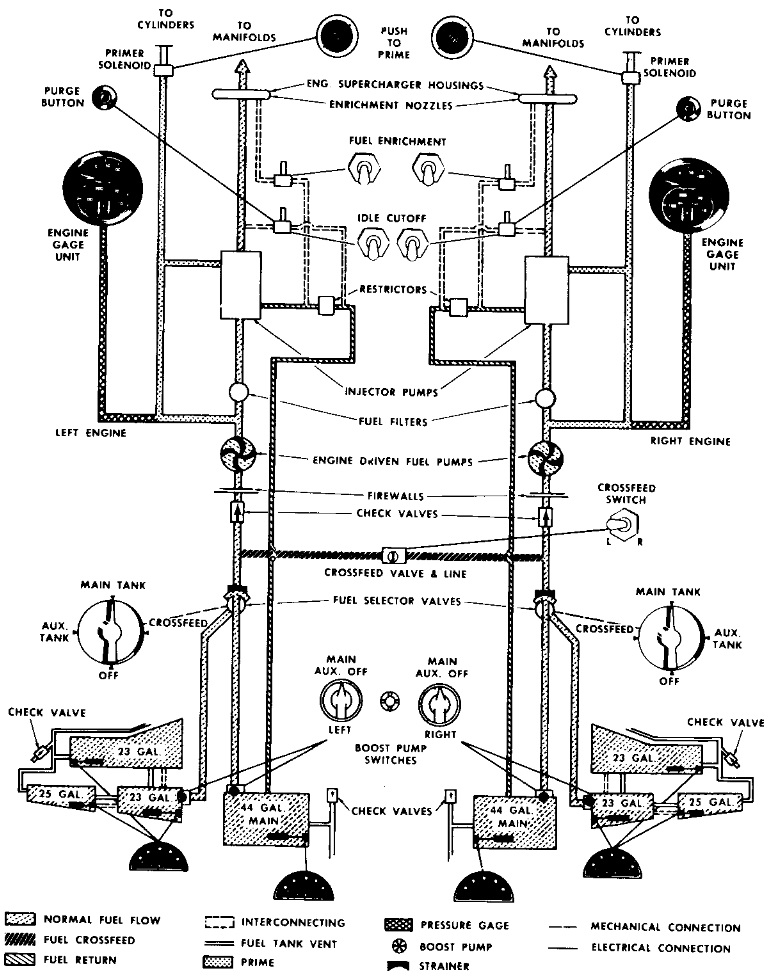
Three sources of induction air are available to the system, ram, filtered and alternate warm air. The three position switch on the center sub-panel, marked "RAM" "AUTO" and "FILTERED," selects either ram or filtered air. In flight, ram air provides better engine operation, but on the ground or where dusty conditions are likely to exist, filtered air should be selected. In the "AUTO" position the source selection is determined by the landing gear position switch. When the gear handle is in the "DOWN" position, filtered air is selected; ram air is selected when the handle is in the "UP" position.

Two push-pull controls for alternate warm air, located under the sub-panel to either side of the control pedestal, select warm air to combat any induction system icing.

Direct cranking, 24-volt starters are energized in the starting cycle of your Queen Air. Electrical impulse is caused to flow to the starter by the actuation of the unitized starter, primer and magneto switch. This triple function unit provides control over starter, primer and ignition in a single switch for each engine. Each switch is placarded "OFF," "R," "L," "BOTH," "START" and "PUSH TO PRIME." The push to prime feature of this switch affords the pilot the convenience of priming the engine with the starter engaged, in a single operation. Spring loading returns the switch to the "BOTH" magneto position, when it is released, assuring proper firing of the retard-breaker magnetos.

The Queen Air is equipped with two Hartzell, all-metal, full-feathering, constant speed, three-bladed propellers. Centrifugal force from the counter weights, assisted by a feathering spring, moves the blades to high pitch. Engine oil, under governor boosted pressure, moves the blades to low pitch. A spring in each propeller hub moves the blades to the feathered condition when the prop control lever on the pedestal is pulled to the feathered position. A single action, engine driven, propeller governor automatically maintains engine rpm. The propeller controls located on the control console are placarded "Propellers-Push Low Pitch; Pull Extreme To Feather." A red band at the lower end of the quadrant indicates the feather position. Throttle and propeller levers are grouped along the control console. Their knobs are shaped to government standard configurations so they can be identified by touch. Controllable friction locks on either side of the pedestal may be tightened when power settings are established to prevent creeping. Due to the fuel injection system, no mixture control is required.

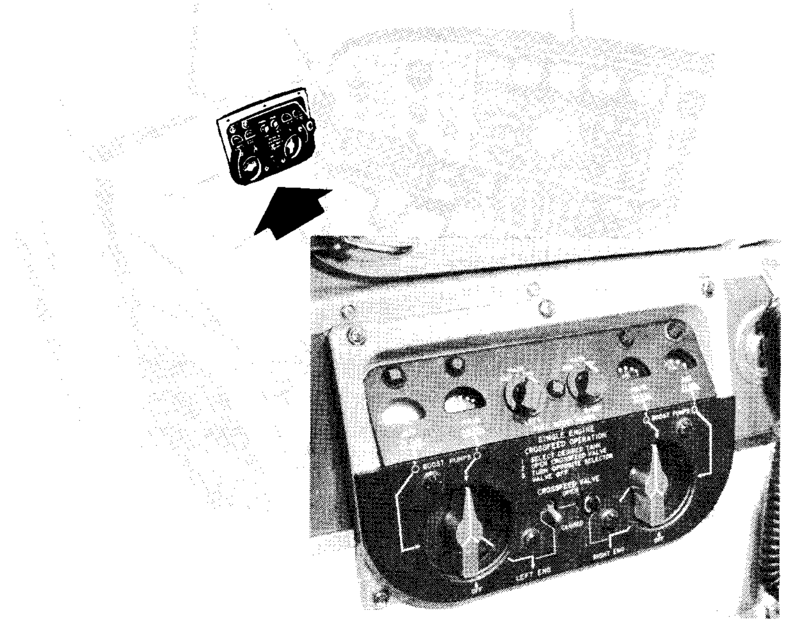
FUEL SYSTEM



TO CYLINDERS
TO MANIFOLDS
PUSH TO PRIME
PRIMER SOLENOID
PURGE BUTTON
ENG. SUPERCHARGER HOUSINGS
ENRICHMENT NOZZLES
FUEL ENRICHMENT
IDLE CUTOFF
ENGINE GAGE UNIT
RESTRICTORS
INJECTOR PUMPS
FUEL FILTERS
LEFT ENGINE
RIGHT ENGINE
ENGINE DRIVEN FUEL PUMPS
FIREWALLS
CHECK VALVES
CROSSFEED SWITCH
L R
CROSSFEED VALVE & LINE
MAIN TANK
AUX. TANK
CROSSFEED
OFF
FUEL SELECTOR VALVES
MAIN AUX. OFF
LEFT
RIGHT
BOOST PUMP SWITCHES
CHECK VALVE
23 GAL.
25 GAL.
44 GAL. MAIN
NORMAL FUEL FLOW
FUEL CROSSFEED
FUEL RETURN
INTERCONNECTING
FUEL TANK VENT
PRIME
PRESSURE GAGE
BOOST PUMP
STRAINER
MECHANICAL CONNECTION
ELECTRICAL CONNECTION

FUEL AND OIL SYSTEMS

The Queen Air 80 has a 180-gallon fuel capacity supplied by two main tanks and four auxiliary wing tanks. Fuel capacity can be increased to 230 gallons with the installation of two additional auxiliary wing cells. The fuel system is actually two independent systems connected by a cross-feed. Each system consists of one main and two (three with optional) auxiliary fuel cells, two submerged electric boost pumps, a manual fuel selector valve, a fuel strainer, and an engine driven pump. The auxiliary fuel cells of each system are interconnected, feed a single line, are filled through a common opening and transmit their common level to a single gage. A submerged boost pump and sump drain are located in each main cell and in each rear inboard auxiliary cell. The forward auxiliary cells also incorporate sump drains. Fuel selector valves and strainers are located in each wheel well. The cross-feed system has an electrically operated gate valve and is controlled by a toggle switch on the fuel control panel. The fuel management control panel mounted to the pilot's left, gives the schematic outline



of the fuel system, plus gages, cross-feed controls, boost pump switches and selector valve controls.

Fuel quantity is measured by float type transmitter units in each fuel cell. These units transmit fuel level signals to the fuel gages on the fuel control panel. The standard auxiliary tank capacity is 46 gallons in each wing, and the optional 25 gallon outboard auxiliary cell installation increases the capacity to 71 gallons. The main tank capacity is 44 gallons per wing. Fuel pressure, measured at the engine driven pumps, is indicated on the engine gage units.

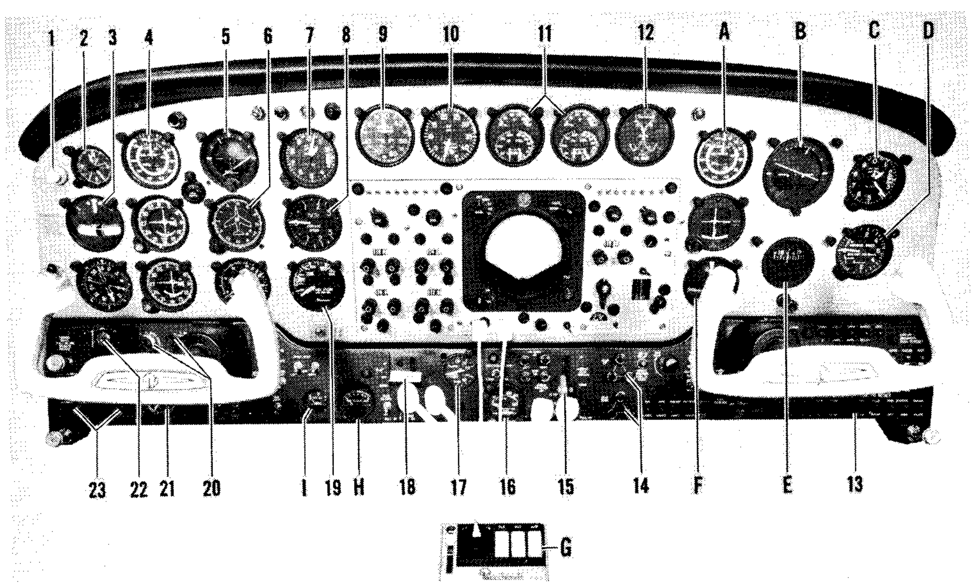
The three position selector valve handle controlled by the pilot determines the cell, main or auxiliary, from which fuel is drawn. Cross-feed is obtained in the off position by operating the cross-feed switch.

A dry sump, full pressure oil system, supplied from a four gallon tank behind the firewall in each nacelle, lubricates the engines. This system incorporates engine driven circulating pumps, scavenger pumps, oil coolers, shut off control valves and appropriate plumbing for each engine. The system is fully automatic, controlled by thermostatic and pressure relief by-pass valves in the oil coolers. Manual shut-off valve controls located just forward and to either side of the control pedestal are provided, should it become necessary to secure the lubrication system for an engine in the event of fire, malfunction or failure.

INSTRUMENTS

Most flight and engine instruments are arranged on a floating instrument panel so that the more important instruments are seen first. Where practical, the normal operating limits are indicated. Standard flight instrumentation includes attitude and directional gyros, magnetic compass, electric turn and slip indicator, vertical speed indicator, outside air thermometer, dual scale (knots and miles per hour) air speed indicator and altimeter.

Engine instruments, consisting of a manifold pressure gage, ta-



STANDARD EQUIPMENT

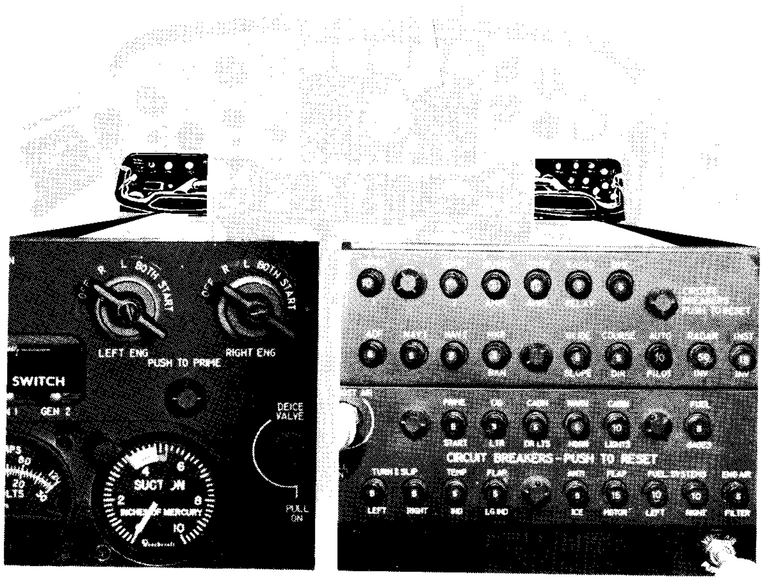
1. Alternate Static Air Source
2. Clock
3. Turn and Bank Indicator
4. Airspeed Indicator
5. Attitude Gyro
6. Directional Gyro
7. Altimeter
8. Vertical Speed Indicator
9. Manifold Pressure Gage
10. Synchroscope Tachometer
11. Engine Gage Units
12. Cylinder Head Temperature Gage
13. Circuit Breaker Panel
14. Landing Gear Indicators
15. Landing Gear Switch
16. Induction Air Temperature Gage
17. Flap Position Indicator
18. Flap Extension Switch
19. Fuel Flow Indicator
20. Magneto-Starter Switches
21. Suction Gage
22. Battery Key Lock
23. Volt-Ammeters

OPTIONAL EQUIPMENT

A. Copilot's Airspeed Indicator
B. Copilot's Attitude Gyro
C. Copilot's Altimeter
D. Copilot's Vertical Speed Indicator
E. Copilot's Directional Gyro
F. Copilot's Turn and Bank Indicator
G. Autopilot
H. Electrothermal Propeller De-Icer Ammeter
I. Anti-Ice Fluid Gage

chometer, two engine gage units, and a cylinder head temperature gage, are grouped at the top center of the instrument panel. The engine gage units indicate fuel and oil pressure and oil temperature for their respective engines. A fuel flowmeter is located just above the subpanel on the left side of the control console, and an induction air temperature gage is installed in the center of the subpanel.

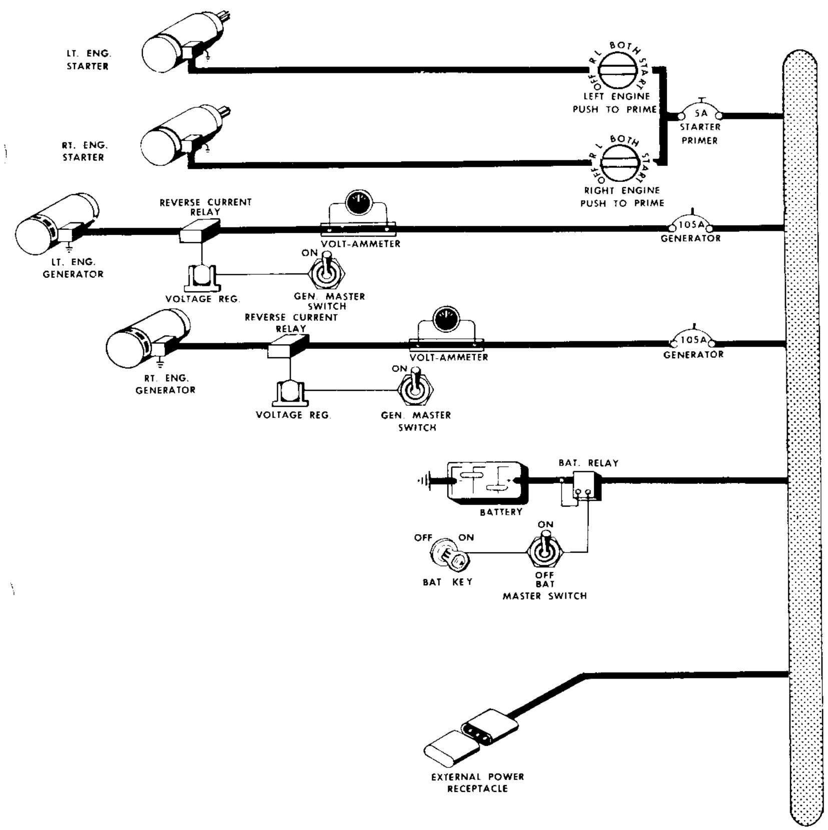
Impact air pressure and atmospheric air pressure for the air speed indicator, altimeters and vertical speed indicator are supplied by the pitot and static air systems. Since the accuracy of these instruments depends on accurate pick up of the two pressures, the systems have been carefully developed and tested under controlled conditions. To insure proper operation of the systems, and consequently the instruments, drain the systems regularly and keep static ports and pitot heads free of obstruction.

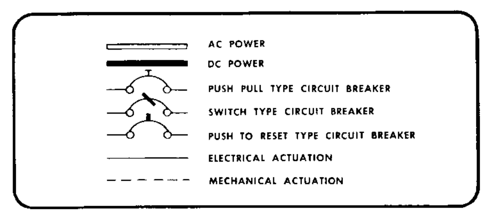


ELECTRICAL SYSTEM

The Queen Air's direct current, 24-volt, electrical system consists of a single 24-volt nickel cadmium battery mounted in the top center

ELECTRICAL SYSTEM





of the left nacelle; two 28-volt dc, 50 or 100 ampere engine-driven generators connected in parallel to the main bus system; carbon pile voltage regulators; differential voltage reverse current relays and ammeters. The output of each generator is automatically controlled by its voltage regulator and the system equalizer circuit which adjusts generator output so that both are equal. An alternator rectifier system is offered as optional equipment in lieu of the above.

Two volt-ammeters located on the extreme left of the subpanel normally indicate generator or alternator output in amperes, however, when the spring loaded push button switch is pressed, main bus voltage is indicated.

The generator and battery master switches on the subpanel, which are normally left on, have a provision for cutting off battery/generator power simultaneously by a "gang bar" extending across the switches. This "gang bar" hood is marked "MASTER SWITCH." The battery lock switch, adjacent to the master switches, is key operated. In the "ON" position, it allows the flow of electricity from the battery through the master switches to the bus.

The internal lighting system consists of several lighting networks. Among the components of these networks are: the cabin door warning light, mounted on the instrument panel, which is lighted whenever the cabin door is unlocked; passenger controlled reading lights which are integrated into the cabin cold air outlet panels overhead; cockpit controlled cabin dome lights actuated by toggle switches on the right subpanel; cockpit lights including map, subpanel, fuel control panel, flight and engine instrument lights, all of which are controlled by rheostats in the overhead light control panel.

HEATING AND VENTILATING SYSTEM

Ambient air enters the Queen Air's air conditioning system through the intake aperture on the right hand side of the nose. This cold air is distributed by the cold air plenum, part passing into the 100,000 btu, Janitrol heater and part flowing to the cold air outlets in the cabin and pilots' compartment.

The heated air passes through ducts under the floor, on the right side of the fuselage, to the warm air outlets in the passengers' compartment. Here, the flow is reversed and the warm air is pumped forward. Studies indicate that this system provides a more even heating of the entire cabin since normal cabin air flow tends to move forward.

That part of the ambient air which was ducted to the cold air outlets throughout the aircraft is available to the occupants from the ceiling-mounted, cold air vents.

Ram air pressure supplies the heating and ventilating system with fresh air while the airplane is in flight. A blower replaces the ram effect during ground operations. Power for the blower is initiated by the HEATER-BLOWER switch and is further controlled by a switch on the landing gear which permits the blower to operate only when the landing gear strut is compressed. For cooling on the ground, turn the HEATER-CONTROL switch "OFF" and turn the HEATER-BLOWER switch to the "ON" position. This action cuts the heater out of the system and the blower impels cool air from the screened intake on the top of the nose.

Fuel under pressure is supplied to the heater combustion chamber by the left engine fuel pump or by the boost pumps if that engine is not running. The proper fuel-air ratio being delivered is maintained by a regulator, sensitive to differential air pressure. Two solenoid valves in the supply line prevent any seepage of fuel when the heater is not operating. When the controlling switches are in the "ON" position, ignition is continuously supplied to the ignitor. Fuel flow, and consequently cabin temperature, is governed by a sensing element in the cabin exit air vent which acts in conjunction with the other elements in the electronic control system.

Two rheostats, one in the cockpit and the other in the cabin, control interior heating of the Queen Air. The CABIN-COCKPIT switch on the right center of the subpanel, determines which of these rheostats will be used to control the temperature throughout the aircraft.

Three other controls are important to the system. Mounted on the right center subpanel, are the HEATER CONTROL switch, the HEATER-

BLOWER switch, and the MANUAL-AUTO switch. For normal operation, the HEATER-BLOWER switch and the HEATER CONTROL switch are flipped up and the MANUAL-AUTO switch is toggled to "AUTO." This combination sets up circuits that provide thermostatic temperature regulation.

If manual heat control is desired, or required by a malfunction in the "AUTO" system, flip the MANUAL-AUTO switch to "MANUAL." This removes the sensing elements from the control system, allowing continuous combustion in the heater. Temperature within the aircraft is then maintained by manipulation of the HEATER CONTROL switch.

A normally closed limit switch in the heater discharge duct, cycles the heater off when the temperature reaches 200°F. As an over-temperature safeguard, a normally open thermoswitch closes, if the temperature should reach 300°F, blowing a fuse located behind the RH subpanel which renders the heater inoperative.

Below the subpanels, at the outboard extremes, are manual controls for the regulation of air flow in the cockpit. These "push-open" controls govern the amount of air flowing into the cockpit from the heater ducts over the rudder pedals. The flow of air is decreased by pulling the controls out.

DEFROST SYSTEM

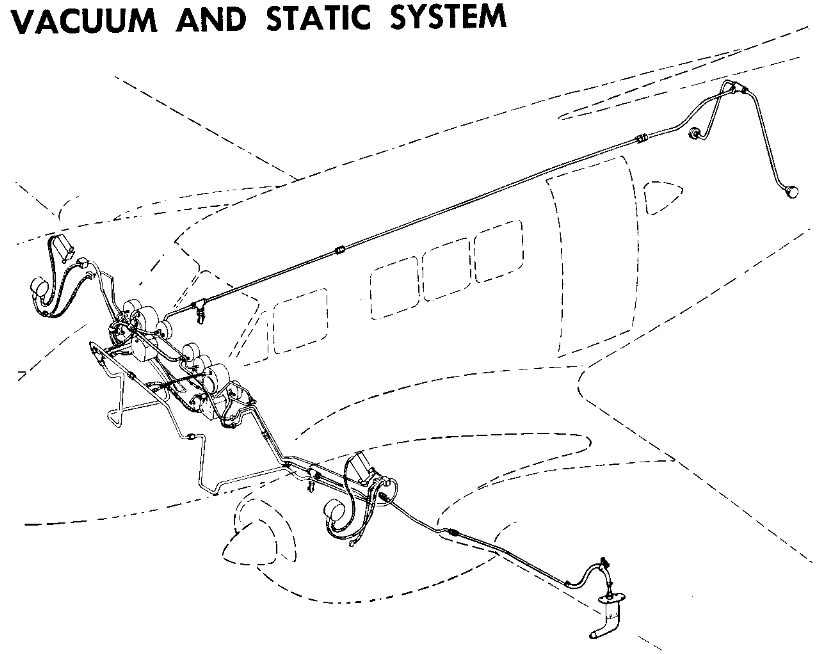
Heated air for defogging the windshield is ducted from the air box, above the rudder pedals, and routed to outlets at the base of each windshield panel. A butterfly valve, controlled by a push-pull handle which is placarded, "DEFROST AIR, PULL ON," regulates the flow across the windshield. This control handle is located below and to the right of the copilot's control column.

To direct the maximum amount of heated air to the windshield, pull out the CABIN HEAT control, to the left of the copilot's control column, and the pilot and copilot's manual heat controls.

VACUUM SYSTEM

Each engine is equipped with a vacuum pump to provide vacuum or suction pressure for the operation of the vacuum instruments. The pumps, each of which is capable of operating the entire vacuum system, are lubricated by oil which is reclaimed and sent back to the engines by an oil separator installed in the discharge line of each pump.

VACUUM AND STATIC SYSTEM



The system incorporates check valves to seal off a pump should it fail, and a suction relief valve on the inlet side of each pump in order to regulate the pressure and maintain it within the normal operating range.

Air for the vacuum driven instruments is drawn through individual air filters which are integral parts of the vacuum instruments. These filters, which protect the delicate, precision parts of the instruments, remove dust, grit and any other foreign particles from the air to insure long life and trouble free operation of the instruments. Proper and regular cleaning of the filters, especially after operating in dusty conditions, is essential to the accurate functioning of the vacuum driven instruments.

A suction gage, mounted on the subpanel, indicates the amount of suction in the vacuum system in inches of mercury. If a partial loss in vacuum pressure is experienced, failure of one pump may be indicated. Pump operation should be checked by noting suction pressure with each engine running individually. See Vacuum System discussion Section VII for gage indications.

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 own distributor, dealer or Certified Service Station, are listed in the latter portion of this section.

GOOD VISIBILITY

With increasing congestion around airports, the ability to see about you is vital to safe take-off and landing. All occupants of the aircraft have excellent visibility through the large safety glass, two-piece windshield or side windows. There is no need to S-turn for adequate vision as the nearly level ground attitude afforded by the tricycle landing gear gives excellent forward visibility to the pilot.

LANDING LIGHTS

Sealed beam landing lights in the leading edge of each outboard wing panel are shielded by clear plastic lenses with a specially designed shaded area to produce maximum effectiveness. Either light is independently operated by separate switches. Prolonged use during ground handling should be avoided. Conventional position lights on the wing tips and tail cone are designed to give steady light and are controlled by a two position switch on the subpanel.

STALL WARNING INDICATOR

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

SAFETY BELTS

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

INSTRUMENT COWL PAD

The foam rubber instrument cowl pad, which is incased in dull-finished vinyl, is shaped to cover the contour above and between the instrument panel and the windshield. It extends aft over the instrument panel in an eyebrow effect, shielding the windshield from instrument light glare during night operations and eliminating much of the sun's glare during the day. Further, it gives the pilots more protection during sudden stops or rapid deceleration.

CABIN INTERIOR

Your Queen Air 80 offers truly "hushed" air travel through its acoustically engineered and sound proofed cabin. Passenger and pilot fatigue factors have been taken into consideration wherever they are pertinent in designing the airplane. These primary design considerations assure relaxed, comfortable speedy travel.

The travel designed interiors include cockpit loud speaker, attractive upholstery and wall to wall carpets.

Since people come in varied sizes and shapes and with equally differing requirements for business and comfort, the designers have provided a maximum variety of cabin styles and arrangements for your selection. To fit the individual comfort needs of its customer, BEECHCRAFT has originated a new concept in seating comfort. As you view the cabin interior, you will note that the individual seats have been track mounted allowing you to slide them fore and aft as necessary to fit your personal comfort. These big, comfortable seats not only provide you with all the leg room you may desire but they are also the reclining type for maximum comfort when the "affairs of state" have been attended to. You will find that the cabin seats are easily removable if it becomes necessary to carry cargo.

NOTE

> When the front cabin seats are installed facing aft, install the 50-534436-81 bushings and BLDS 6-19 detent pins through the forging holes at the rear right and left of the seat. This prevents the seats from reclining and exerting an undesirable load on the rear cockpit bulkhead. The pins and bushings for each seat are stored under the seat when not in use.

Your Queen Air 80 also offers its exclusive picture window visibility to all on board. Here, the cabin windows are placed so close together that only frames separate them, providing true wide-vista visibility with no sacrifice of structural integrity or size. In this custom tailored cabin you will experience an airiness and spaciousness only provided by this panoramic arrangement.

The windows of your Queen Air 80 carry an added safety feature with them, in that the right rear window is also an emergency escape hatch.

In the rear of the cabin the designers have placed the convenient, walk-in luggage and baggage area. With all your luggage readily available to you even while you are miles high, no packing problems arise. There is no problem as to what should go into your brief case and what should be carried in the larger pieces. When you need something from your luggage, simply walk back to the baggage area and pick it up. There is no need to skimp on luggage either. The Queen Air 80 provides more than 29 cubic feet of baggage space, capable of containing more than 350 lbs. of luggage on big, wide, carpeted shelves. The aft lavatory compartment contains complete lavatory facilities with draw curtains for full restroom privacy.

BOARDING CONVENIENCE

Boarding and leaving the Queen Air 80 will be a new pleasure for you because of the skillfully designed "AIR STAIR" door. Modern convenience, comfort and safety have been incorporated in this most functional design. The "AIR STAIR" allows you to walk aboard the aircraft erect, with no bending or high steps to strain for and with a handrail at your finger tips. The steps are wide and reach down within a few inches of the ground, while the handrail cable provides added safety and boarding convenience. The "AIR STAIR" can be lowered from the ground or from the cabin by means of handy twist to lock handle grips. A fuselage mounted door latch and safety chain augment the normal latching system for added convenience and optimum safety.

WHEELS UP SAFETY

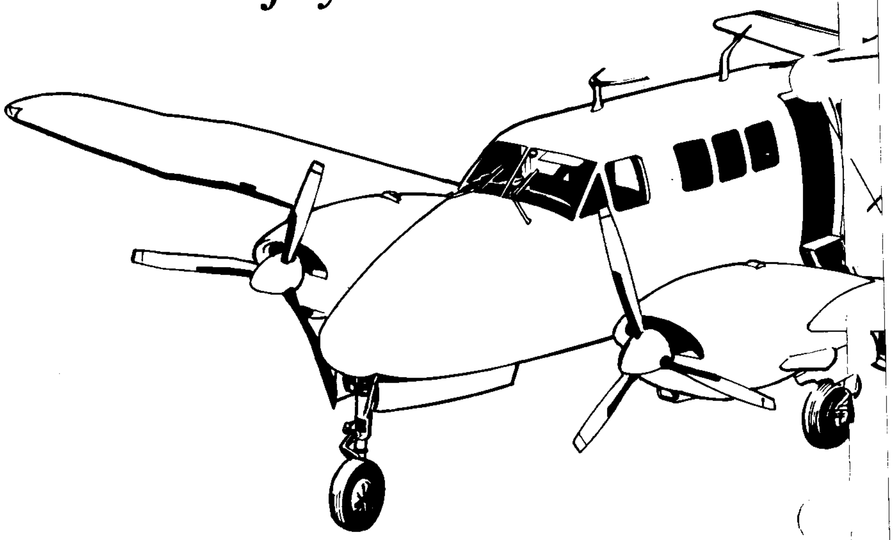
Another safety feature that deserves special note in this section is the skillfully designed landing gear in the retracted position. To afford maximum safety, BEECH engineers have incorporated a manual gear extension system to augment the normal electrically operated system. Should it become impossible to extend the landing gear with either of these systems, considerable safety is afforded by the retracted landing gear.

In the gear up configuration, the main wheels protrude slightly below each nacelle. In the event of a gear up landing, this protuberance protects the wings and, importantly, the fuselage. Further, with gear retracted, the center of gravity is located behind the protruding, main wheels. The nose section is lighter, therefore, and slides easily. The damage incurred by the aircraft under these conditions is substantially lessened.

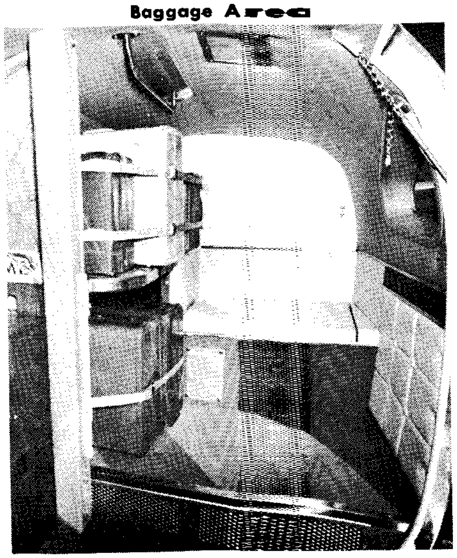
ALTERNATE STATIC AIR

Your Queen Air 80 is equipped with an alternate static air source designed to supply static air to the instruments should the fuselage static ports become obstructed. The system is controlled by a knob on the upper left side of the pilot's instrument panel. Should you suspect that the normal static source has become restricted, as indicated by erratic or abnormal instrument readings, rotate the control knob to the "ON" position. Since this is an alternate system, some deviation from normal instrument readings may be anticipated. Generally, airspeed and altimeter readings will be slightly higher than normal, when using the alternate static air source. Consult the Emergency Static Source Calibrations in the Airplane Flight Manual for instrument error calibrations.

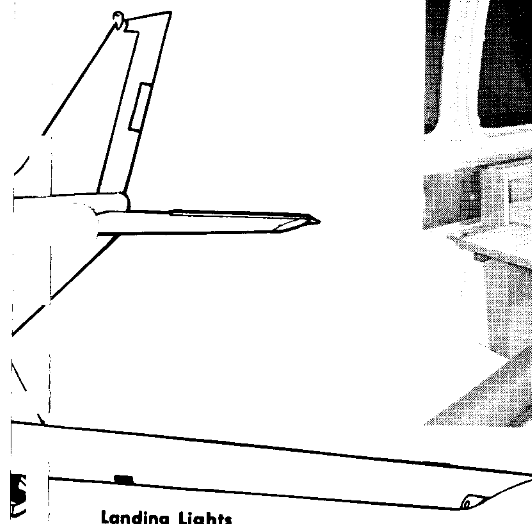
Comfort . . . .
Convenience . . . .
Safety



Baggage Area

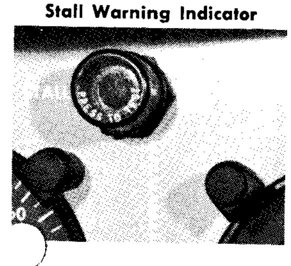


Air Stair and Entry



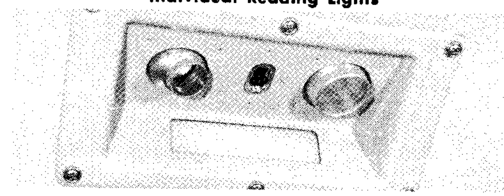
Landing Lights

Stall Warning Indicator

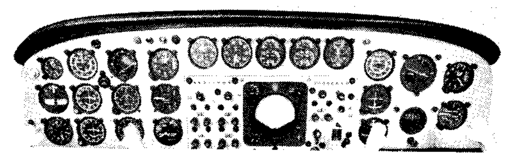


Executive Desk

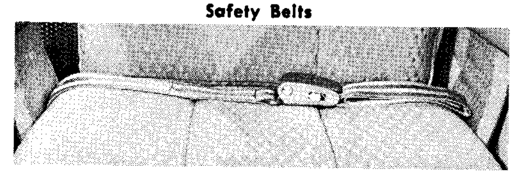
Individual Reading Lights



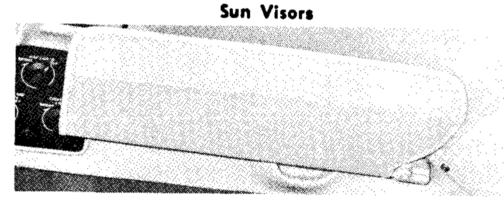
Instrument Cowl Pad



Safety Belts



Sun Visors



Optional Equipment . . .

To Meet Your Flying Requirements for . . .

ALL-WEATHER RADAR. Permits you to fly around, not through, bad weather.

AUTOPILOT SYSTEM. Installation of the BEECHCRAFT H-14 or Sperry SP-3 Autopilot will provide true "hands-off" flying. These three-axis servo systems, allow you to set the controls, sit back, and relax.

RADIO EQUIPMENT. Custom radio installations are available for factory installation.

INDIVIDUAL OUTLET OXYGEN SYSTEM. A self compensating altitude system with individual outlets by each seat.

SURFACE DE-ICING SYSTEM. Your Queen Air 80 will become an "ice breaker" capable of removing most ice accumulations that threaten cold weather operations. When used in conjunction with windshield defrost, heated fuel cell vents and propeller anti-icer, your aircraft will have airline weather capabilities.

PROPELLER ANTI-ICER. Either alcohol flow or electrothermal type propeller anti-icer allows maximum power even under severe icing conditions. A must for "all weather" flying.

ALTERNATOR-RECTIFIER. A revolutionary development in Avionics. The 125 ampere alternator-rectifier replaces and outperforms the generator, reduces maintenance costs and charges your battery at 800 rpm.

JATO. Answer that emergency acceleration problem, swiftly and smoothly, with the tremendous thrust of JATO. These stand-by rocket engines are the ultimate in thrust augmentation for flight safety. They also permit you to add 100 pounds to your maximum take-off gross weight.

DELUXE INSTRUMENT PANEL. Provides duplicate flight instruments for the co-pilot consisting of altimeter, airspeed, vertical speed, turn and slip, gyro horizon and directional gyro. Also features a dual heated pitot system.

MAP LIGHT AND STOPWATCH. Mounted on the control wheel they become an extremely handy navigational aid.

AIR CONDITIONER. Furnishes 1 ton of refreshing cool comfort during ground operations or inadvertent flight delays.

. . . . . . FOR YOUR Beechcraft

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

WING ICE LIGHTS. Provide visual confirmation of ice accumulation on your wings. An important safety item.

HEATED FUEL CELL VENTS. Prevent ice from blocking your fuel cell vents, which could result in collapse of the cells due to insufficient air pressure.

WINDSHIELD ANTI-ICING. Precludes the possibility of visibility loss due to windshield icing during cold weather operations.

WINDSHIELD WIPERS. The all electric windshield wipers provide the best visibility during heavy rainfall.

CAGLE BRAKE UNITS. Automatic, self adjusting brake units which completely eliminate brake drag, provide shorter takeoff run, and reduce maintenance costs.

AUXILIARY WING FUEL TANKS. Two 25 gallon fuel tanks may be added to raise total fuel capacity to 230 gallons.

NOSE GEAR OR NOSE CONE TAXI LIGHT. Provides maximum visibility for night ground operations.

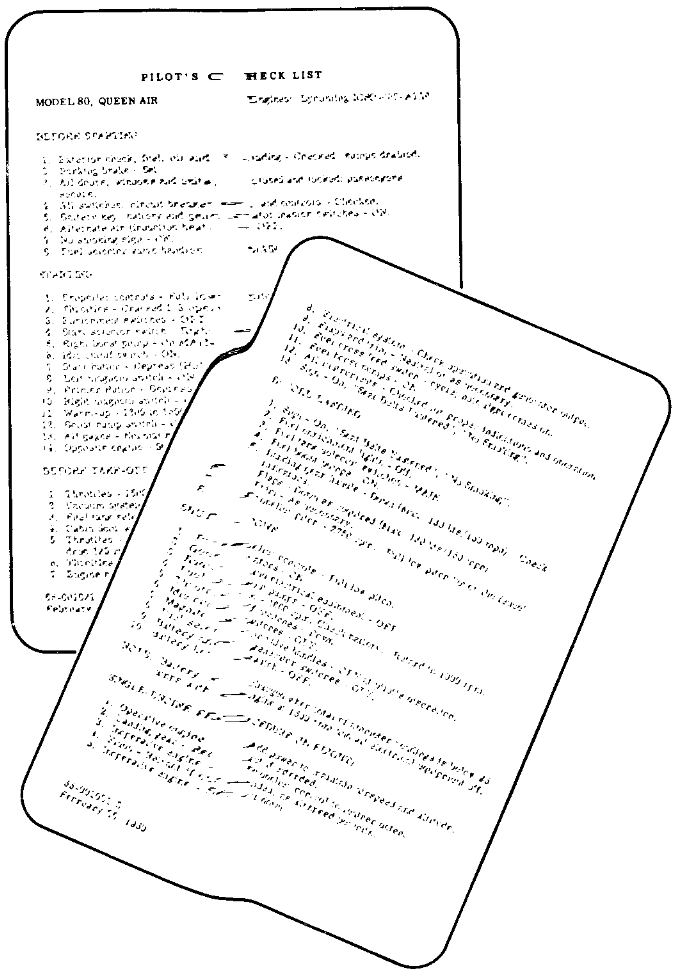
PROPELLER UNFEATHERING ACCUMULATOR. Quicker, more positive propeller unfeathering. Simply move the propeller control out of the feather detent and the propeller unfeathers.

SUPER SOUNDPROOFING. Thick blankets of modern soundproofing fibreglass insulation coupled with thick double windows, seal noise and vibration outside.

INDUCTION SYSTEM ALCOHOL ANTI-ICER. Provides additional safety when flying in icing conditions.

ELECTROTHERMAL WINDSHIELD. Positive visibility during severe cold weather operations.

VARIED CABIN ARRANGEMENT. Your Queen Air 80 can be equipped with a couch in place of two standard chairs at no extra cost, or the couch can be obtained as additional equipment for variable seating arrangements. The couch is over six and one-half feet long, seats four persons, and can be adjusted for use as a chaise longue. You may select a dictaphone installation or a fold-away desk incorporating cigarette lighters, a playing card cabinet, and a coffee dispenser; a modern refreshment bar complete with ice and food compartments; a fifth seat configuration, and many more comfort designed features. Provisions for the installation of aerial photography equipment are also available.


PILOT'S
MODEL 80, QUEEN AIR

SECTION II

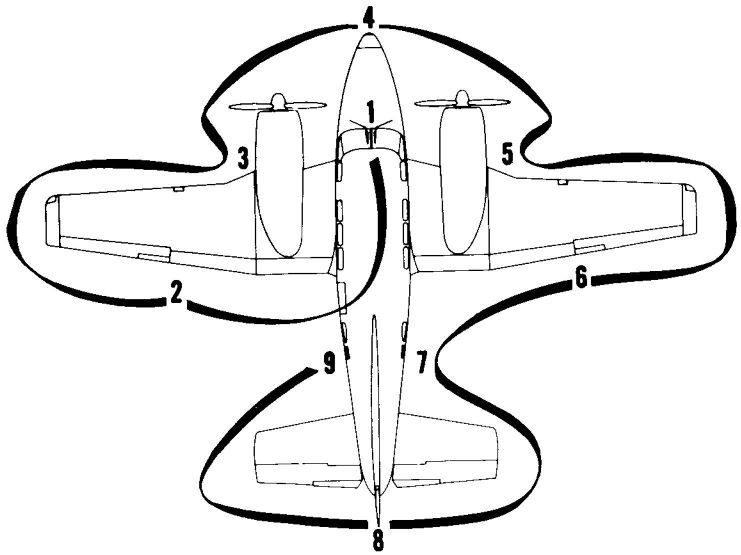
Operating Check Lists

SECTION II

The material in this section has been organized to give you a readily available and easily accessible reference to all operational check lists. The general techniques presented are based on the recommendations of and data compiled by Beech Aircraft Corporation pilots who have test flown and demonstrated the Queen Air 80. The outlined procedures are presented to assist you in developing professional flying techniques in your BEECHCRAFT airplane.

As you become familiar with your airplane and the individual circumstances under which you fly it, you may find that revisions in these procedures will better fill your requirements or personal preference. These procedures, if well organized and studied, should become so much a matter of habit that reference to this section will be unnecessary except as a refresher. Further, if your check lists are properly designed and include all the elements presented here, the possibility of malfunction will be lessened and maintenance costs will be reduced.

WALK AROUND INSPECTION



PRE-FLIGHT INSPECTION

1. Cockpit — check: battery and magneto switches "OFF" controls unlocked, trim tabs neutral.
2. Left wing, trailing edge — check: general condition, tie-down removed, rig and attachment of flaps and aileron.
3. Left wing, leading edge — check: nacelle, propeller, landing gear, fuel, oil, anti-icer fluid supplies, remove pitot cover(s). Drain 4 fuel sumps; 2 just outboard of nacelle; 1 at wing root; fuel selector valve.
4. Nose section — check: general condition, taxi lights, nose gear and wheel.
5. Right wing, leading edge — check: same as Step 3.
6. Right wing, trailing edge — check: same as Step 2.
7. Right side, fuselage — check: general condition, static ports for obstructions.
8. Empennage — check: control surface condition, freedom of motion and attachment. Tie-down removed.
9. Left side, fuselage — check: same as Step 7.

INTERIOR

1. Cabin door and escape hatch — secured.
2. All switches and circuit breakers — checked.
3. Parking brakes — set.
4. Flight controls — checked for free movement and proper response.

PRE-STARTING PROCEDURE

1. Seat and rudder pedals — adjusted to pilots.
2. Propeller control levers — full low pitch (forward).
3. Throttle — cracked ⅛ open.
4. Mixture Controls — in "IDLE CUT-OFF" position.
5. Engine alternate air controls — FULLY IN.
6. Engine emergency oil shut-off valve handles — FULLY DOWN.
7. Fuel tank selectors — MAIN.
8. Flaps — UP.
9. Induction air system selector switch — AUTO.
10. Landing gear handle — DOWN.
11. All radio switches — OFF.
12. Master battery and generator switches, battery lock switch — ON.

START PROCEDURE

1. Mixture control — In "IDLE CUT-OFF" position.
2. Throttle — 1000 rpm position.
3. Boost pump — On "MAIN" check pressure.
4. Magneto-starter switch — To start. Push for prime until engine fires then advance mixture control to "FULL RICH."
5. Throttle — 1300 to 1500 rpm with generators; 1000 to 1500 rpm with alternator.
6. Oil pressure — 35 psi within 30 seconds.
7. Induction Air System Selector Switch — "AUTO."
8. Boost Pumps — "OFF" check pressure. Continuous use of the boost pump is recommended for ground operation in extremely high ambient temperatures.

BEFORE TAXI

1. Seat belt — no smoking sign — ON.
2. Radios — functioning properly; frequencies set.
3. Chocks — removed; parking brake released.
4. Cabin door warning light — OFF.

BEFORE TAKE-OFF CHECK

1. Engine warm-up — 1000 to 1500 rpm.
2. Controls — free movement with proper response.
3. Instruments — on, set, operating properly. Vacuum system functioning.
4. Fuel selector — on MAIN. Check auxiliary position. Return to MAIN, actuate boost pumps, check cross-feed.
5. Flaps — check operation. Set as desired.
6. Trim — check operation. Set as desired.
7. Propellers — full forward (low pitch, high rpm).
8. Run-up (engine instruments in green) — each engine individually:
   A. Throttle to 2600 rpm.
      (1) Exercise propellers.
      (2) Check each magneto — 125 rpm maximum drop.
      (3) Check volt-ammeter for generator output.
   B. Throttle to 1500 rpm.
      (1) Perform feather check.
      (2) Alternate air check — note drop in manifold pressure.
9. Fuel boost pumps — ON.
10. JATO arming switch — ON.

NORMAL TAKE-OFF

1. Apply take-off power. Consult Power Chart/ Computer and Take-off Procedures.
2. Use nose wheel steering for directional control.
3. Let airplane accelerate to 81 kts/93 mph IAS before take-off.
4. Retract gear when airborne. (Apply brakes during retraction.)
5. Accelerate to 109 kts/125 mph IAS. Make power reduction — 37.5 in. Hg and 3000 rpm.
6. Accelerate to 150 kts/172 mph IAS for cruising climb.
7. Cabin sign — "OFF."
8. JATO arming switch — "OFF."
9. Check induction air for RAM position.
10. Fuel boost pumps — "ON" until cruise altitude is reached and power is reduced, then "OFF."

BEFORE LANDING

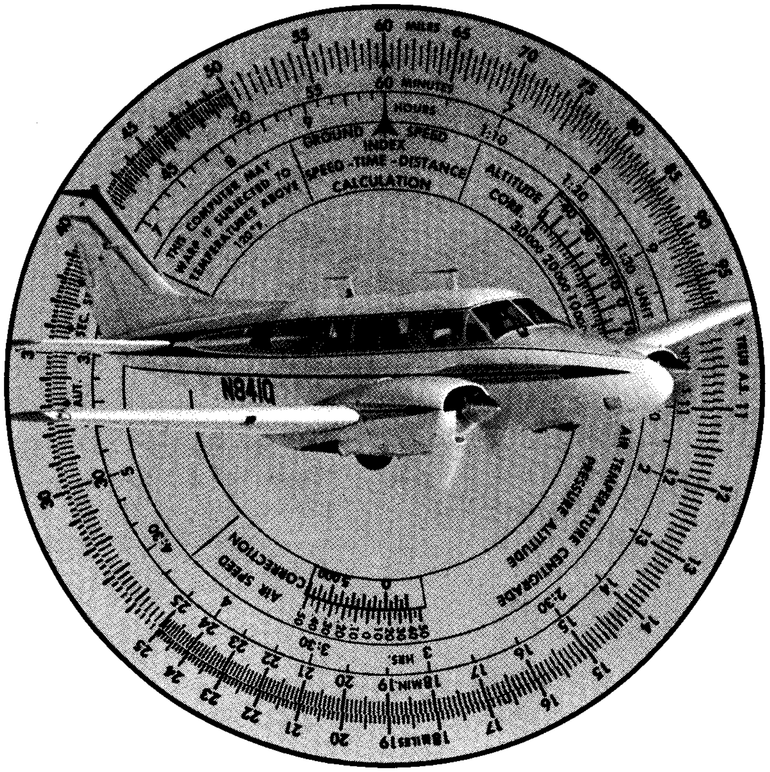
1. Fasten seat belts — No Smoking sign ON.
2. Fuel selectors — on MAIN.
3. Fuel boost pumps — ON.
4. Gear extended below 130 kts/150 mph IAS, indicators show down.
5. Mixture — check for FULL RICH.
6. Propellers — set at 2750 rpm, advance to full low pitch at minimum approach speed. CAUTION: High rpm with low power can detune the engines.
7. Flaps — as required. Maximum extension speed 130 kts/150 mph IAS.
8. Trim as required by load.

SHUT-DOWN

1. Propeller controls — low pitch, high rpm.
2. Fuel boost pumps — OFF.
3. Radio and electric equipment — OFF; ammeters totaled. See footnote.
4. Throttles — 1000 rpm.
5. Mixture controls — in "IDLE CUT-OFF" position.
6. Magneto switches — OFF when engine stops turning.
7. Master battery and generator switches — OFF.
8. Battery key switch — OFF.

IMPORTANT

With engines running at 1600 rpm, read ammeters. If total amperage (on both meters) is more than 25 amps, with all electrical equipment off, continue to run the engines at 1600 rpm until the amperage total falls below 25 amps. With the optional alternator-rectifier installed, rpm need be maintained at only 1000 to gain the desired 25 amp reading. This will leave the battery charged.


MILES
MINUTES
HOURS
GROUND SPEED
INDEX
SPEED-TIME-DISTANCE
CALCULATION
ALTITUDE CORR.
AIR SPEED CORRECTION
AIR TEMPERATURE CENTIGRADE
PRESSURE ALTITUDE

SECTION III

Performance Specifications and Limitations

This section provides a convenient reference library of charts and tabular listings of speed, performance and engine limitations. The limitations and data in this section have been established through flight testing and engineering calculations to assist you in operating your Queen Air 80. These charts and listings were established under normal operating conditions at maximum gross weight, therefore, allowances for actual conditions must be made. Reference to Section VI will facilitate your advanced planning since the graphic presentation there, provides for variations in altitude, loading, airspeed and engine performance. Consideration of these variables in conjunction with proper interpretation and application of weather and temperature data will assure you safe, fast, economical transportation.

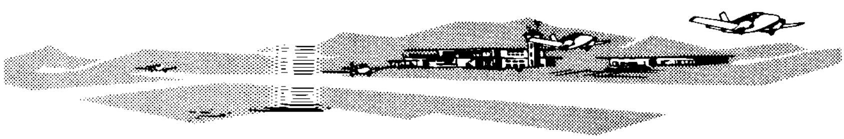
During all phases of engine and flight operations, be aware of rpm and manifold pressure limits as presented in your Engine Operation Data Chart, and avoid excessive cylinder pressures. Use this data also, to arrive at rpm and manifold pressure settings for climb and cruise. Note that the manifold setting required for a given horsepower will vary with ambient air temperature. When increasing power, set rpm first, then add manifold pressure. When reducing power, decrease manifold pressure, then rpm. This section also presents tabulations of oxygen supply endurance, de-icing system pressures and available cycles, plus data pertinent to approved maneuvers and weight and balance. Become familiar with your BEECHCRAFT Queen Air 80 and the specifications presented in this section.

NOTE

The airspeed computations presented in this section are based on *indicated airspeed* except Airspeed Limitations and Instrument Markings, which are *calibrated airspeeds.* Corresponding performance figures appearing in the FAA Approved Airplane Flight Manual and installed as placards in the airplane are *calibrated airspeeds.*

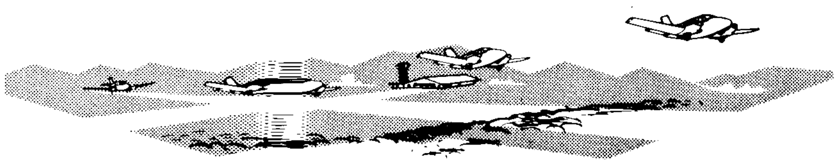
Air-speed Charts

NORMAL TAKE-OFF (IAS)



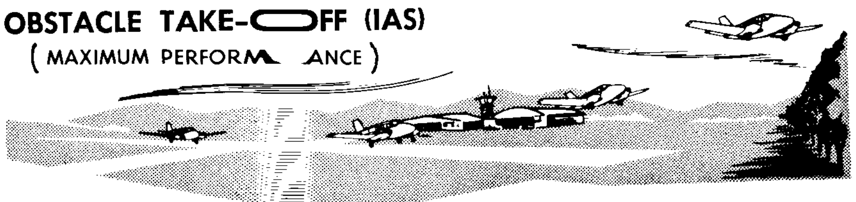
NO FLAPS — TAKE-OFF 81 KTS / 93 MPH — 50 FEET 90 KTS / 104 MPH

SHORT FIELD TAKE-OFF (IAS)



65% FLAPS — TAKE-OFF 6[illegible] KTS / 7[illegible] MPH — 50 FEET 81 KTS / 93 MPH

OBSTACLE TAKE-OFF (IAS)
(MAXIMUM PERFORMANCE)



65% FLAPS — TAKE-OFF 74 KTS / 85 MPH — 50 FEET 74 KTS / 85 MPH

CLIMB SPEEDS

Two Engine

Cruising climb speed
(85% rated power, 3,000 RPM) . . . 139 kts/160 mph

Best rate of climb speed, 5,000 feet

Clean	106 kts/122 mph
Gear Down	91 kts/105 mph
Gear and Flaps Down	78 kts/ 90 mph

Best angle of climb speed, 5,000 feet

Clean	83 kts/ 95 mph
Gear Down	73 kts/ 84 mph
Gear and Flaps Down	65 kts/ 75 mph

Cruising climb power setting
(85% power)

	Manifold Pressure	RPM
Sea Level	39 in. Hg	3,000
5,000 feet	37 in. Hg	3,000
10,000 feet	35.5 in. Hg	3,000
12,000 feet and above	Full Throttle	3,200

Single Engine

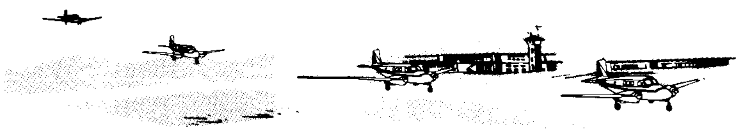
Best rate of climb speed, Sea Level
Clean (Maximum continuous
power, 3,200 rpm) . . . 102 kts/117 mph

Best angle of climb speed, Sea Level
Clean (Maximum continuous
power, 3,200 rpm) . . . 90 kts/104 mph

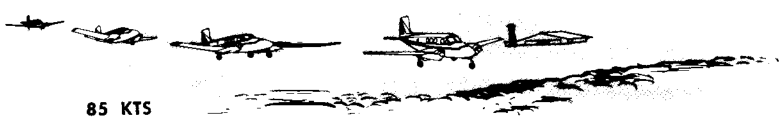
Minimum control speed . . . 83 kts/ 95 mph

Safe single engine speed . . . 92 kts/105 mph

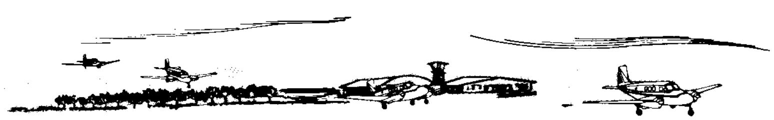
NORMAL LANDING



SHORT FIELD LANDING



OBSTACLE LANDING



AIRSPEED LIMITATIONS (CAS)

Never Exceed Speed	.....235 kts/270 mph
Maximum Structural Cruising Speed	....178 kts/205 mph
Maximum Rough Air or Maneuvering Speed	...169.5 kts/195 mph
Maximum Speed for Flap Extension	....130 kts/150 mph
Maximum Speed, Flaps Extended	.....130 kts/150 mph
Maximum Speed for Landing Gear Extension	.....130 kts/150 mph
Maximum Speed, Landing Gear Extended	.....130 kts/150 mph

STALL SPEEDS (IAS)

GROSS WEIGHT 8000 LBS.	BANK ANGLE — DEGREES: LEVEL	15°	30°	45
POWER	GEAR AND FLAPS UP			
*On	80.0 MPH 69.5 KTS	81.5 MPH 71.0 KTS	86.0 MPH 75.0 KTS	95.0 MPH 82.5 KTS
Off	98.5 MPH 85.5 KTS	100.0 MPH 87.0 KTS	106.0 MPH 92.0 KTS	117.0 MPH 102.0 KTS
POWER	GEAR AND FLAPS DOWN			
*On **Approach	70.5 MPH 61.0 KTS	72.0 MPH 62.5 KTS	76.0 MPH 66.0 KTS	84.0 MPH 73.0 KTS
Off	85.0 MPH 74.0 KTS	86.5 MPH 75.5 KTS	91.5 MPH 79.5 KTS	101.0 MPH 88.0 KTS

*TAKE-OFF POWER

Engine Operation Limitations

MAXIMUM POWER

Take-Off (limit, 5 minutes) ....380 hp @ 3400 rpm
Continuous Operations ....360 hp @ 3200 rpm

INSTRUMENT MARKINGS

Oil Temperature

Caution (Yellow Radial) ....100°F.
Normal (Green Arc) ....100°-235°F.
Maximum (Red Radial) ....235°F.

Oil Pressure

Minimum (Red Radial) ....35 psi
Normal Range (Green Arc) ....65-85 psi
Maximum (Red Radial) ....85 psi

Fuel Pressure

Minimum (Red Radial) ....17 psi
Normal (Green Arc) ....20-28 psi
Maximum (Red Radial) ....35 psi

Manifold Pressure

Normal Operating Range (Green Arc) ...14-45 in. Hg
Caution Range (Yellow Arc) ....45-47 in. Hg
Maximum Sea Level (Red Radial) ....47 in. Hg

Tachometer

Engine Warm-Up ......1300-1500 rpm (with Generators)
1000-1500 rpm (with Alternator-Rectifiers)
Normal Operation (Green Arc) ....2400-3200 rpm
Caution Area (Yellow Arc) ....3200-3400 rpm
Maximum (Red Radial) ....3400 rpm

NOTE: Propeller feathering system is actuated at approximately 2325 rpm.

Cylinder Head Temperature

Normal Operating Range (Green Arc) ....250°-450°F.
Maximum (Red Radial) ....475°F.

NOTE: 400°F max. cyl. head temp. in level flight at 75% or lower power.

Cylinder Head Temperature

Normal Operating Range (Green Arc) . . . . 250°-450°F.
Maximum (Red Radial) . . . . 475°F.

NOTE: Maximum continuous cylinder head temperature is 400°F.

Suction

Minimum (Red Radial) . . . . 3.75 in. Hg
Caution (Yellow Arc) . . . . 3.75-4.8 in. Hg
Normal (Green Arc) . . . . 4.8-5.25 in. Hg
Maximum (Red Radial) . . . . 5.25 in. Hg

NOTE: When vacuum gage indicates within caution range, pump malfunction should be suspected.

Airspeed Indicator

Take-Off and Landing Configuration
(White Arc) . . . . 69-130 kts/80-150 mph
Normal Operating Range
(Green Arc) . . . . 81.5-178 kts/94-205 mph
High Speed Range
(Yellow Arc) . . . . 178-234 kts/205-270 mph
Maximum Speed (Red Radial) . . . . 234 kts/270 mph

Gliding Distance Table

The Gliding Distance Table shown below gives the horizontal distance you can glide, by maintaining the indicated air speeds given, under the various wind conditions listed, from the assigned altitudes. Maximum glide is achieved with propellers feathered, gear and flaps up.

GLIDE DISTANCE

IAS (kts)	101.3	115.3	111.7	106.9	92.2	95.7	98.8
Winds (kts)	0	30 HW	20 HW	10 HW	30 TW	20 TW	10 TW
Alt. Above Ground (ft.)	(Nautical Miles)						
1000	2.0	1.4	1.6	1.8	2.6	2.4	2.2
2000	4.0	2.8	3.2	3.6	5.2	4.8	4.4
3000	6.0	4.2	4.8	5.4	7.8	7.2	6.6
4000	8.0	5.6	6.4	7.2	10.4	9.6	8.8
5000	10.0	7.0	8.0	9.0	13.0	12.0	11.0
6000	12.0	8.4	9.6	10.8	15.6	14.4	13.2
7000	14.0	9.8	11.2	12.6	18.2	16.8	15.4
8000	16.0	11.2	12.8	14.4	20.8	19.2	17.6
Glide Ratio	12.20	8.76	9.94	11.05	15.95	14.75	13.40

OXYGEN SYSTEM

As optional equipment, your Queen Air can be fitted with an oxygen system incorporating one of three cylinder capacities. This 1800 psi, continuous-flow, supply system can be equipped with a 38.4, 48.3 or 63.3 cubic foot cylinder to provide oxygen for your high altitude operations.

The accompanying tabulations are provided to assist you in planning your oxygen requirements. They are based on 95 per cent rated volume and the premise that when two people are being supplied by the system, both will be drawing from the .018 orifices in the cockpit and all additional people will be supplied from the .016 orifices in the cabin.

The maximum efficiency and economy of your oxygen system is assured by the manual shut off control. Just turn the handle, located forward of the pedestal clockwise to the "OFF" position and any leakage problem, when the system is not in use, is resolved.

OXYGEN DURATION IN HOURS

Altitude Feet	Number of Persons Being Supplied 1	2	3	4	5	6	7
			(38.4 Cubic Foot Cylinder)				
10,000	6.9	3.4	2.6	2.1	1.7	1.5	1.32
15,000	6.4	3.2	2.4	1.9	1.6	1.37	1.2
20,000	5.9	2.9	2.2	1.75	1.45	1.25	1.1
25,000	5.4	2.7	2.0	1.58	1.32	1.12	.98
			(48.3 Cubic Foot Cylinder)				
10,000	8.7	4.4	3.3	2.6	2.2	1.9	1.66
15,000	8.0	4.0	3.0	2.4	2.0	1.72	1.5
20,000	7.4	3.7	2.8	2.2	1.83	1.57	1.37
25,000	6.7	3.4	2.5	2.0	1.65	1.41	1.23
			(63.3 Cubic Foot Cylinder)				
10,000	11.4	5.6	4.3	3.5	2.9	2.5	2.2
15,000	10.5	5.3	4.0	3.2	2.6	2.3	2.0
20,000	9.7	4.8	3.6	2.9	2.4	2.1	1.8
25,000	8.9	4.4	3.3	2.6	2.2	1.8	1.6

OXYGEN DURATION IN HOURS

Altitude Feet	Number of Persons Being Supplied 1	2	3	4	5	6	7
				(38.4 Cubic Foot Cylinder)			
10,000	6.9	3.4	2.6	2.1	1.7	1.5	1.32
15,000	6.4	3.2	2.4	1.9	1.6	1.37	1.2
20,000	5.9	2.9	2.2	1.75	1.45	1.25	1.1
25,000	5.4	2.7	2.0	1.58	1.32	1.12	.98
				(48.3 Cubic Foot Cylinder)			
10,000	8.7	4.4	3.3	2.6	2.2	1.9	1.66
15,000	8.0	4.0	3.0	2.4	2.0	1.72	1.5
20,000	7.4	3.7	2.8	2.2	1.83	1.57	1.37
25,000	6.7	3.4	2.5	2.0	1.65	1.41	1.23
				(63.3 Cubic Foot Cylinder)			
10,000	11.4	5.6	4.3	3.5	2.9	2.5	2.2
15,000	10.5	5.3	4.0	3.2	2.6	2.3	2.0
20,000	9.7	4.8	3.6	2.9	2.4	2.1	1.8
25,000	8.9	4.4	3.3	2.6	2.2	1.8	1.6

The maximum efficiency and economy of your oxygen system is assured by the manual shut off control. Just turn the handle, located forward of the pedestal clockwise to the "OFF" position and any leakage problem, when the system is not in use, is resolved.

MANEUVERS

This is a "NORMAL" category aircraft, therefore all acrobatic maneuvers, including spins are prohibited.

WEIGHT AND BALANCE

It is the responsibility of the aircraft owner and pilot to insure that his craft is properly loaded. At delivery, the BEECH AIRCRAFT CORPORATION provides with the airplane, an FAA Approved Airplane Flight Manual which is required by the FAA to remain in the airplane at all times. All necessary weight and balance data are provided for the owner in Section IV of the FAA Approved Flight Manual. The material presented in Section IV of that manual will allow the owner or pilot to make the computations necessary to assure proper aircraft loading.


N110Q

SECTION IV

Flying Your Beechcraft

The material presented in this section of your manual is a compilation of data provided for your convenience by the BEECH engineers and pilots. These general handling techniques are offered as procedural suggestions, designed to introduce you to your Queen Air and to act as safe guides for your initial operations. Naturally, as you become familiar with your aircraft, you will recognize the need to adapt the suggested procedures to suit your own technique, circumstances, and preference. As you develop your own handling procedures, make flight safety the determining factor. Beech Aircraft Corporation's continuing efforts to insure flight safety will be to no avail unless you, the operator, restrict yourself to the established limitations for your aircraft. The final responsibility for the observation of these limitations rests with the pilot. Operation in excess of the defined limits constitutes a violation of Civil Air Regulations.

To aid you in achieving safe, maximum performance, Section VI, which considers many combinations of aerodynamic variables, has been supplied. Your application of this material, in conjunction with the check list information provided in Section II and the performance specifications and limitations presented in Section III, as adapted by your own technique and experience, will assure optimum performance when "Flying Your Beechcraft."

EXTERIOR INSPECTION

As you approach the aircraft, note its general appearance, i.e., wings level, condition of windshield and side windows, etc. In addition to the check lists presented in Section II, the "walk-around" portion of your preflight inspection should include checking the rig and freedom of control surfaces, visually checking the antenna, the fuselage for dents, scratches or other minor damage and evaluating their importance. Personal attention to preflight procedures is the mark of the safe pilot and will repay you not only in safety but in lowered maintenance costs as well.

STARTING

Clear the area behind the aircraft prior to starting the engines and assure that sufficient clearance exists for taxi. For a cold start, or even in warm weather, priming may be necessary, varying from none to several seconds, depending on temperature, engine condition and other factors. Priming is easily accomplished on your new Queen Air, even when the starter is engaged, since the primer is incorporated into the magneto-starter switch. The primer is actuated by pushing in on the magneto-starter switch. With the primer held in, and the starter engaged, the left magneto will begin to fire. This feature is particularly advantageous on those cold mornings when priming during the start may be necessary.

If the engine fails to start due to flooding, place the mixture control in the "IDLE CUT-OFF" position. Continue cranking the engine with the throttle one-half open. When the engine fires, advance the mixture control to "FULL RICH" and retard the throttle.

WARM-UP

After the engines are firing evenly, adjust the throttles to produce rpm within the warm-up range suggested in Section III. It is recommended that you select an rpm somewhat above generator cut-in speed to provide adequate oil pressure plus engine cooling and to prevent battery drain. During the warm-up period, the propeller should be in full low pitch and only filtered air should be supplied to the engine.

NOTE

The engines of the Queen Air are supercharged, packing great power in a small package. Rapid or radical changes in power setting will reduce engine life. Gentle application and reduction of power will prolong engine life. Therefore, make your changes in power setting, smoothly and gently. Avoid rapid, radical changes.

TAXIING

Never Taxi With a Flat Strut!

Prior to pulling the chocks, release the parking brake and depress the brake pedals, feeling for positive pressure, to assure that the brakes are functioning properly. Pull the chocks and allow warm-up rpm to move the aircraft from the parking place.

To avoid excessive tire and brake wear, start turns with nose wheel steering, adding inside brake if necessary. Avoid starting turns with brake and turning so sharply that the aircraft pivots on one main gear. Nose wheel steering, augmented by braking, allows turns of a three-foot radius about the inside gear.

Cross-wind taxiing poses no problem to your Queen Air. Any tendency to weather-cock can be effectively countered by nose wheel steering.

PREFLIGHT ENGINE CHECK

Taxi your Queen Air 80 to the run-up area for the active runway and turn into the wind, allowing the airplane to roll forward far enough to straighten the nose wheel. Set the parking brakes and adjust the throttles to afford generator power for your electrical system and proper cooling for the engines. Perform a check of all engine instruments, insuring that their readings lie well within the normal limitations tabulated in Section III. Note also, that generator out-put is normal and that the battery is charging. Check the radio equipment for proper operation and note fuel levels and pressures. Switch to auxiliary fuel tanks momentarily, then return to "MAIN." Advance the throttles individually to approximately 2600 rpm and exercise the propellers through the constant speed range at least once.

In cold weather, it is desirable to cycle the propellers several times to allow warm oil to flow into the propeller hub. In this step, be cautious not to place the propeller controls in the feather detents. Feathering from the relatively high rpm used for this check will impose severe loads on the engine.

After a stabilization in high pitch, return the propellers to low pitch. At approximately 2600 rpm, perform your magneto check. Avoid operating on one magneto for more than 60 seconds since the cold plugs will tend to foul.

When you have checked the magnetos on each engine, you may desire to check the feathering system. Reduce throttle and rpm settings and move the propeller controls into the detents. Note the change of blade angle; then return the controls to low pitch. Pull out the alternate air controls and look for a drop in manifold pressure to indicate that the system is functioning properly. Push the controls back in and note that the manifold pressure returns to its original setting. Apply power to both engines simultaneously and note that equal output is developed by both. Reduce your throttle settings to those that produce cooling rpm; switch to the main fuel cells, noting the pressure indications; perform your cross-feed check; check cockpit windows closed; trim as required; turn on fuel boost pumps; and check all instruments for proper readings. As you become more familiar with the Queen Air, you will want to perform the various checks in your own sequence. It is essential, however, that you do not neglect any of the items presented on the check lists of Section II. The sequence in which you make the checks may become a matter of personal preference.

NORMAL TAKE-OFF

During taxi, take-off or landing, particularly when wind velocity is below 15 knots, make sure that you are not exposed to propeller wash or jet blast turbulence from larger aircraft. As you line up on the active runway, check to see that the fuel boost pumps are "ON." When you are cleared for take-off, smoothly add power until take-off power is achieved. If a cross-wind condition exists, application of differential power, rudder pressure, and/or nose wheel steering are available to maintain directional control. The use of wheel brakes on take-off should be avoided if possible. During the take-off run, check engine instruments for take-off power indications and proper function.

NOTE

It is possible to exceed rated power on take-off. The change from filtered to ram air, when the landing gear is retracted, will add from 1.5 to 2 inches of manifold pressure. In most situations, therefore, application of 44-45 inches of manifold pressure will be sufficient for take-off. **DO NOT EXCEED 380 BHP.**

Under normal circumstances, allow the aircraft to accelerate in the level attitude until it approaches flying speed; then lift the nose wheel, rotating the Queen Air to the normal take-off attitude. When you have gained about five feet, release enough of your back control pressure to allow the airplane to accelerate. Retract the gear and adjust your attitude to give the desired climb performance. Reduce to cruise climb power at approximately 150 kts/172 mph IAS.

When operating at maximum continuous power, below the critical altitude of 11,500 feet, the mixture control must be in the full rich position. Below the critical altitude the fuel flow is controlled by an altitude compensator. Above the critical altitude manual leaning is required to prevent the mixture from becoming too rich.

Never raise the landing gear handle until you are safely airborne and runway landing length no longer exists. Relying on the landing gear safety switch to retract the gear for you may result in premature retraction. The switch breaks the control circuit whenever the strut is compressed but gusts, depressions in the runway or the like can cause the strut to extend, completing the circuit.

JET ASSISTED TAKE-OFF

If you have chosen to have your Queen Air 80 equipped with JATO, you have afforded yourself perhaps the greatest safety feature available. Its utilization must be in accordance with the FAA Approved Flight Manual Supplement which was supplied with the JATO installation. In general, however, close the JATO circuit breaker and turn on the arming switch just prior to turning on to the active runway. When the arming circuit is closed, the arming light glows, indicating that rocket engine power is available to you, should you experience any power difficulty.

In a situation where minimum single engine control speed has been reached and your pre-computed stopping distance (see graph Section VI) has been passed, your take-off may be completed with JATO. Should you find yourself in a situation where augmented thrust is required to top obstacles at the end of a short runway, or to power you off from a soft field, JATO again should be considered. Under either of these conditions, you may expect JATO's endurance of almost 15 seconds to give you 60 extra feet of altitude. For best performance, it is suggested that you actuate the rocket engines immediately after you have released the brakes and established take-off power.

CLIMB

The variation in practical considerations makes it impossible to state any all-inclusive climb procedure. The type of climb to altitude that you choose will be peculiar to your individual circumstance. In general terms, however, and with reference to the graphic material presented in other sections, a climb at Best Rate of Climb will get you to your desired cruising altitude most quickly and with the greatest fuel economy. Best Rate of Climb may be necessary or mandatory if IFR conditions are experienced. If Best Rate of Climb is to be employed, it should be remembered that forward visibility will be reduced somewhat by the high angle of climb and passenger comfort will be lessened.

A cruising climb at 85% power as presented in Section III provides maximum forward visibility and passenger comfort. With proper management, you save time by using the higher speed cruising climb.

Leaning in a climb — Some leaning is recommended at all altitudes with cruise climb power to obtain optimum economy. The following leaning procedure is recommended.

(a) Stabilize climb speed, engine rpm and manifold pressure with mixture full rich.

(b) Allow the cylinder head temperature to stabilize. (If cruise altitude is below 4000 feet, climb full rich.)

(c) Begin leaning out in small increments, watching the cylinder head temperature, until a temperature rise of approximately 20° is reached.

CAUTION

Do not permit cylinder head temperatures to exceed 475°F or attempt to peak temperatures. Climb power requires a mixture richer than best power, at all times.

No matter what type of climb you elect, pay particular attention to the cylinder head temperatures and adjust your climb to maintain them below the red line maximum.

CRUISE

When the desired cruising altitude has been reached, level off and retrim your aircraft but do not reduce power until cruise speed has been gained. This procedure will allow your airspeed, power settings, and engine temperatures to stabilize in the minimum time.

Determination of cruise speed, again, is affected by a number of individual factors. No single indicated airspeed is the best for every situation. Your choice of power settings will be directed by load, temperature, altitude, and most importantly, the purpose of your flight.

When your flight requirements demand maximum mileage per gallon of fuel, you will find it advantageous to consult the range plates presented in Section VI for calculations concerning various power settings at a given altitude and the maximum range available under these conditions. With these variables considered, specific fuel flow can be determined by consulting the Fuel Consumption chart in Section VI.

Again, this Fuel Consumption chart is valuable in arriving at the proper power settings if endurance is important to your flight. When the desired percentage of power has been determined, go then to the separate, Engine Operation Data chart, for the specific power settings required.

Since cruise efficiency can be considerably enhanced by proper trimming of the aircraft, it is suggested that attention be directed to this task as soon as possible.

Leaning in cruise — Leaning is required at all altitudes with cruise power to obtain recommended fuel flows. Lean one engine at a time in the following manner:

(a) Stabilize at cruise altitude on speed, engine rpm, manifold pressure and cylinder head temperature, with mixture control adjusted to the mid fuel flow setting on the fuel flow meter for a selected percentage power.

(b) Manually lean, observing the following indications:

(1) The synchroscope on the tachometer will rotate or increase in rotation toward the engine of increasing power.

(2) As the mixture is leaned, the cylinder head temperature will rise 20° to 30°F to a peak indicating that the engine is leaner than best power. At this peak, a small loss in power will occur with a slight drop in airspeed, which may or may not be detectable.

(3) Continue leaning a little more (5 to 10 pounds per hour). The airspeed will reduce approximately two miles per hour in the 60% to 65% MC power range.

CAUTION

Do not exceed a cylinder head temperature of 400°F.

(4) If the engine is leaned too much it will become rough, the mixture should then be richened from 5 to 10 pounds.

(c) After the proper setting has been determined for a given power, repeatability can be obtained by following the above procedure in sequence.

Fuel consumption presented on the Fuel Consumption Chart in Section VI shows a rich limit and a lean limit in the cruise range. These limits have been selected on the basis of performance and do not reflect the operation limits of the engine from a reliability point of view. The engine may be operated below the lean limit, but with a resulting loss in power and airspeed. Cruise speed and range have been based on the lean limit curve. A slight increase in cruise speed will result if a richer setting is used.

When cruise has been established, consider that the individual fuel systems incorporate a fuel return line from the injector nozzle to the main fuel cell. Premature selection of auxiliary tanks may, therefore, result in the returned fuel being pumped overboard. Fuel for starting, warm-up, taxi, and take-off should be drawn from the MAIN cell. Main cell fuel should be used until the indicators show half full.

The procedure for cross-feed operation is described on the fuel control panel. Simply stated, the procedure entails: selection of the desired tank, turning on of the fuel boost pump, opening the cross-feed valve and turning off the opposite tank selector valve. The cross-feed system can be used to supply fuel to either engine from any tank. The fuel boost pump should be used only briefly during the change over to cross-feed operation.

When the fuel selector is shifted to any new position, be sure that it seats in that new position. A definite "detent" can be felt when the selector is properly aligned. If the selector does not seat, the flow of fuel may be restricted or interrupted, causing engine stoppage. After shifting to a new tank, note fuel pressure to assure that the engine is drawing sufficient fuel from the new supply.

MANEUVERS

Your Queen Air is licensed under the "NORMAL" category limitations and is intended for nonacrobatic and cargo operations. Only those maneuvers incident to NORMAL flying, including stalls (except whip stalls) and turns in which the angle of bank is not in excess of 60° are permitted. A table of stall speeds is presented in Section III.

As a normal stall is approached, only slight buffeting is experienced. The ever watchful, mechanical stall warning indicator in the left wing, however, warns of the impending stall well in advance, allowing adequate time to correct the situation.

Normal stall recovery procedures should be employed if a stall is experienced; lower the nose, level the wings and add power. Intentional spins are prohibited in aircraft of this category and should be avoided. Should a spin be encountered, it is suggested that normal spin recovery procedure be applied; reduce throttle, elevator control forward, opposite rudder to stop rotation, raise the nose gently when the aircraft is under control and has regained flying speed.

Avoid abrupt maneuvers and sudden application of control pressures at all times.

FLIGHT THROUGH TURBULENT AIR

Prior to all flights, a thorough analysis of enroute weather should be accomplished. Areas of severe thunderstorms or turbulence should be avoided and the flight plan route mapped accordingly. However, it is not always possible to avoid these conditions at night or under IFR conditions. If it becomes necessary to penetrate such turbulent areas, you must be prepared to counter rapid changes in attitude and to accept major variations in altitude.

When flight through regions of moderate to heavy turbulence is imminent, it is essential to set up an air speed in the safe speed range indicated on the chart presented in Section VI.

DESCENT

For passenger comfort, a low rate of descent should be planned. In such a descent, atmospheric pressure change is gradual and the possibility of any difficulty arising from this pressure increase is held to a minimum. Weather, in-flight clearances, fuel requirements or emergencies may demand a more rapid descent, however, but even in such situations, aerodynamic and design factors must be considered. To achieve the maximum rate of descent in your Queen Air 80, set up a power off, 2700 rpm, gear and flap down configuration, at 130 kts/150 mph IAS. The resulting 20 degree nose down attitude allows you to dissipate the maximum amount of altitude in the minimum amount of time, but it also makes three gallons of fuel in each main cell unavailable. With this fuel consideration in mind, sound judgment and judicial planning, planning which includes provisions for a cruising or standard rate descent, are essential.

NOTE

The experienced aviator knows that all high performance engines require smooth throttle operation in order to insure long engine life. You are cautioned, therefore, to avoid rapid opening and closing of the throttles. Further, and whenever possible, avoid engine speeds of 2800 rpm or higher with manifold pressures below 15 in. Hg. Power configurations beyond these limitations can cause detuning of the dynamic counterweight system.

Throughout your descent, be aware of cylinder head temperatures and monitor manifold pressures. As altitude is decreased, ambient pressure and, there-by, manifold pressure is increased.

NORMAL LANDING

Plan to enter the landing pattern at an indicated air speed which will allow immediate landing gear extension. With the gear down and locked, lower the flaps, and continue to slow the aircraft. Check fuel on "MAIN," safety belts snug and locked, and parking brake off. Exert toe pressure on the brake pedals to insure that normal brakes are ready to function when required. As the base position is approached, check to see that the fuel boost pumps are "ON" and proceed with the landing check list as outlined in Section II.

Landings are easy and accomplished with a minimum of effort due to the excellent slow flight characteristics of the Queen Air. Visibility is unimpaired through the full view windshield.

As you approach touch-down, commence your flare-out and retard the throttles simultaneously. Increase back pressure on the elevator controls, rotating the Queen Air 80 to a slightly nose high attitude, while closing the throttles. Land your aircraft on the main gear, holding a slightly nose high attitude. As the airplane slows down, gently place the nose wheel on the runway and retract the flaps.

NIGHT LANDING

Pilot technique and preference will govern the use of power and landing lights but it is suggested that a power on landing be effected.

Since depth perception is decreased in the semi-darkness on the night landing, a power on flare-out affords a slower rate of descent and a more gentle touch down. It also allows a more rapid acceleration should the need for power arise.

In this procedure, power slightly less than that necessary to sustain flight is carried from the final to touch-down. Power is decreased somewhat in the final but it is not cut until the landing gear actually makes contact with the ground.

Caution should be observed in the use of landing lights when haze, fog or smoky conditions exist since under these conditions, reflected light will actually reduce, rather than enhance, visibility.

ENGINE SHUT DOWN

When taxiing to the parking area, turn off all nonessential electrical equipment such as radio, navigational gear, landing lights, etc., to prevent draining the battery. In your parking position, check all instrument readings, place the propellers in full low pitch (high rpm) and turn off all electrical equipment. It is essential, that battery voltage at shut-down be sufficient for the next start if auxiliary power is not available for starting. Therefore, set the engines at 1600 rpm and read the total amperage on both ammeters. If the ammeter total is greater than 25 amps, continue to run the engines at 1600 rpm until the total falls below this 25 amp figure. This procedure will charge the battery to the desired voltage.

When the optional, alternator-rectifiers are installed, you need hold only 1000 rpm to accomplish the battery charge check. They are capable of producing sufficient voltage even at this low rpm to charge the battery.

With positive indication that the battery is fully charged, proceed with the shut down check list items in Section II.

COLD WEATHER OPERATIONS

Prior to your normal pre-flight inspection, remove all ice, snow, and frost from the wings, propellers, control surfaces, hinges, windshield, fuel and oil caps and vents. With these formations cleared from your aircraft, proceed with your normal walk-around inspection paying particular attention that no ice, frost, or snow remains. If you find it impossible to remove these formations, do not fly the airplane. With ice and snow removed, pay particular attention to the freedom of movement of the control surfaces, to assure that no hidden obstructions exist. Under very cold conditions, it will be necessary to preheat the engines prior to a start. Particular attention should be applied to the oil cooler, reservoir and associated plumbing to insure proper preheat since congealed oil in these areas will prevent proper lubrication of the engines. A start with oil below the minimum temperature may indicate normal pressure immediately after the start, but then may decrease when residual oil in the engine is pumped back with the congealed oil in the reservoir. If an engine heater capable of also heating the reservoir and cooler is not available, the oil should be drained while the engines are hot and stored in a warm area until the next flight.

In cold weather, it is recommended that you use external power for starting, when available, since cold weather decreases the efficiency of batteries. The external power unit should be equipped with the standard AN fitting or an adapter, to insure proper connection. Set the unit's output at 28.5 to 29 volts and make the plug-in. To prevent arcing, be sure that no power is supplied to the plug when it is mated.

To assure a quick start, plug in an auxiliary power unit capable of at least 300 amperes, turn the battery lock switch to "ON," and continue with the normal starting procedure. The battery and generator master switches remain "OFF." When the engine is running smoothly, actuate the master switches after external power has been removed.

If external power is not available for starting in cold weather, it is recommended that you start the left engine first. This allows maximum voltage to flow to the starter with minimum voltage drop through line loss, since the battery is in the left nacelle.

Use normal starting procedures in cold weather, but pay special attention to priming. Prime the engines cautiously as you start. If the engine floods, position the mixture control in "IDLE CUT-OFF," advance the throttle half open and continue cranking. When the engine fires, advance the mixture control to "FULL RICH" and retard the throttle. Pay particular attention to the oil pressure when starting and for a short period thereafter. Congealed oil in a supply line or the tank may cause a drop or complete loss of oil pressure. If the pressure does not reach 35 psi within 30 seconds after starting or if the pressure drops below 35 psi, shut down the engine and determine the cause.

You will find it advantageous to consult the Consumable Materials Chart in Section VII to aid you in selecting the proper engine oil weight for cold weather operations.

When normal temperatures and pressures have been established, cycle the propellers several times to flush cold oil from the hub and replace it with warm engine oil. Do not use the alternate air system to hasten engine warm-up. The warm air supplied by this system by-passes the air filters and might introduce foreign material into the intake system. At the completion of your warm up, exercise the controls, checking for freedom of movement and full travel.

In proceeding to the run-up area, avoid taxiing through water puddles or accumulations of slush, etc. Water splashed on the wings and fuselage will freeze, increasing drag and decreasing lift. Also, if water has been splashed on the landing gear down locks in taxiing, there is a possibility that the water will freeze on the locks after retraction of the gear, preventing them from engaging when the gear is lowered. If the hooks do not engage, you will get an unsafe indication from the triple light indicator and the horn will sound. If this happens, initiate a "go-around" and cycle the landing gear until the safe, gear-down-and-locked indication is received.

On flights that take you into areas where icing conditions may be anticipated, actuate either the alcohol flow propeller anti-icer or the electrothermal type propeller de-icer, if you have chosen either as optional equipment to supplement your Queen Air 80.

The alcohol flow anti-icer should be operated at full capacity for a few moments to wet the propeller blades thoroughly, then the flow should be reduced to a rate that will keep the blades free of ice. The anti-icer fluid pump, which controls the rate of fluid flow to the propeller blades, is governed by a rheostat switch on the left subpanel, inboard of the pilot's control column. The rate of flow is increased anti-icer fluid pump, which controls the rate of fluid flow to the propeller blades, is governed by a rheostat switch on the left subpanel, inboard of the pilot's control column. The rate of flow is increased by turning the switch in the clockwise direction from "OFF" through "NORMAL" and "INCREASE." In the "NORMAL" position, 1.7 hours of continuous operation is available. When the selector is at maximum, system endurance is limited to approximately 35 minutes. Remember, however, that the alcohol flow propeller anti-icer is designed to prevent icing, not to remove ice once it has built up. Be sure to prepare your propellers for icing conditions prior to entering them.

The electrothermal type de-icer is controlled by a trip-free, circuit breaker type, "ON"-"OFF" switch on the left side of the subpanel. The system will function automatically until the switch is turned off, and may be operated continuously in flight. When the switch is turned on, power from the airplane's generating system is supplied through a distribution system to an electrically heated de-icer bonded to each propeller blade. De-icing is accomplished by heating a portion of each anti-icer in a sequence controlled by a timer. The propeller anti-icer ammeter installed to the left of the switch should indicate between 15 and 22 amperes when the system is operating. The small momentary deflection of the ammeter needle every 30 seconds is caused by the switching action of the timer, and is an indication of normal operation of the system.

If icing conditions cannot be avoided, and your Queen Air 65 is equipped with the optional surface de-icer, allow ice to build up on the leading edges of the various airfoils before actuating the system. Operate the system to remove the ice formations then discontinue until you again have an ice accumulation. If the boots are continuously operating, ice may form around their inflated contours and thus not be susceptible to boot action.

During longer flights in cold weather, propeller operation will be smoother and they will respond more readily and accurately to changes in power or load if they are exercised occasionally. Once power settings are established and the airplane trimmed, the movement of the pitch change mechanisms to maintain constant rpm is so slight that the oil in the propeller hubs may become cold and congeal. Occasional exercising of the propellers flushes the cold oil from the hubs. First, lower the manifold pressure approximately three inches from the selected cruise setting, then cycle the propellers approximately 200 rpm above and 200 rpm below your selected rpm. *When lowering the rpm, be sure you do not exceed the manifold pressure limitation.* The rate of rpm change is your best indication of how often you should exercise the propellers. If the rpm changes rapidly you may extend the interval, but if it changes slowly, you should shorten the interval.

To maintain battery strength, turn off all nonessential electrical equipment at least one minute before landing, in cold weather. This will reduce the out-put load placed on the battery during landing roll-out when engine rpm is below generator cut in speed.

During your let-down, particularly in cold weather operations, watch your engine temperatures closely. Carry enough power to keep these temperatures well within the operating limitations.

When landing on a slush or ice covered runway, retract the flaps immediately after positive touch-down, in order to prevent flap damage resulting from particles thrown against them by the wheels or prop wash. On your landing roll, use the brakes sparingly and apply them cautiously to avoid skidding. Apply only enough brake pressure to slow the wheels. Do not lock them. When you have slowed the aircraft and are ready to turn off the active runway, use rudder and nose wheel steering for directional control.

INDUCTION SYSTEM ICING

Induction system icing may occur when flying through fog, clouds, snow or other forms of visible moisture throughout a wide temperature range. To minimize the possibility of icing, *always select "FILTERED" air before entering these conditions.* Since fog, clouds and precipitation constitute a nearly saturated atmosphere, condensation may occur in the induction system and lead to impact icing. When operating on "RAM" air, there is nothing to reduce the amount of moisture entering the system. The location and characteristics of the induction air filter minimize the amount of moisture drawn into the induction system, reducing the possibility and severity of icing.

Remember these important points regarding induction ice! Always select "FILTERED" air before entering icing conditions and do not return to "RAM" air during these conditions. Your only defense against icing is engine heat. If you do not take immediate remedial action your engine may be robbed of its heat-producing ability. Power settings of 60-75% produce the maximum heat for the alternate air source and should be used when icing is experienced.

CROSS WIND PROCEDURES

You are indeed fortunate if you operate your airplane under conditions that allow you to consider cross wind situations as unusual. It is rare that the wind at an airport is exactly down the active runway. In truth, almost all of your take-off and landing operations will have some cross wind component to consider.

Under normal cross wind conditions, your Queen Air will be easily controlled and will offer no difficulty. Of course, immediate attention must be given to the existing cross wind situation for no matter how responsive the controls may be, they can do no good unless they are applied, and applied before the situation becomes extreme.

CROSS WIND TAKE-OFF

Be alert to the cross wind and apply corrective control to counter its effects immediately. In the cross wind take-off, your flap and trim configuration is the same as that for the normal take-off. Application of take-off power may differ, however, at the discretion of the pilot.

As an aid to directional control, you may find it advantageous to lead with power on the up wind engine during your take-off roll, gradually equalizing the power on the two engines as the aircraft accelerates. Throughout your run, and until just before breaking ground, hold the upwind wing down with aileron. As the airplane accelerates, its angle of attack will tend to keep the nose wheel on the ground. It is advisable to hold this attitude until the aircraft has achieved a speed that assures positive lift-off, with no fear of settling back to the runway. When your Queen Air reaches positive flying speed, lift it from the runway with a definite application of elevator control. When clear of the ground, initiate a slight coordinated turn into the wind to correct for drift.

CROSS WIND LANDING

The tricycle landing gear design of the Queen Air 80 makes cross wind landings easy and safe. Since each cross wind situation is a unique combination of variables, no one procedure is sufficient for all situations. Flaps should be retracted immediately after touch-down to decrease the effective lift of the wings. Also, various methods to compensate for the effects of the cross wind are available to the pilot.

It is suggested that crabbing into the wind or lowering the up-wind wing, will effectively counter most cross wind conditions. In extremely high cross winds, it is advisable to use a combination of these techniques.

Just before touch-down, take out your cross wind correction. Immediately after positive contact with the runway, retract the flaps and lower the nose wheel to the runway. Nose wheel steering will assist in maintaining directional control but if the cross wind situation is extreme, use your brakes to control cross wind forces.

SECTION V

Unusual Operating Conditions

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

Emergencies created by the failure or malfunction of one or more components or accessories may be broadly classified in one of two groups: those requiring immediate action or those which allow sufficient time for thoughtful consideration of the situation before remedial action is required.

In this discussion of emergencies, those situations requiring immediate corrective action are treated in check list form for ease of familiarization and application. The other situations, those which do not demand immediate action, are discussed with respect to probable cause, effect, and best corrective action to rectify the condition. While we have time to discuss all of these situations, you may find time of the essence, should an emergency arise in the air. It will be advantageous therefore, to become familiar with the recommended procedures and to devote sufficient time to practicing and mastering them. Only through familiarity with the procedures can you gain the proficiency necessary for safe operation.

Even though good inspection and maintenance procedures are practiced, emergencies are still a possibility. In order to be prepared for them, your complete understanding of this section is a necessity.

ENGINE FAILURE

The major advantage of an additional engine is that it allows your aircraft to continue flying in the event of an engine failure. Your "insurance policy" engine, however, is like having all weather instrumentation. It is a safety factor which depends on the knowledge, technique and familiarity of the pilot with single engine procedures.

Engine failure is usually preceded by symptoms which will enable you to take preventive action, if you are alert to operating conditions at all times. Concern, therefore, must be given to operating and maintenance procedures. During your operations, pay constant attention to such things as cylinder head temperature, oil pressure, manifold pressure, fuel pressure, rpm, engine sound, etc. and be guided by the operating limitations presented in this handbook. One basic law is suggested for your safety. If engine failure is experienced, land as soon as possible or remain on the ground if conditions permit.

DETERMINING THE INOPERATIVE ENGINE

Once an engine has actually failed, your first consideration is to continue flying the aircraft. Apply maximum allowable power to both engines immediately. Then determine for certain which engine has failed. Advancing power to the operating limitations will give you maximum flying power on the good engine and will give you time to react to engine indications rather than forcing you into a rapid, arbitrary decision which might end in securing the operating engine. The following checks will aid you in deciding which engine has failed:

1. Dead Foot — Dead Engine. The rudder pressure required to maintain directional control will be on the side of the good engine.
2. The cylinder head temperature for the inoperative engine will decrease.
3. Partially retard the throttle on the engine believed dead. Control pressures and engine sound will not change if the correct throttle has been retarded. At low altitudes or at low airspeeds, it is suggested that only checks one and two be made. If you elect to retard a throttle under these conditions, exercise extreme caution.

Never rely on tachometer or manifold pressure readings to determine which engine has failed. After power has been lost on an engine, the tachometer will often indicate the correct rpm and the manifold pressure gage will indicate the approximate atmospheric pressure or above.

SECURING DEAD ENGINE

When it is positively known which engine has failed, pull the propeller lever full back past the detent to the feather position, then turn the mixture control in "IDLE CUT-OFF." When the feathered propeller stops windmilling, shut off the ignition switches and secure the generator. Next turn the fuel tank selector to "OFF." If there appears to be a danger of fire, close the oil shut off valve on the dead engine.

ENGINE FAILURE DURING TAKE-OFF

Before each take-off it is suggested that you consult the accelerate-stop graph in Section VI to determine your refusal speed and deceleration distance for the maximum load condition. Due to the many variables involved, it would be impractical to try to prepare corrective procedures for every situation possible. However, we have prepared a list of the most common conditions that might develop, followed by the recommended corrective action.

To pinpoint the meaning of the terms used in the procedures, we have included the following definitions:

Minimum Single Engine Control Speed — The airspeed below which the airplane cannot be controlled in flight, with one engine operating at take-off power and the other engine with its propeller windmilling.

Best Angle of Climb Speed — The airspeed which delivers the greatest gain in altitude in the shortest possible horizontal distance with gear up, flaps up, and inoperative propeller feathered.

Best Rate of Climb Speed — The airspeed which delivers the greatest gain in altitude in the shortest possible time with gear up, flaps up, and inoperative propeller feathered.

The specific data for the terms above is given in Section III, Performance; or in Section VI, Operational Data.

Engine Failure Occurs During Take-Off:

A. If there is sufficient runway remaining for deceleration — CUT POWER IMMEDIATELY AND STOP STRAIGHT AHEAD.

B. If there is insufficient runway remaining and you have not gained best single-engine angle-of-climb speed — USE THE FOLLOWING PROCEDURE:

1. THROTTLES CLOSED
2. BATTERY AND GENERATOR SWITCHES — "OFF"

3. FUEL SELECTORS — "OFF"

4. CONTINUE STRAIGHT AHEAD, TURNING TO AVOID OBSTACLES IF NECESSARY

C. If there is insufficient runway remaining and you have gained best angle-of-climb speed for single-engine and are airborne — IMMEDIATELY CLEAN UP THE AIRPLANE (RETRACT LANDING GEAR, FEATHER WINDMILLING PROPELLER) AND FOLLOW NORMAL SINGLE-ENGINE PROCEDURE.

NOTE

With the airplane clean you can climb. With gear down, and propeller windmilling, you will not be able to maintain altitude.

1. If it is necessary to clear obstacles — cleanup airplane and maintain best angle-of-climb speed.
2. If no obstacles are present, cleanup airplane and accelerate to best rate-of-climb speed.
3. After obtaining the best rate of climb speed, return for landing.

Bear in mind also that the performance shown on the single-engine climb graph is for standard altitude; if your ambient temperature is higher than standard, your rate-of-climb will be less than that shown, while on a cold day it will be better. The amount of these variations may be visualized by selecting a few different ambient conditions of temperature and pressure, and checking the performance as shown on the graph.

SINGLE ENGINE CLIMB

Your decision to initiate a single engine climb must be guided by airspeed. Minimum single engine control speed, it must be remembered, is insufficient for climb. Therefore you must accelerate to at least best angle-of-climb speed before attempting a climb on one engine.

The problem of acceleration is reduced to a minimum if your Queen Air 80 is equipped with the optional, rocket engines (JATO). For single engine climbs:

1. Advance throttle for operating engine to maximum allowable power.
2. Retract landing gear.
3. Feather inoperative engine.
4. Clear obstacles.
5. Establish climb attitude, at best single engine rate of climb speed.
6. Secure inoperative engine.

ENGINE FAILURE IN FLIGHT

Make every effort to determine the cause of the malfunction if power is lost in flight. Do not delay your efforts to secure the inoperative engine but if the malfunction can be corrected, proceed to do so. If in-flight procedures can not regain the lost engine, maintain at least minimum single engine control speed and prepare to land at the first adequate airport.

SINGLE ENGINE CRUISE

When engine failure is experienced in flight, you must decide whether continued flight is practical. The decision rests with you. If flight can be continued, after consideration of load, altitude, weather, air-speed, etc., maintain at least minimum single engine control speed and secure the dead engine. Check to see that the landing gear is retracted and reset the throttle and propeller of the operating engine for single engine cruise. Make sure that flaps are up and trim the aircraft for its new attitude. It is suggested that you fly with the dead engine slightly high (3 to 5 degrees angle of bank). In this attitude, the airplane will have a tendency to turn into the good engine but at the same time, the unbalanced thrust caused by the good engine will tend to turn the airplane toward the inoperative engine. The result is a balance of the two effects and an increase in performance.

Finally, consider fuel management. In your shut down procedure, you turned off all fuel to the inoperative engine. As the flight continues, the weight of this fuel will exert an increasing force on your already unbalanced situation. To alleviate this problem, employ the fuel system cross-feed, drawing fuel from the dead engine's supply. It will be necessary to turn on the boost pump briefly during the change over to cross-feed operation. A check valve in the system, ahead of the cross-feed line, allows cross-feed operation, should a line fail in the dead engine compartment.

During single engine flight, you should monitor engine temperatures constantly. Engine cooling is accomplished by airflow and fuel flow; and any reduction of power will reduce both. You may decrease power somewhat for cruise but choose a power setting that produces near maximum airspeed and one that will maintain altitude. If temperatures begin to rise, be prepared to go to maximum continuous power or to higher airspeeds. Should temperatures begin to get out of hand, remember that cooling can be increased by maximum continuous power at airspeeds equal to or better than best rate of climb speed.

SINGLE ENGINE LANDING

Your preparations for a single engine landing vary only slightly from those for a normal landing. Although you are working in the singular, the application of the check lists remains the same. However, it is advisable to allow a longer final for drift corrections. In the final, give yourself a little more altitude than in the normal approach and ease off your power a little sooner. Pay more attention to trim in the final than normal and compensate for power reductions immediately.

In the single engine approach, either normal or emergency, do not lower your gear or flaps until you are sure that you can make the field and complete the landing. Be particularly judicious in lowering the flaps. Once they have been lowered, you may not be able to get them up again in time to climb out. If you commit yourself to a single engine landing, and you are committed when your airspeed drops below minimum single engine control speed, complete that landing unless an extremely undesirable situation exists. On flare-out, remember that with one engine feathered, normal drag is considerably reduced and your Queen Air 80 will demonstrate a tendency to hold off or float. Take this into consideration when you plan your approach.

SINGLE ENGINE GO-AROUND

The most important factor in the single engine go-around is recognition of the fact that it is necessary to "take it around." You should exert every effort to make your first approach on one engine, your final approach. If the safety margin becomes tenuous, however, do not hesitate to initiate a "wave-off." Your Queen Air 80 displays excellent handling characteristics in this situation and the power available from only one of its engines is easily adequate for the purpose. Do not let the ease of control or the availability of power tempt you into a steep climb, however. Your Queen Air 80 will climb at a steady rate if you maintain proper airspeed and angle of climb, as indicated in Section VI for best performance. In initiating your go-around:

1. Apply maximum allowable power while coordinating rudder to counter excess torque and to prevent any possibility of an uncontrolled roll.
2. Raise the landing gear; flaps to 65%.
3. Retrim elevator to reduce control forces.
4. Raise flaps as altitude permits.
5. Raise the wing so that the dead engine is approximately 3 to 5 degrees high.
6. Retrim for best climb.

AIRSTART

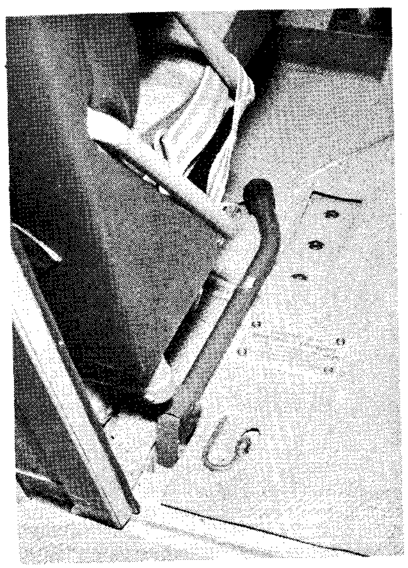
Do not attempt to restart an engine that has failed in flight unless you have determined that no further malfunction or damage will result. If you have any doubt, continue on one engine. When it appears that a restart is advisable, push the oil shut-off valve handle fully in, switch the fuel selector to the MAIN tank and turn the fuel boost pump to "MAIN." Advance the throttle to the normal starting position and set the mixture control in "IDLE CUT-OFF." Advance the propeller control out of the feather detent to the low rpm range to unfeather the propeller and engage the starter. (If the optional unfeathering accumulator is installed it is not necessary to engage the starter to unfeather the propeller.) Failure of the propeller to unfeather or to rotate indicates an internal failure, and you should return the propeller control to the feather position and secure the engine. If you continue with the restart, turn the ignition switch to "BOTH" and advance the mixture control to "FULL RICH" after the engine is windmilling at approximately 1000 rpm. The engine should start without priming.

Warm up the engine at as low a speed as possible. Reduce airspeed if practical to prevent overspeeding the engine during warm-up. Note oil and fuel pressure continually throughout the warm-up. If both do not respond normally, immediately after starting or at any time during the warm-up period, feather the propeller and secure the engine. If the oil pressure has not reached the operating minimum within 30 seconds a malfunction is indicated. Shut down the engine.

When all indications are favorable, continue the warm-up and when the oil temperature reaches the normal operating range, advance the propeller control and throttle to balance the power. Be sure to lead with rpm and follow with throttle when bringing your power into balance.

During cold weather, particularly, you should decide quickly on restarting since the propeller hub and engine oil will cool rapidly in a stopped engine and you may find it impossible to unfeather if you delay too long.

LANDING GEAR EMERGENCY EXTENSION



If the landing gear can not be extended with the normal system, a manual emergency extension system is provided in the Queen Air 80 for lowering the gear. The procedure for emergency gear extension is as follows:

1. Slow the aircraft to below normal extension airspeed.
2. Pull out the landing gear relay circuit breaker.
3. Place the landing gear handle in the "DOWN" position.
4. Pull up the landing gear clutch lever and turn it clockwise to lock. The lever is located on the floor to the

SINGLE ENGINE GO-AROUND

The most important factor in the single engine go-around is recognition of the fact that it is necessary to "take it around." You should exert every effort to make your first approach on one engine, your final approach. If the safety margin becomes tenuous, however, do not hesitate to initiate a "wave-off." Your Queen Air 80 displays excellent handling characteristics in this situation and the power available from only one of its engines is easily adequate for the purpose. Do not let the ease of control or the availability of power tempt you into a steep climb, however. Your Queen Air 80 will climb at a steady rate if you maintain proper airspeed and angle of climb, as indicated in Section VI for best performance. In initiating your go-around:

1. Apply maximum allowable power while coordinating rudder to counter excess torque and to prevent any possibility of an uncontrolled roll.
2. Raise the landing gear; flaps to 65%.
3. Retrim elevator to reduce control forces.
4. Raise flaps as altitude permits.
5. Raise the wing so that the dead engine is approximately 3 to 5 degrees high.
6. Retrim for best climb.

AIRSTART

Do not attempt to restart an engine that has failed in flight unless you have determined that no further malfunction or damage will result. If you have any doubt, continue on one engine. When it appears that a restart is advisable, push the oil shut-off valve handle fully in, switch the fuel selector to the MAIN tank and turn the fuel boost pump to "MAIN." Advance the throttle to the normal starting position and set the mixture control in "IDLE CUT-OFF." Advance the propeller control out of the feather detent to the low rpm range to unfeather the propeller and engage the starter. (If the optional unfeathering accumulator is installed it is not necessary to engage the starter to unfeather the propeller.) Failure of the propeller to unfeather or to rotate indicates an internal failure, and you should refeather the prop and secure the engine. If you continue with the restart, turn the ignition switch to "BOTH" and advance the mixture control to "FULL RICH" after the engine is windmilling at approximately 1000 rpm. The engine should start without priming.

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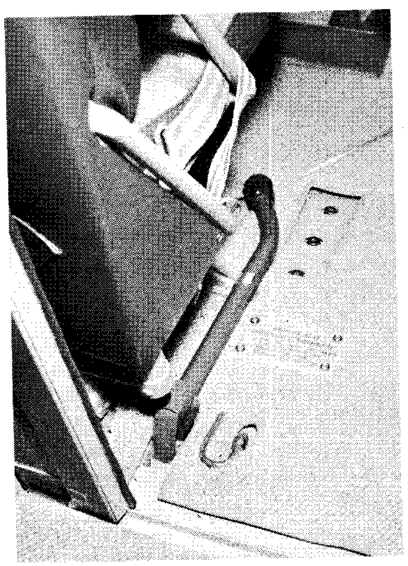
During cold weather, particularly, you should decide quickly on restarting since the propeller hub and engine oil will cool rapidly in a stopped engine and you may find it impossible to unfeather if you delay too long.

LANDING GEAR EMERGENCY EXTENSION



If the landing gear can not be extended with the normal system, a manual emergency extension system is provided in the Queen Air 80 for lowering the gear. The procedure for emergency gear extension is as follows:

1. Slow the aircraft to below normal extension airspeed.
2. Pull out the landing gear relay circuit breaker.
3. Place the landing gear handle in the "DOWN" position.
4. Pull up the landing gear clutch lever and turn it clockwise to lock. The lever is located on the floor to the

right of the pilot's seat. Pulling up and turning this lever disengages the landing gear extension motor and sets the drive linkage for manual operation.

5. Remove the large landing gear extension handle from its retaining clip and pump the gear down. Full extension of the gear will require upwards of fifty cycles of the handle. Proceed cautiously when nearing the full down and locked position and stop when the gear indicators show full down or when resistance is felt in the handle. Further movement of the handle could damage the drive mechanism and prevent subsequent, electrical retraction. No provisions are made for manual retraction of the landing gear in the event of power failure or retraction system malfunction.

GEAR UP LANDING

The main landing gear wheels protrude slightly below the engine nacelles when they are in the retracted configuration. They will roll when the aircraft is landed with wheels up, affording a measure of safety and protection for the Queen Air's hull. With wheels up, the aircraft's center of gravity is aft of the main wheels and this creates a nose light condition which allows the craft to slide easily. These two safety factors reduce structural damage to a minimum in the event of a gear up landing. It is recommended that such landings be made on hard surfaces such as paved runways, with wings level. An emergency landing on soft terrain results in extreme damage to the aircraft's underside since sod has a tendency to roll up into chunks or balls. If a gear up landing must be made, the following procedure should be followed:

1. Tighten and lock seat belts in both compartments.
2. Proceed with your normal approach.
3. Turn "OFF" the battery and generator master switches.
4. Close the throttles when you are sure of making the runway.
5. Select "OFF" on all fuel system selector valves.

Do not hurry your approach and landing, you will find that you will make the smoothest landing of your career when you take it in wheels up. Caution yourself and your passengers not to leave their seats until make the smoothest landing of your career when you take it in wheels up. Caution yourself and your passengers not to leave their seats until the aircraft has come to a positive stop. Generally, and most particularly in water landings, the aircraft will lurch one time on contact giving the impression that it has come to rest. This is a normal impression, however, wait until the aircraft has positively stopped before releasing your seat belts.

EMERGENCY EXIT

The "AIR STAIR" door is latched mechanically and is easily released, even in the emergency situation. An alternate emergency exit is available through the "pop-out," right rear, cabin window. To actuate this escape system, pull down the metal flap that covers the exit latch handle at the middle of the right rear, window panel. Next, push the red button to release the exit latch handle. Then, pull up on the handle and push to remove the hatch.

ENGINE FIRE DURING STARTING

In the event of engine fire during starting, attempt to keep the engine running to exhaust all vapors that contribute to the fire. If the engine stops firing or if it has not started, keep it turning with the starter in an attempt to draw the flames into the engine.

Fires during the starting cycle are usually the result of excessive priming, but may occur under normal situations if the engine is warm and there is excessive fuel in the induction system. If such fires are experienced, open the throttle and continue cranking to draw the fire through the engine. Generally, this procedure is sufficient to stifle any fires in the induction system. If this fails to extinguish the fire, continue cranking the engine with discretion, as prolonged continuous operation may overheat the starter. Turn off the fuel boost pump, fuel selector valve and idle cut-off switch. Leave the oil shut-off valve open until you discontinue cranking in case the engine should fire. Shut down the other engine (if running) and get your passengers clear of the aircraft. Signal the ground crew to use portable fire extinguishers to subdue the flames, and keep the engine turning until they arrive, if practicable. After you stop cranking, turn off the ignition and pull the oil shut-off valve handle fully out. If it becomes necessary to use fire extinguishers, do not attempt to restart engine until the cause of fire has been remedied and all extinguisher compounds have been removed.

ENGINE FIRE IN FLIGHT

Should you experience an engine fire in flight that cannot be extinguished by variations in airspeed or power setting, etc., it will be necessary to shut down the effected engine as follows:

1. Fuel tank selector — "OFF."
2. Idle cut-off switch — "DOWN" (off).
3. Throttle — Fully "OPEN."
4. Generator switch — "OFF."
5. Propeller lever — "FEATHERED."
6. Oil shut-off valve handle — Fully "OUT."

If the fire continues, land immediately.

FUSELAGE FIRE

Most fuselage fires can be reached with the portable cabin extinguisher (if installed) and can be quickly subdued. To aid in your fire fighting efforts, close all windows and shut off heater and ventilating systems to destroy any fanning drafts they may produce. Next, turn "OFF" heater switches. If it is determined that your fire is within a specific system, shut down all elements of that system and use the fire extinguisher as need demands.

If the fire is located in the electrical system, "gang bar" the battery and generator switches "OFF," pull all circuit breakers for the system and then reset only those which protect essential equipment. If some one of the essential circuits is the offending agent, its circuit breaker must be pulled again and that system secured. You will then prepare for the appropriate emergency.

If it has been necessary to use the fire extinguisher to combat a fire, remember that most gas type extinguishers employ carbon dioxide as their extinguishing agent. After the blaze has been subdued, reduce the concentration of these potentially dangerous fumes by allowing maximum ventilation to enter the cabin.

UNUSUAL TAKE-OFF CONDITIONS

For convenience, we have grouped the obstacle, short field and unimproved field take-offs under the common heading of "UNUSUAL

TAKE-OFF CONDITIONS." In each case, your primary concern is to get the aircraft off the ground with the minimum take-off roll. After the airplane has broken ground, the procedures differ somewhat and will be discussed individually.

For minimum take-off roll, align the nose wheel with the runway center line, drop 65% flaps, hold the brakes, trim in or hold slightly excess right rudder and with prop in full low pitch, advance the throttles smoothly to maximum take-off power. As the engines deliver full power, or slightly before to lessen torque effects, release the brakes. Hold the aircraft straight down the runway and when elevator control becomes effective, break the nose wheel off the runway. As airspeed increases, continue to apply back pressure to the controls until the plane is airborne in a slightly exaggerated, nose high, take-off attitude. As soon as you are firmly established in the air with no fear of settling back on the runway, retract the landing gear.

In the short or unimproved field situation, rotate the nose of your Queen Air to a level attitude as soon as you are well clear of the runway and accelerate to at least the minimum single engine control speed. With minimum single engine control speed established, proceed with normal climb.

In the obstacle take-off, adjust your climb attitude to attain the best angle of climb permissible. Hold this angle of climb until all obstacles have been topped and then level off and accelerate to normal climb speed. With normal climb airspeed, again adjust your attitude to the desired climb angle and set your power.

In each of these situations, you should delay your flap retraction until you have gained sufficient airspeed to maintain flight with at least minimum single engine control speed.

OBSTRUCTED LANDINGS

Again for convenience we have grouped the three obstructed landing situations under a common heading since minimum landing roll is an important consideration in the unimproved runway, short field or obstacle landing. In all three patterns, a slow, powered approach is desired. Full flaps should be lowered and a coordinated, power-altitude-attitude approach should be flown. Full flaps will afford you greater lift at slower air speeds and the proper use of power will control your sink rate. Plan your touch-down point to be at the extreme, down-wind end of the runway and govern your approach accordingly.

In the unimproved runway or short field landing, approach your touch down point in a slightly nose high attitude, governing altitude and sink rate with power. Fly your aircraft to its touch-down point with power on, but cut power immediately on touch down. When the aircraft is on the runway, put the nose wheel on the ground and retract the flaps immediately. Apply brakes as required but remember that on unimproved surfaces, excessive braking will place major stresses on the nose gear.

In the obstacle landing, your final approach must be higher than normal, naturally, and it is essential that you plan and establish your rate of descent well in advance. Here, with full flaps, your power configuration will be dictated by the obstacle to be cleared and the runway available. After the obstacle has been cleared, your minimum safe airspeed and the sharp rate of descent may make it necessary to lead the flare-out by a few extra feet and to add power to cushion the landing. On touch down, retract the flaps and put the nose wheel on the runway, braking as necessary.

MAXIMUM GLIDE

With no power, the Queen Air 80 will achieve maximum gliding distance if the propellers are feathered and the landing gear and flaps are retracted. For performance figures in this configuration, consult the Gliding Distance Chart in Section III.

SIMULATED SINGLE ENGINE PROCEDURE

Simulated single engine conditions can be set up in which zero thrust is supplied by one engine. By using the appropriate power settings in this "no thrust" range, you avoid the possible difficulties that accompany the re-starting of a shut down engine. Further, you preserve almost instant power to counter any of the hazards that attend single engine operations.

To set up a single engine inoperative condition, use the following procedure:

1. Move mixture to idle cut off on engine designated as simulated inoperative.

NOTE

Do not simulate engine inoperative by closing throttle first.

2. Establish power on remaining engine necessary to maintain safe flight on one engine.

3. Gear "up".

4. Retract flaps as altitude permits.

5. Reduce throttle on dead engine to 12 inches MP, and propeller to 2800 RPM.

6. Return mixture control to "full rich" position.

CAUTION

Before accomplishing step 6 of the above, it is of utmost importance that step 5 has been completed. If the latter is not accomplished in the proper order, actual engine failure may result from detuning, over-speeding, or over-boosting. Handle propellers and throttles smoothly.

7. In order to set up the zero thrust condition for single engine practice, use the following procedure:

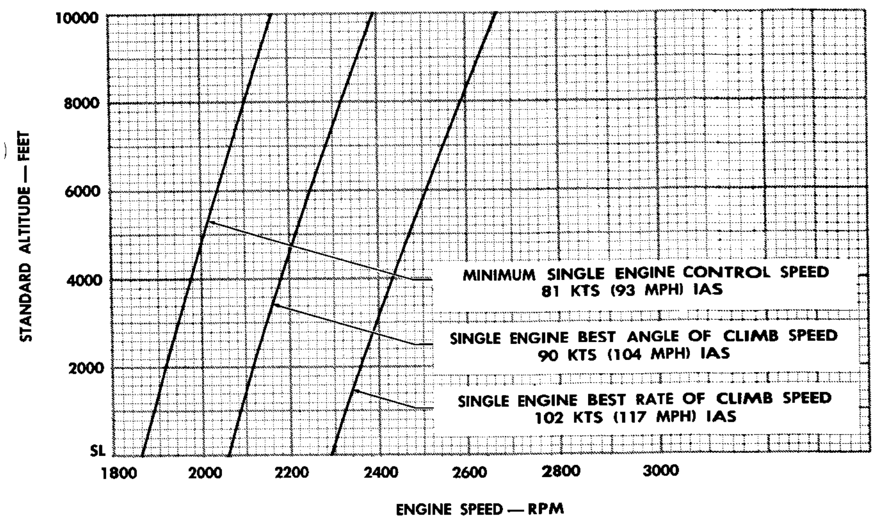
(a) Note your pressure altitude as indicated by your altimeters.

(b) Note your OAT and compute your standard altitude from the Altitude Conversion Chart in Section VI.

(c) Read over horizontally to the desired Minimum Single Engine Control Speed, Single Engine Best Angle of Climb Speed, or Single Engine Best Rate of Climb Speed on the accompanying graph.

(d) Read vertically down from this intersection to the Engine Speed — RPM scale for the desired engine rpm.

ENGINE SPEED FOR ZERO THRUST



(e) Set up the engine rpm and airspeed as indicated for your particular standard altitude. The propeller controls should be at 2800 RPM.

(f) Adjust your power to the minimum throttle setting for the required rpm and airspeed.

(g) Proceed with single engine operations as previously discussed.

8. Observe engine gages on good engine and do not permit cylinder head and oil temperatures to become excessive.

9. Pilot should consider for an actual emergency, turning off magneto switches, fuel selector "off", closing the oil shut off valve for the dead engine and possible loss of any accessories.

10. When the simulated engine inoperative practice is completed, gradually return the retarded throttle toward normal required power settings and as cylinder head temperature approaches green arc, normal power may be used again.

SECTION VI

Operational Data

Graphic presentations of all operational data are grouped in this section of the manual for immediate, efficient reference. Where possible, the data is presented in an in-flight sequence, for your convenience.

A carefully detailed flight plan based on these graphs will enable you to realize maximum performance from your Queen Air 80. In using the graphs, bear in mind that they have been prepared with a consideration for reserves, fuel consumed during warm-up and taxi. You must make allowances for fuel consumed during delays in accepting clearances, en route wind variations or non-standard conditions.

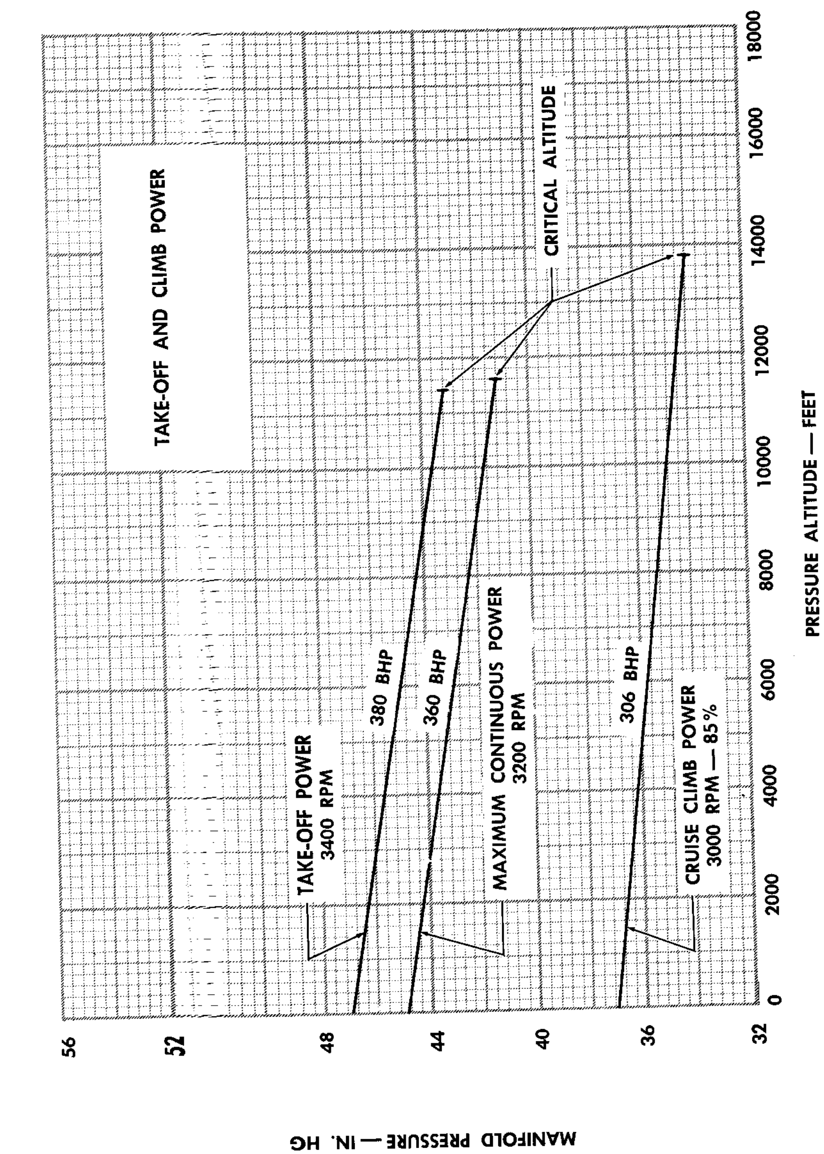
It is suggested that you strictly adhere to the data presented in the graphs initially, and then compare the forecast performance to the actual performance. Analysis and application of any deviation will allow near perfect accuracy in future computations.

TABLE OF CONTENTS

SECTION VI

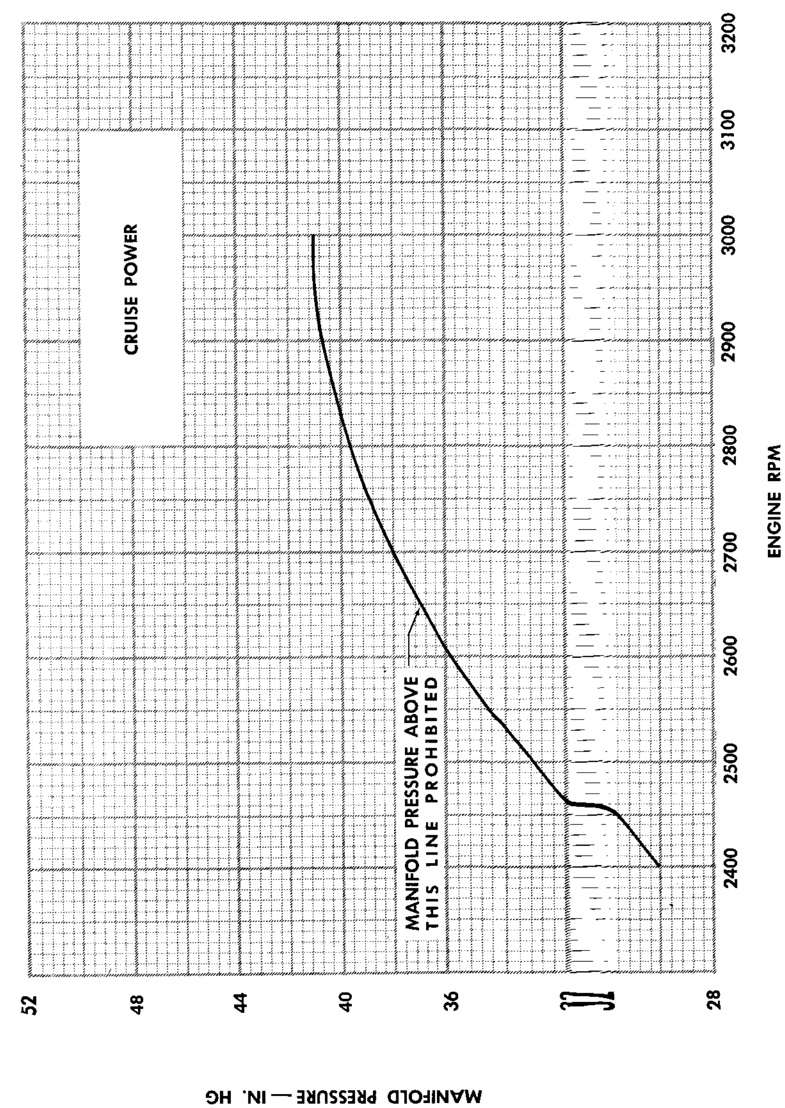
POWER PLANT OPERATING LIMITATIONS

LYCOMING IGSO-540-AIA ENGINE



POWER PLANT OPERATING LIMI[redacted]ATIONS

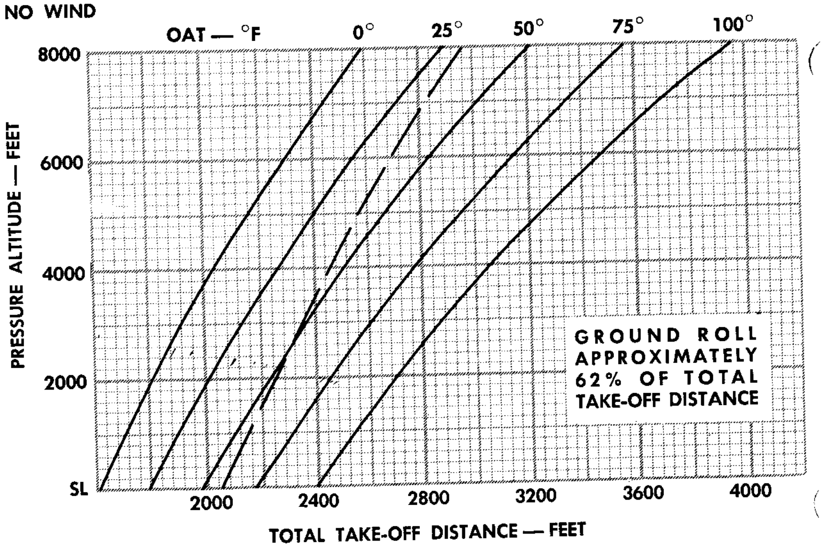
LYCOMING IGSO-540-AIA ENGINE



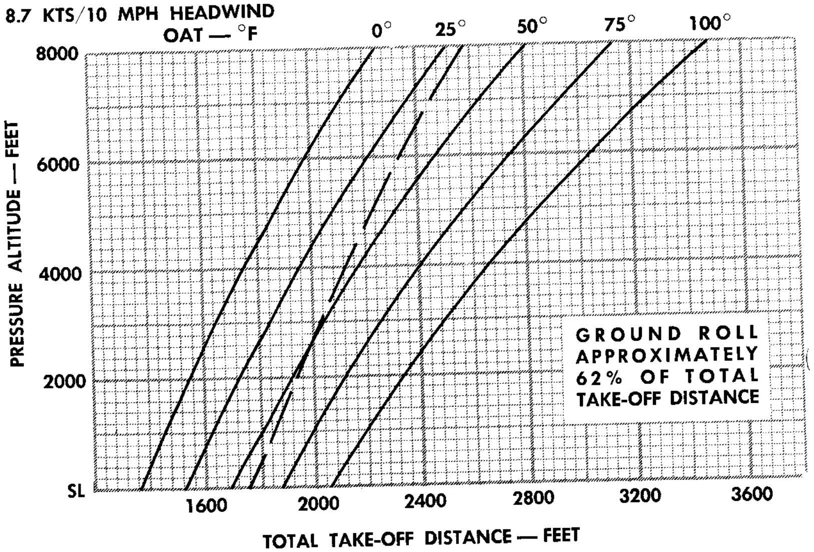
NORMAL TAKE-OFF

DISTANCE OVER 50 FEET
GROSS WEIGHT 8000 LBS
FLAPS UP
TAKE-OFF SPEED — 81 KTS/93 MPH (IAS)
— — STD. TEMP.

NO WIND

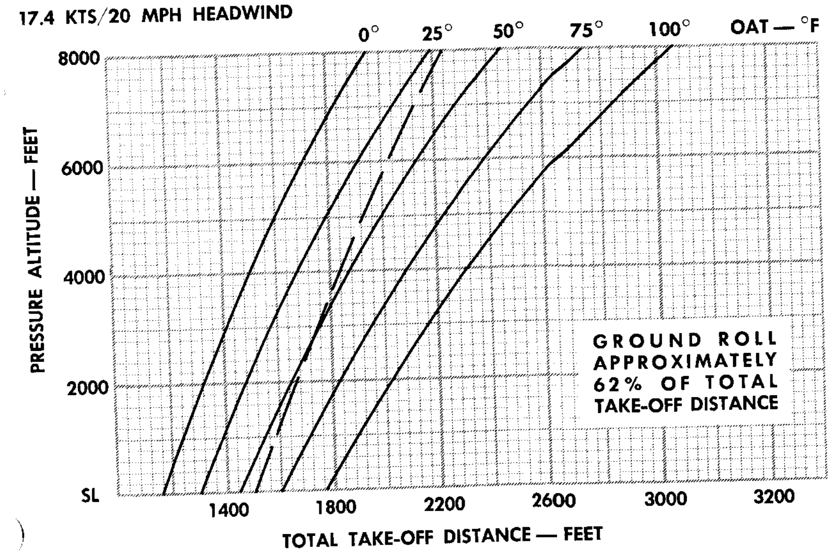


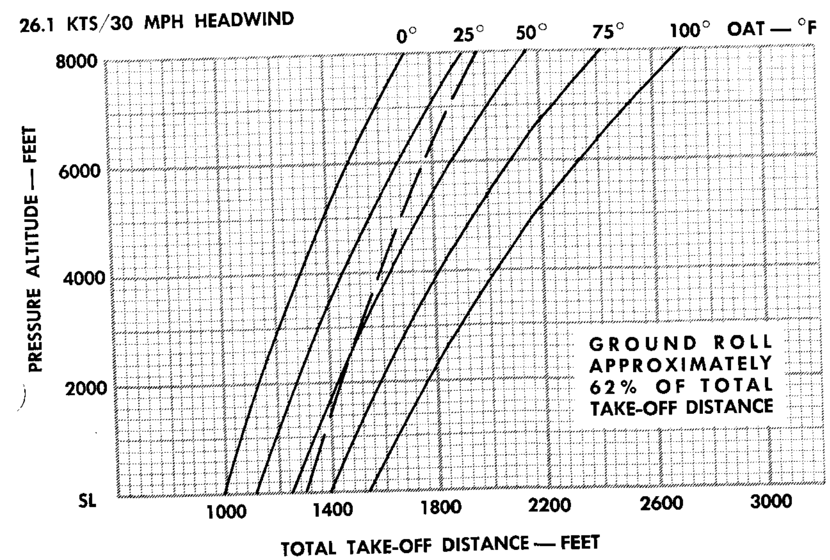
8.7 KTS/10 MPH HEADWIND



NORMAL TAKE-OFF

DISTANCE OVER 50 FEET
GROSS WEIGHT 8000 LBS
FLAPS UP
TAKE-OFF SPEED — 81 KTS/93 MPH (IAS)
— — STD. TEMP.

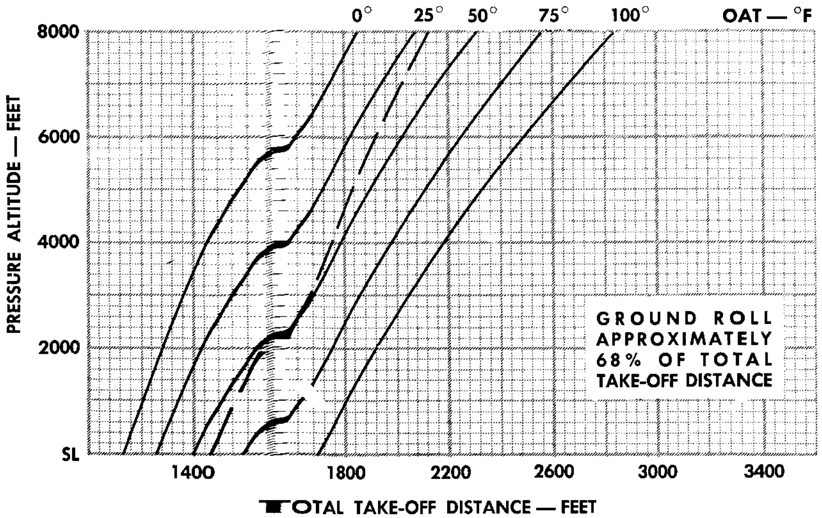




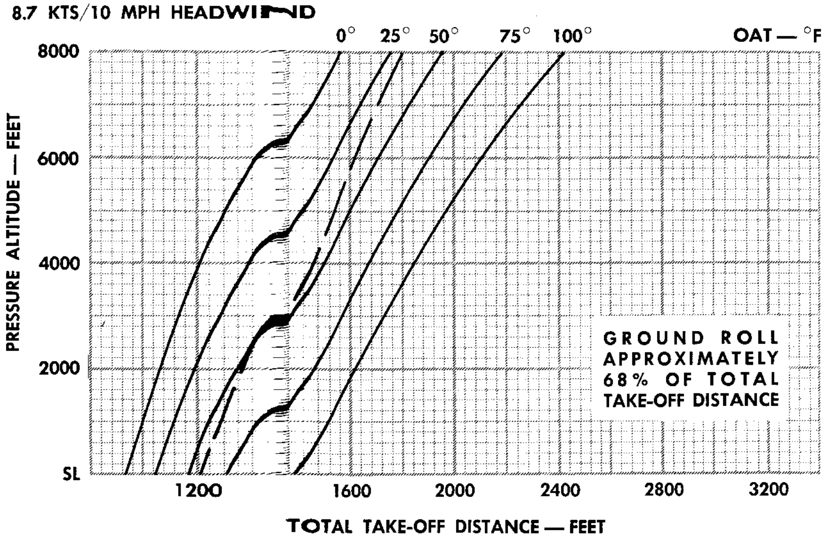
MAXIMUM PERFORMANCE TAKE-OFF

DISTANCE OVER 50 FEET
GROSS WEIGHT 8000 LBS
65% FLAPS
TAKE-OFF SPEED — 74 KTS/85 MPH (IAS)
— — STD. TEMP.

NO WIND



8.7 KTS/10 MPH HEADWIND

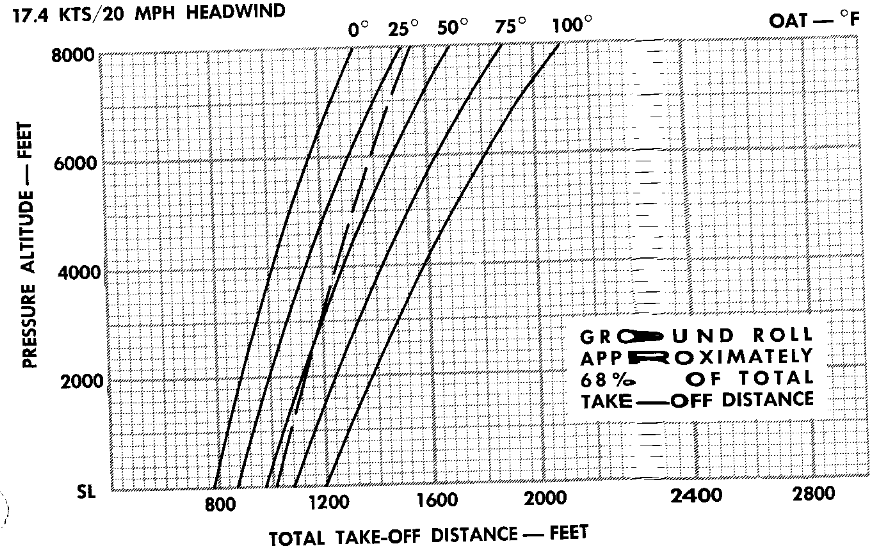


Revised January 15, 1963

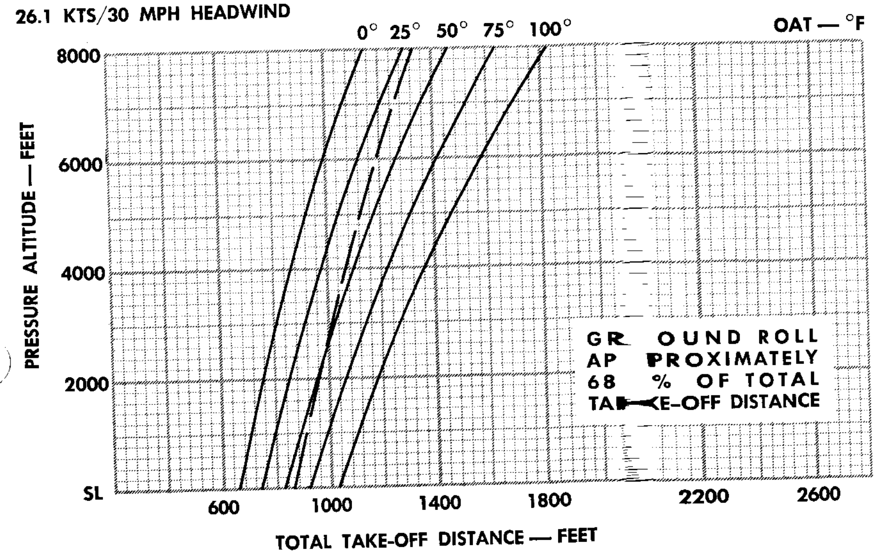
MAXIMUM PERFORMANCE TAKE-OFF

DISTANCE OVER 50 FEET
GROSS WEIGHT 8000 LBS
65% FLAPS
TAKE-OFF SPEED — 74 KTS/85 MPH (IAS)
— — STD. TEMP.

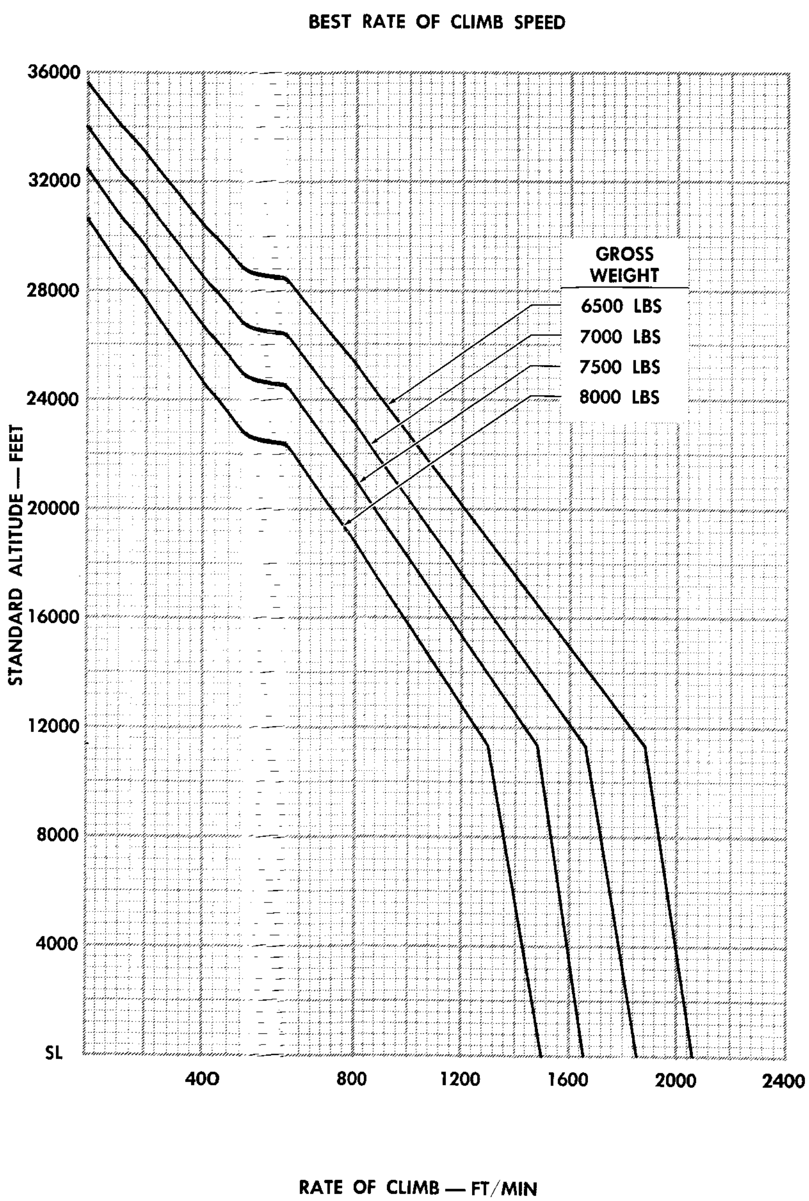
17.4 KTS/20 MPH HEADWIND



26.1 KTS/30 MPH HEADWIND

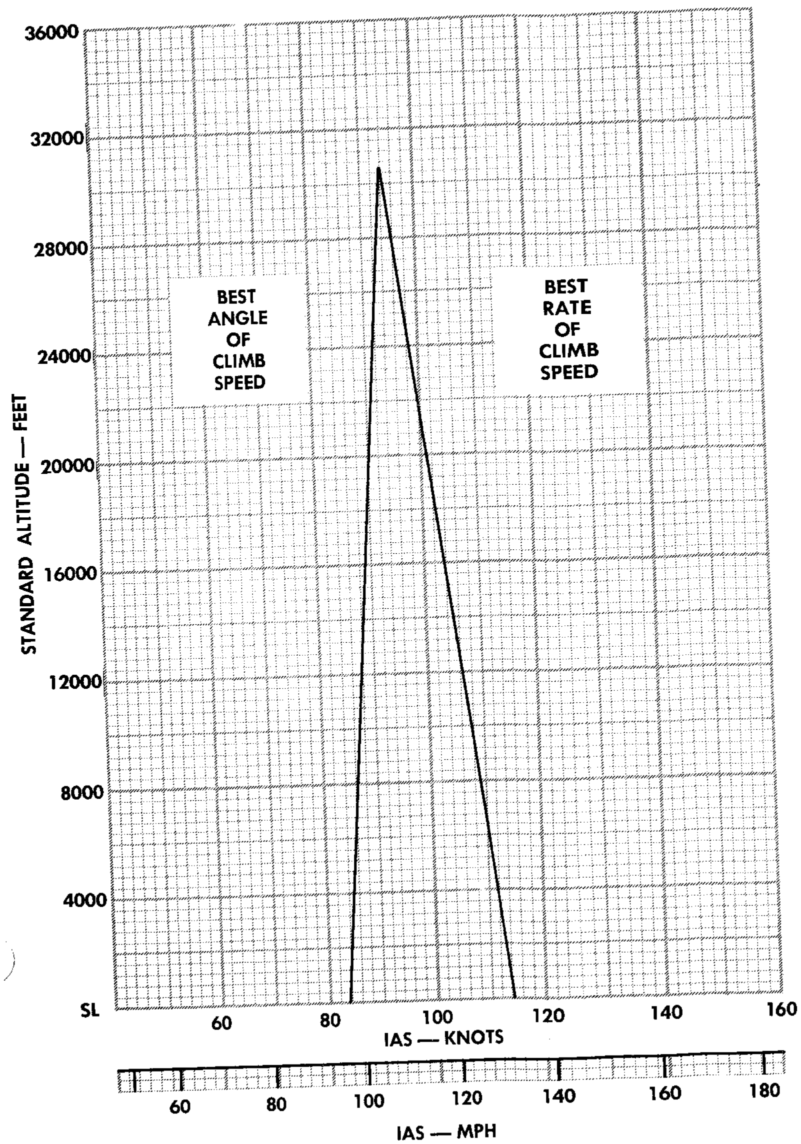


TWO ENGINE CLIMB PERFORMANCE



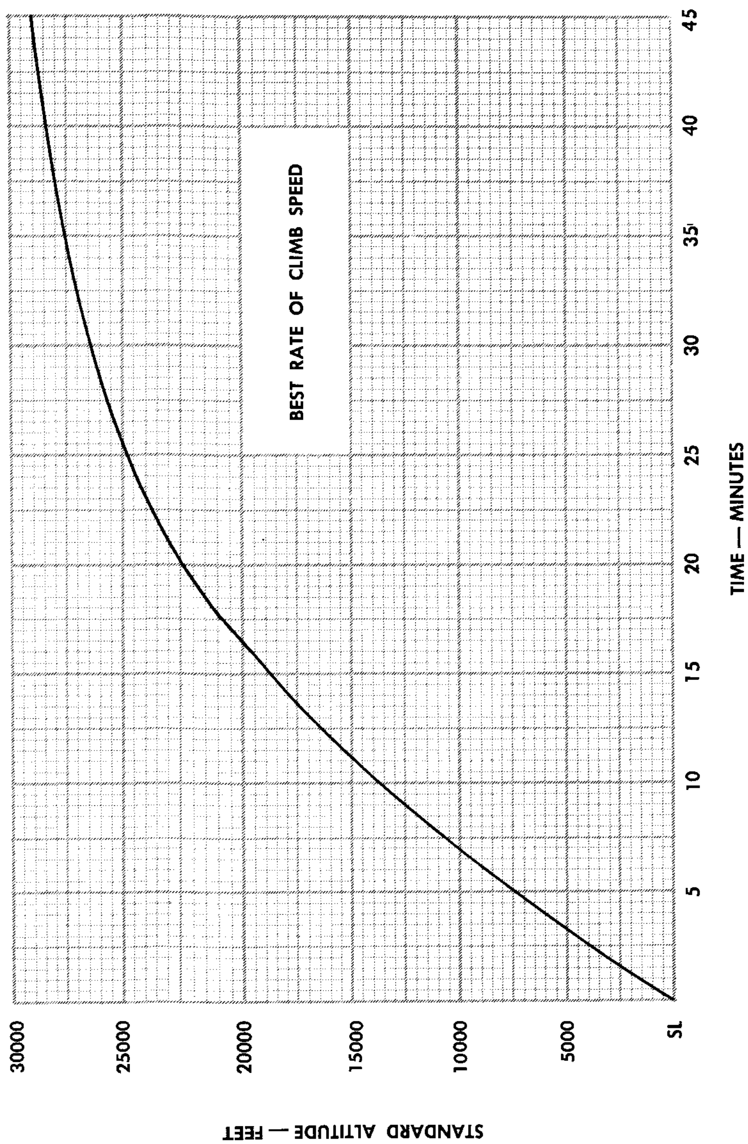
TWO ENGINE CLIMB PERFORMANCE

TWO ENGINE RATE OF CLIMB SPEED
GROSS WEIGHT 8000 LBS



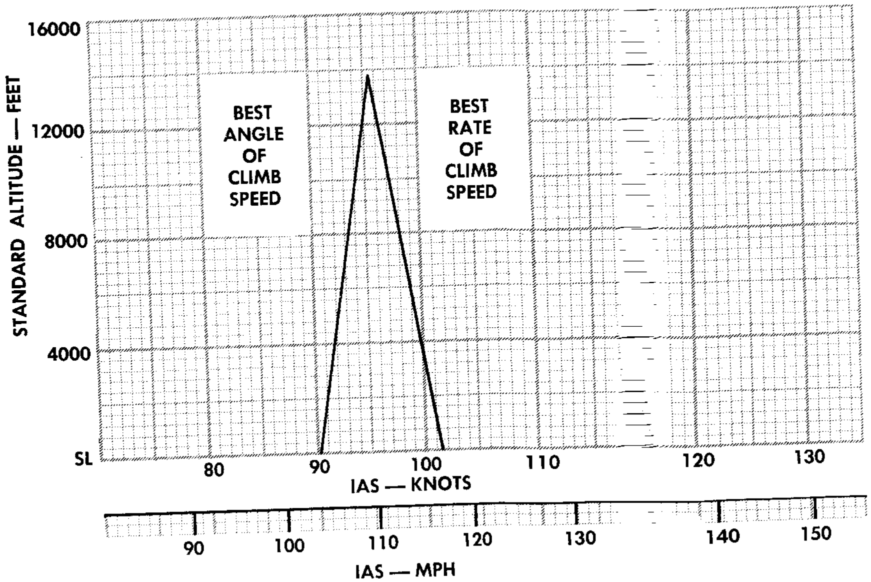
TWO ENGINE TIME TO CLIMB

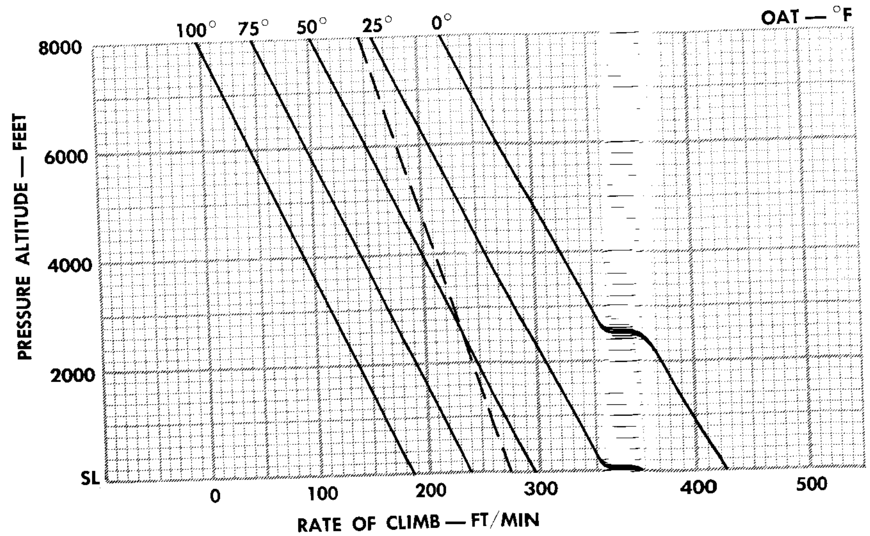
GROSS WEIGHT 8000 LBS



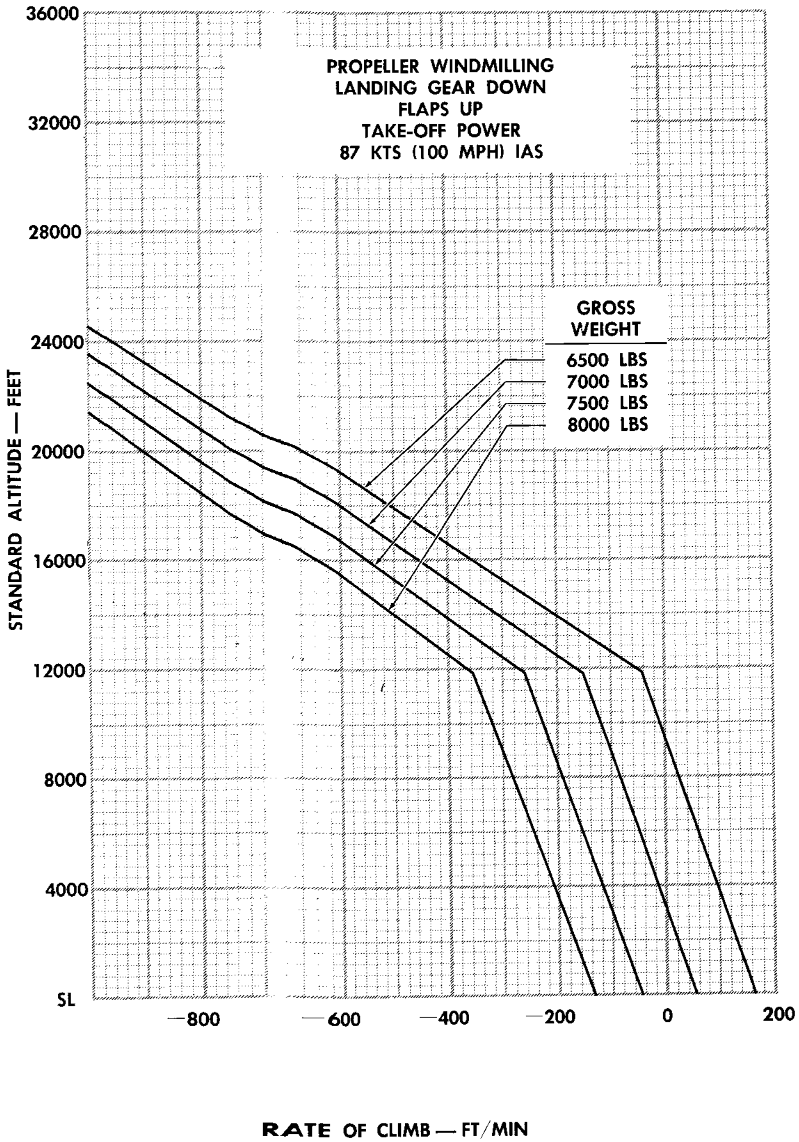
SINGLE ENGINE CLIMB PERFORMANCE

GROSS WEIGHT 8000 LBS
GEAR AND FLAPS UP
MAXIMUM CONTINUOUS POWER
INOPERATIVE PROPELLER FEATHERED
— — STD. TEMP.

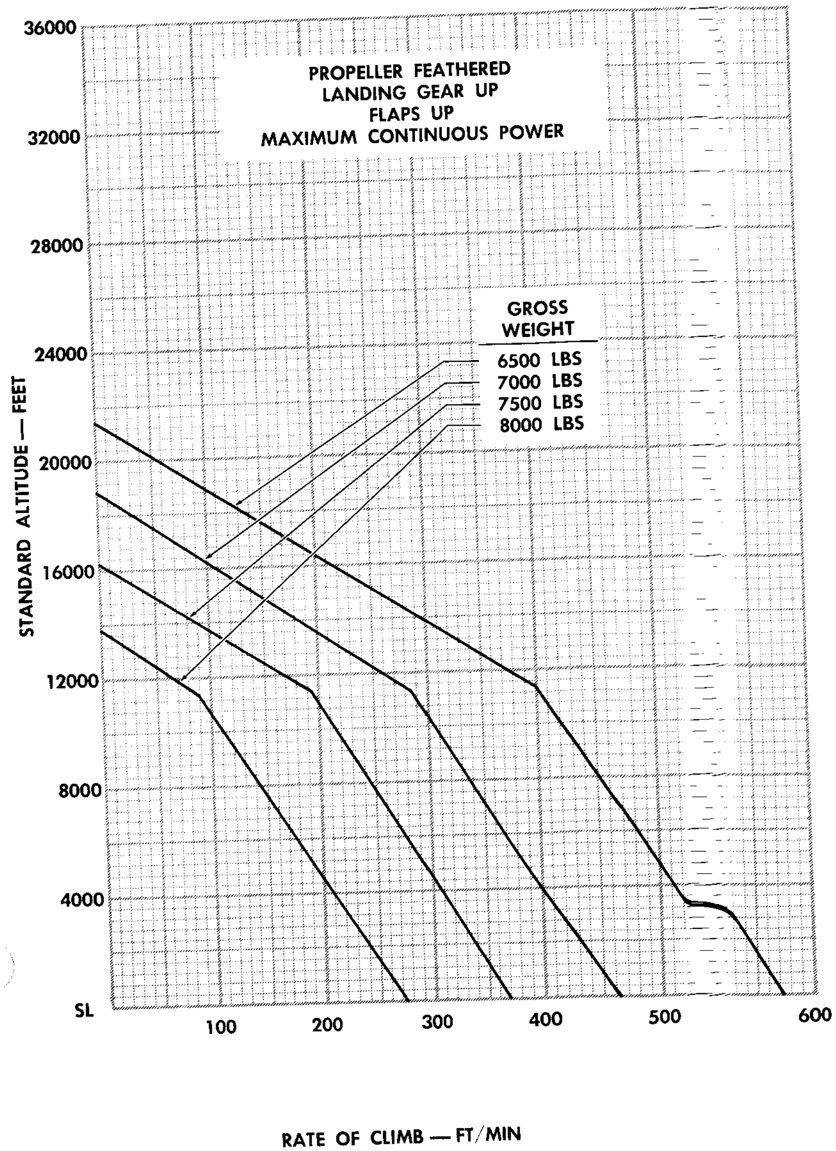




SINGLE ENGINE EMERGENCY RATE OF CLIMB

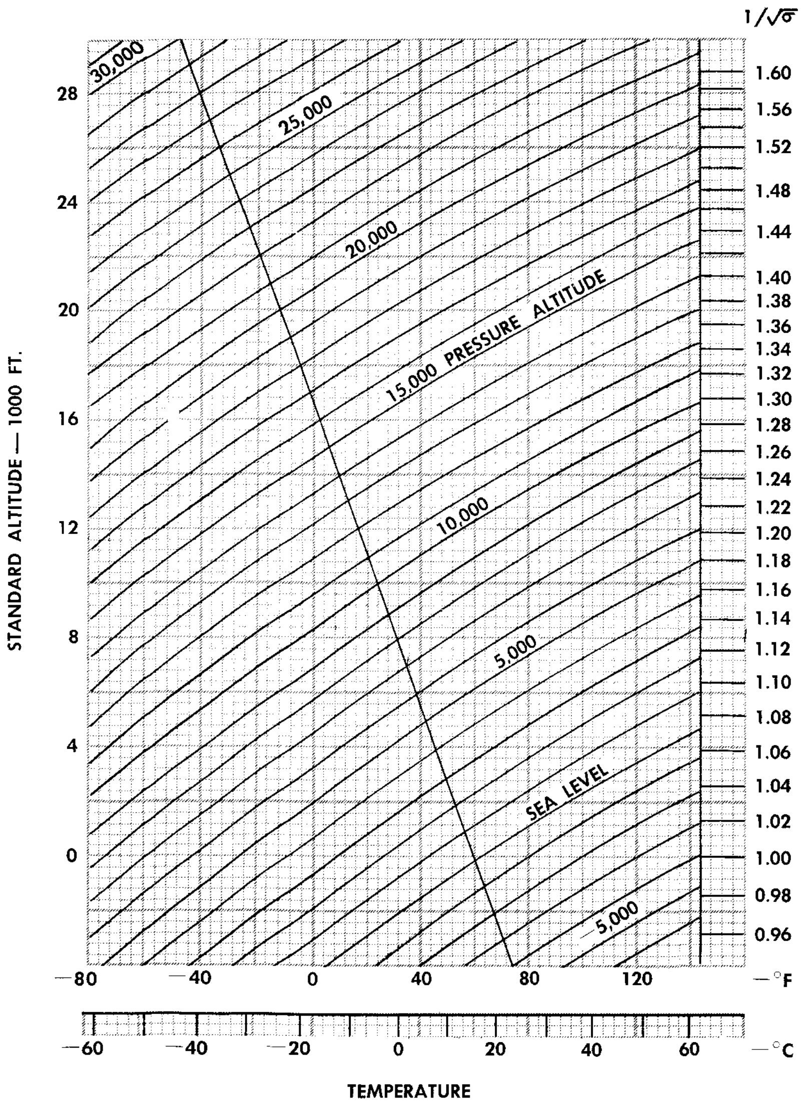


SINGLE ENGINE EMERGENCY RATE OF CLIMB



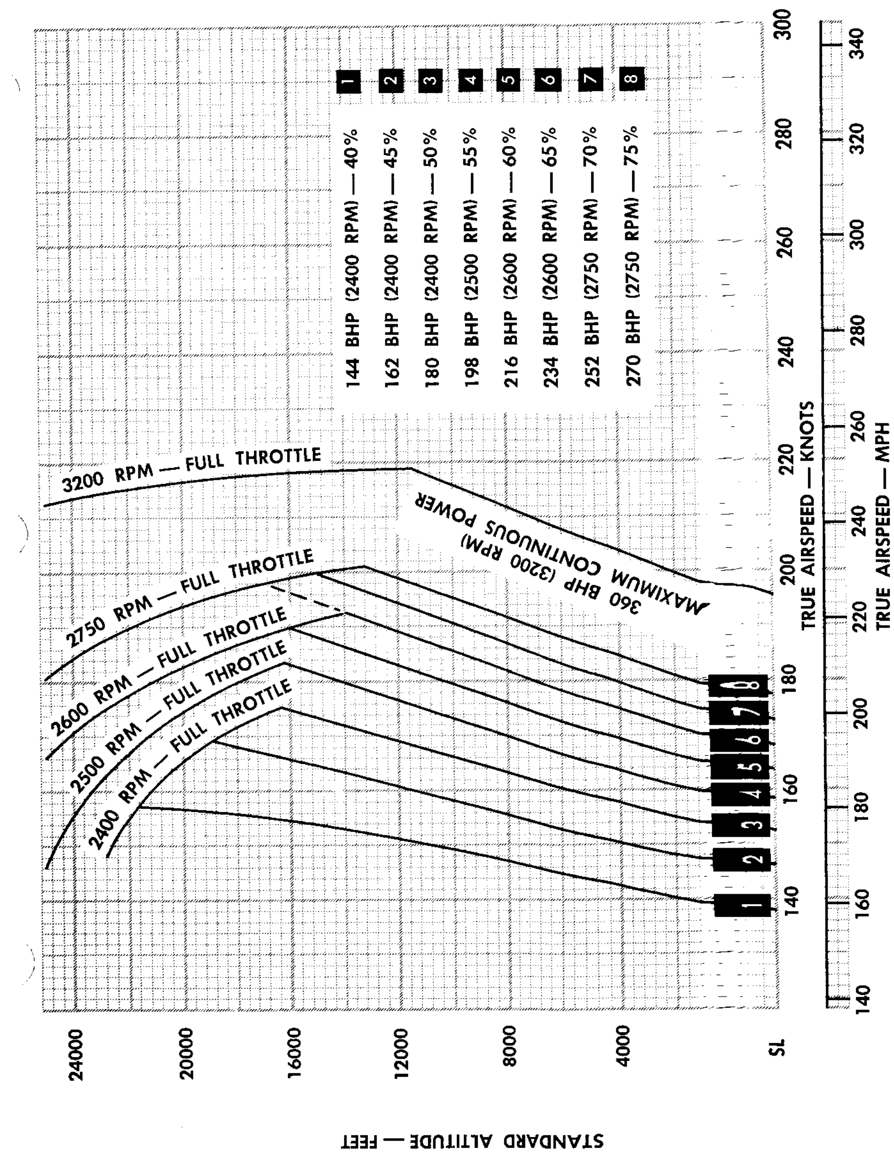
ALTITUDE CONVERSION

EXAMPLE: IF AMBIENT TEMP. IS —13°C AND PRESSURE ALT. IS 6000 FEET, THE STANDARD ALT. IS 4000 FEET AND $1/\sqrt{\sigma}$ IS 1.06



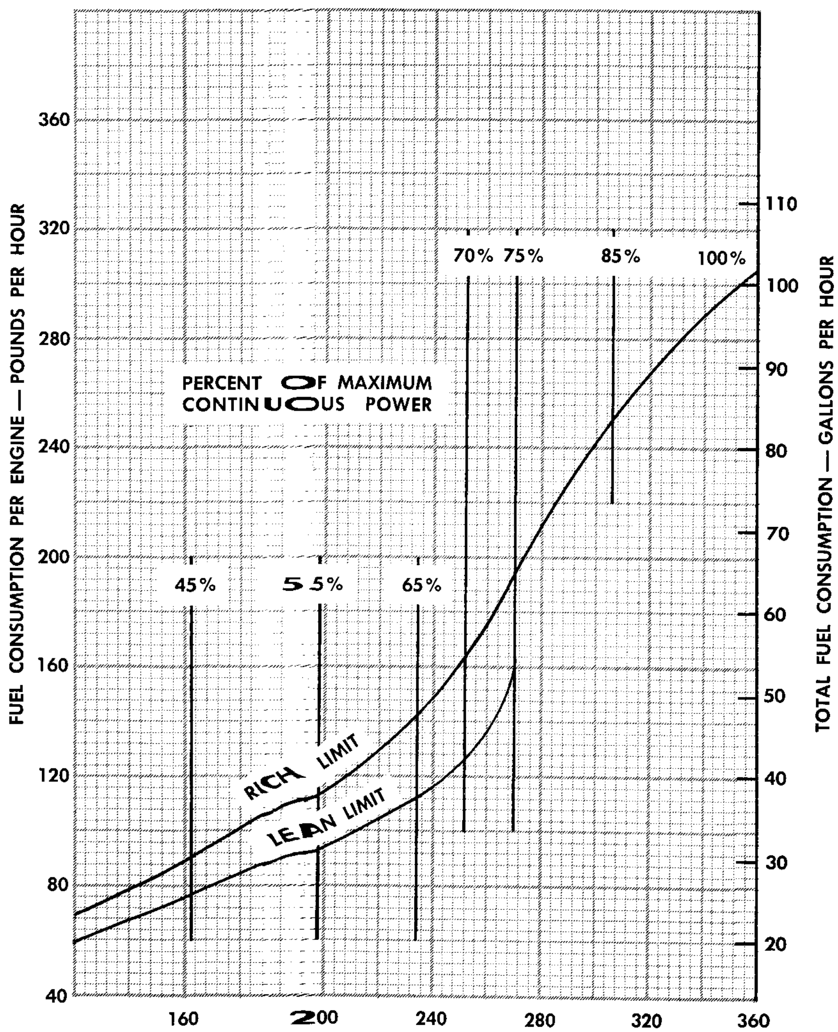
CRUISE PERFORMANCE

AVERAGE CRUISE WEIGHT



FUEL CONSUMPTION

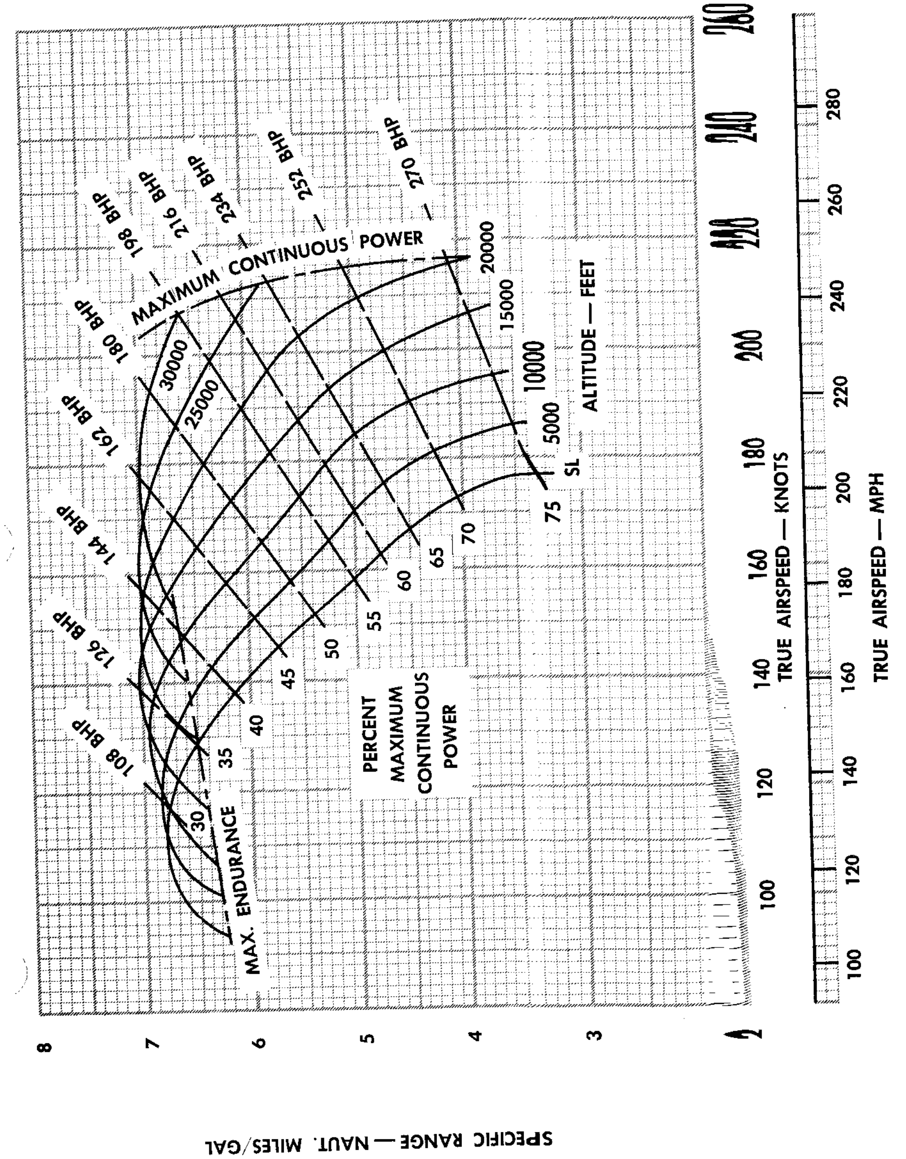
AVERAGE FUEL WEIGHT 6.00 LB/GALLON



BRAKE HORSEPOWER PER ENGINE

SPECIFIC RANGE

AVERAGE CRUISE WEIGHT

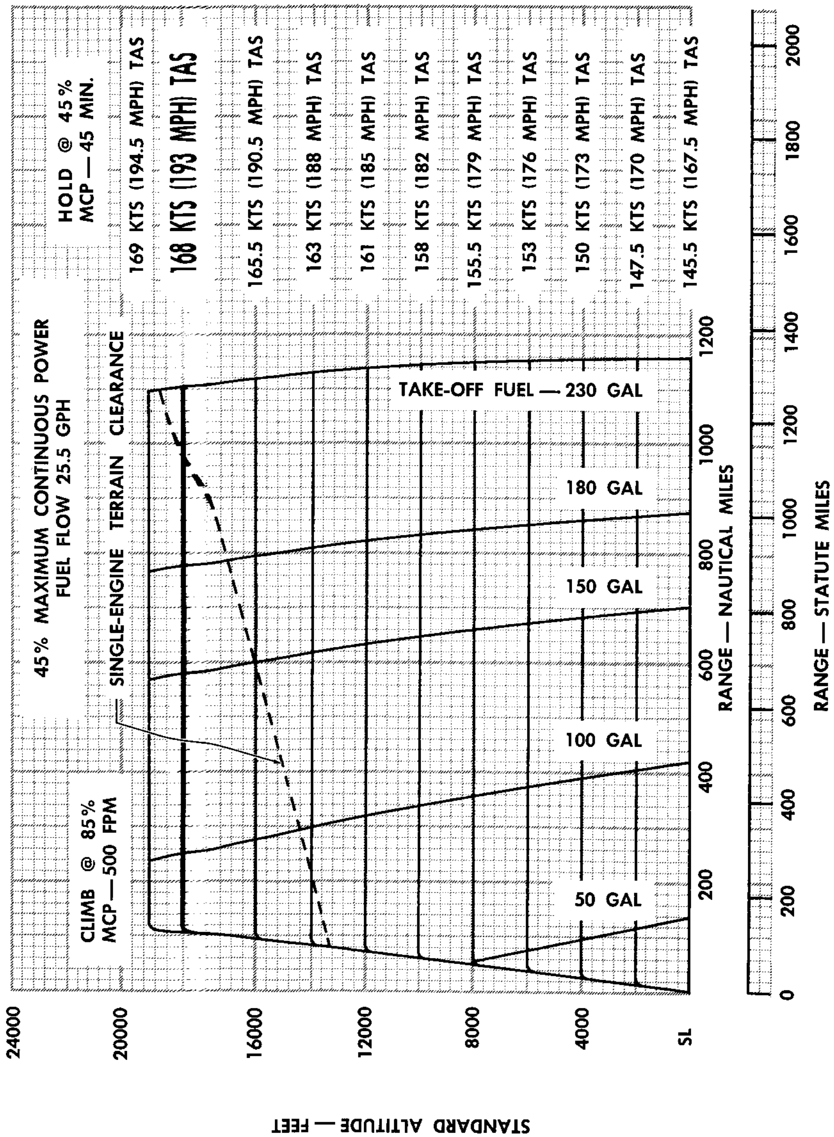


HORSEPOWER SETTING CHART

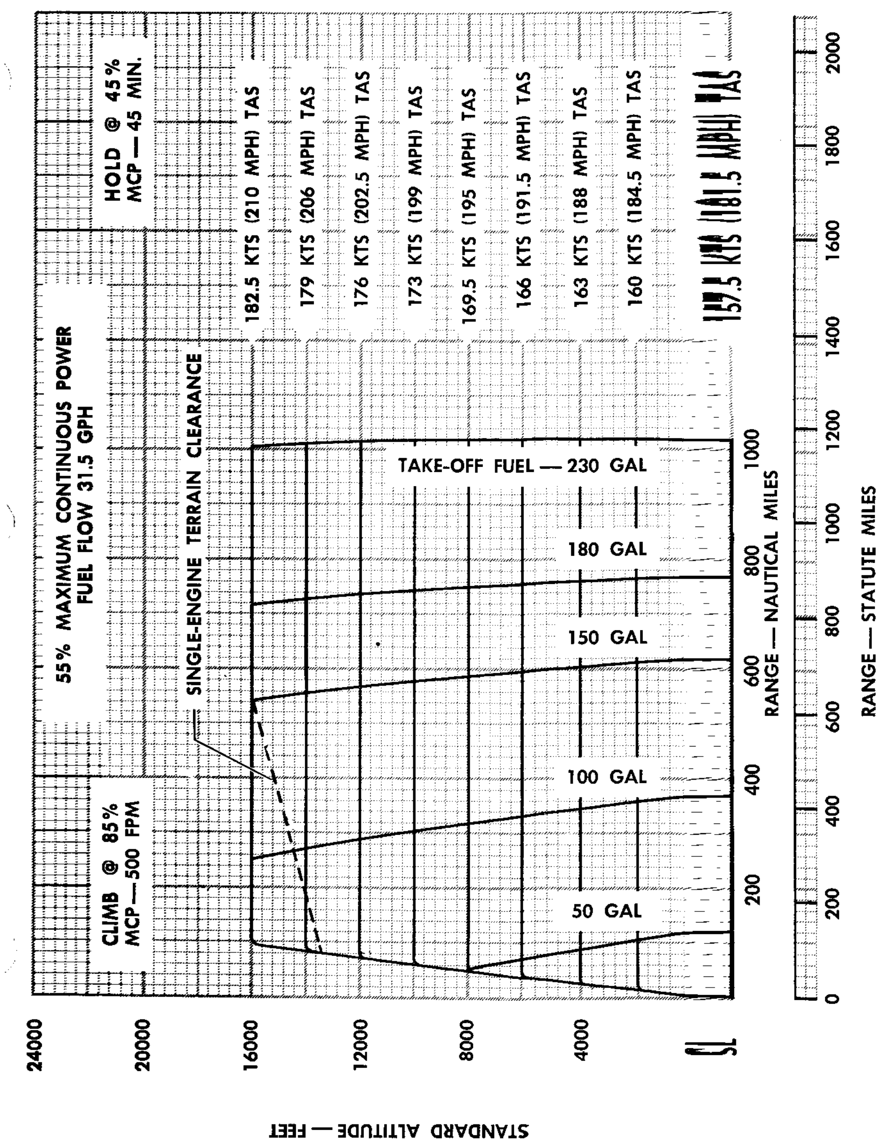
OPERATING CONDITION				MANIFOLD PRESSURE AT OAT								
ALT	RPM	BHP	% MCP	−40°C −40°F	−30°C −22°F	−20°C −4°F	−10°C 14°F	0°C 32°F	10°C 50°F	20°C 68°F	30°C 86°F	40°C 104°F
SEA LEVEL — 2500 FEET	2400	198	55	28.3	28.7	29.2	29.6	29.9	—	—	—	—
		162	45	24.7	25.0	25.4	25.7	26.1	26.4	26.8	27.2	27.5
	2600	234	65	30.7	31.1	31.6	32.0	32.4	32.8	33.3	33.7	34.1
		198	55	27.1	27.5	27.8	28.3	28.7	29.1	29.5	29.8	30.2
	2750	252	70	31.4	31.8	32.3	32.7	33.2	33.6	34.0	34.5	34.9
		234	65	29.7	30.1	30.5	30.9	31.3	31.8	32.2	32.6	33.0
		198	55	26.2	26.6	27.0	27.3	27.7	28.1	28.5	28.8	29.2
2500 FEET — 7500 FEET	2400	198	55	27.6	27.9	28.3	28.7	29.1	29.6	29.9	—	—
		162	45	24.0	24.3	24.7	25.0	25.4	25.7	26.0	26.4	26.7
	2600	252	70	31.6	32.0	32.4	32.9	33.3	33.8	34.2	34.6	35.0
		234	65	29.8	30.2	30.7	31.1	31.5	32.0	32.4	32.8	33.2
		198	55	26.3	26.7	27.1	27.5	27.8	28.2	28.6	29.0	29.3
	2750	252	70	30.5	30.9	31.4	31.8	32.2	32.7	33.1	33.5	33.9
		234	65	28.8	29.2	29.7	30.1	30.5	30.9	31.3	31.7	32.1
		198	55	25.5	25.8	26.2	26.6	27.0	27.3	27.7	28.0	28.4

7500 FEET — 12500 FEET	2400	198	55	27.0	27.4	27.8	28.1	28.5	28.9	29.3	—	—
		162	45	23.4	23.7	24.1	24.5	24.8	25.2	25.5	—	—
	2600	252	70	30.9	31.3	31.8	32.2	32.6	33.1	33.5	—	—
		234	65	29.2	29.6	30.0	30.4	30.8	31.3	31.7	—	—
		198	55	25.8	26.2	26.5	26.9	27.3	27.7	28.0	—	—
	2750	252	70	29.9	30.3	30.7	31.2	31.6	32.0	32.4	—	—
		234	65	28.2	28.6	29.0	29.4	29.8	30.3	30.7	—	—
		198	55	25.0	25.3	25.7	26.0	26.4	26.8	27.2	—	—
12500 FEET — 17500 FEET	2400	198	55	26.6	27.0	—	—	—	—	—	—	—
		162	45	23.1	23.4	23.7	24.1	24.4	24.8	25.1	—	—
	2600	234	65	28.8	29.2	—	—	—	—	—	—	—
		198	55	25.4	25.8	26.1	26.5	26.9	27.3	27.6	—	—
	2750	252	70	29.5	29.8	30.3	—	—	—	—	—	—
		234	65	27.8	28.2	28.6	29.0	29.4	29.8	30.2	—	—
		198	55	24.6	24.9	25.3	25.6	26.0	26.3	26.7	—	—
17500 FEET — 22500 FEET	2750	198	55	24.2	24.6	25.0	25.3	—	—	—	—	—
		162	45	20.1	20.4	20.8	21.2	21.5	21.9	—	—	—
	2900	234	65	26.6	—	—	—	—	—	—	—	—
		198	55	23.5	23.8	24.2	24.5	24.8	—	—	—	—
	3000	234	65	26.0	26.4	26.8	—	—	—	—	—	—
		198	55	22.9	23.2	23.6	24.0	24.3	24.7	—	—	—

RANGE

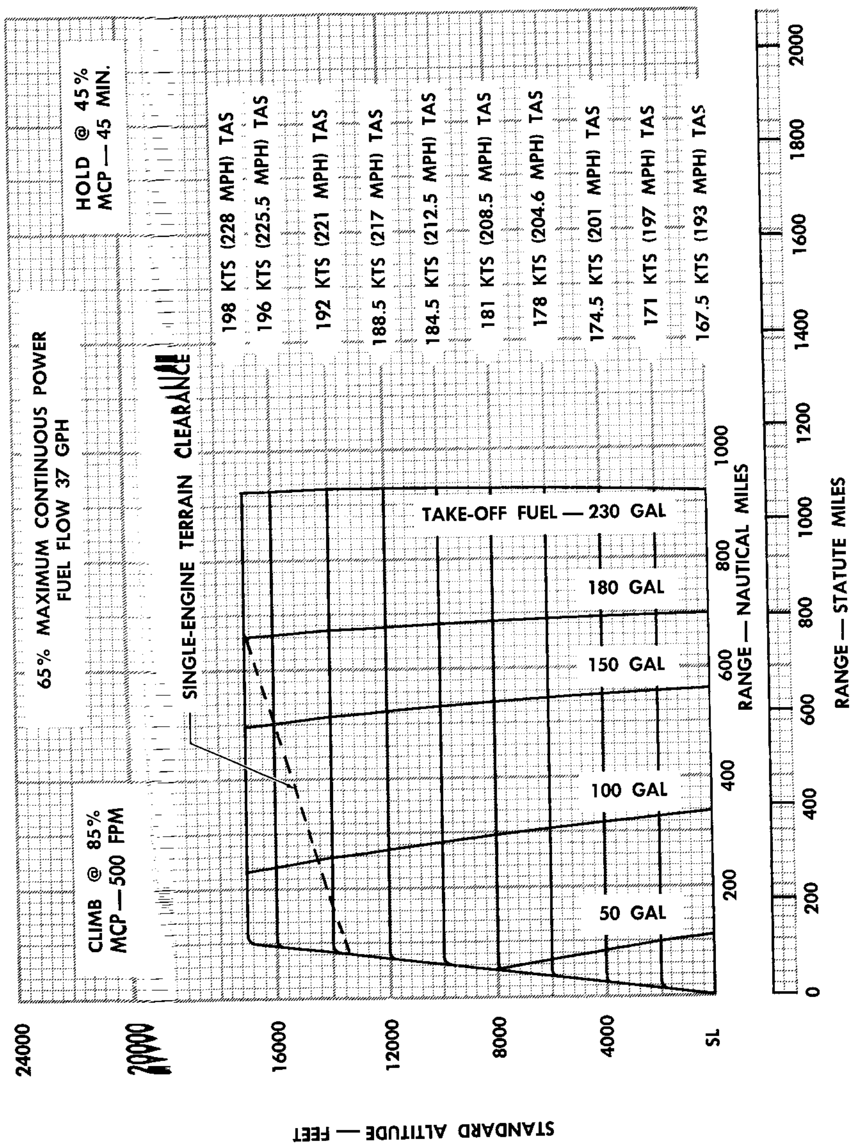

HOLD @ 45% MCP — 45 MIN.
169 KTS (194.5 MPH) TAS
168 KTS (193 MPH) TAS
165.5 KTS (190.5 MPH) TAS
163 KTS (188 MPH) TAS
161 KTS (185 MPH) TAS
158 KTS (182 MPH) TAS
155.5 KTS (179 MPH) TAS
153 KTS (176 MPH) TAS
150 KTS (173 MPH) TAS
147.5 KTS (170 MPH) TAS
145.5 KTS (167.5 MPH) TAS
45% MAXIMUM CONTINUOUS POWER
FUEL FLOW 25.5 GPH
SINGLE-ENGINE TERRAIN CLEARANCE
CLIMB @ 85% MCP — 500 FPM
TAKE-OFF FUEL — 230 GAL
180 GAL
150 GAL
100 GAL
50 GAL
24000
20000
16000
12000
8000
4000
SL
STANDARD ALTITUDE — FEET
200
400
600
800
1000
1200
RANGE — NAUTICAL MILES
0
200
400
600
800
1000
1200
1400
1600
1800
2000
RANGE — STATUTE MILES

RANGE



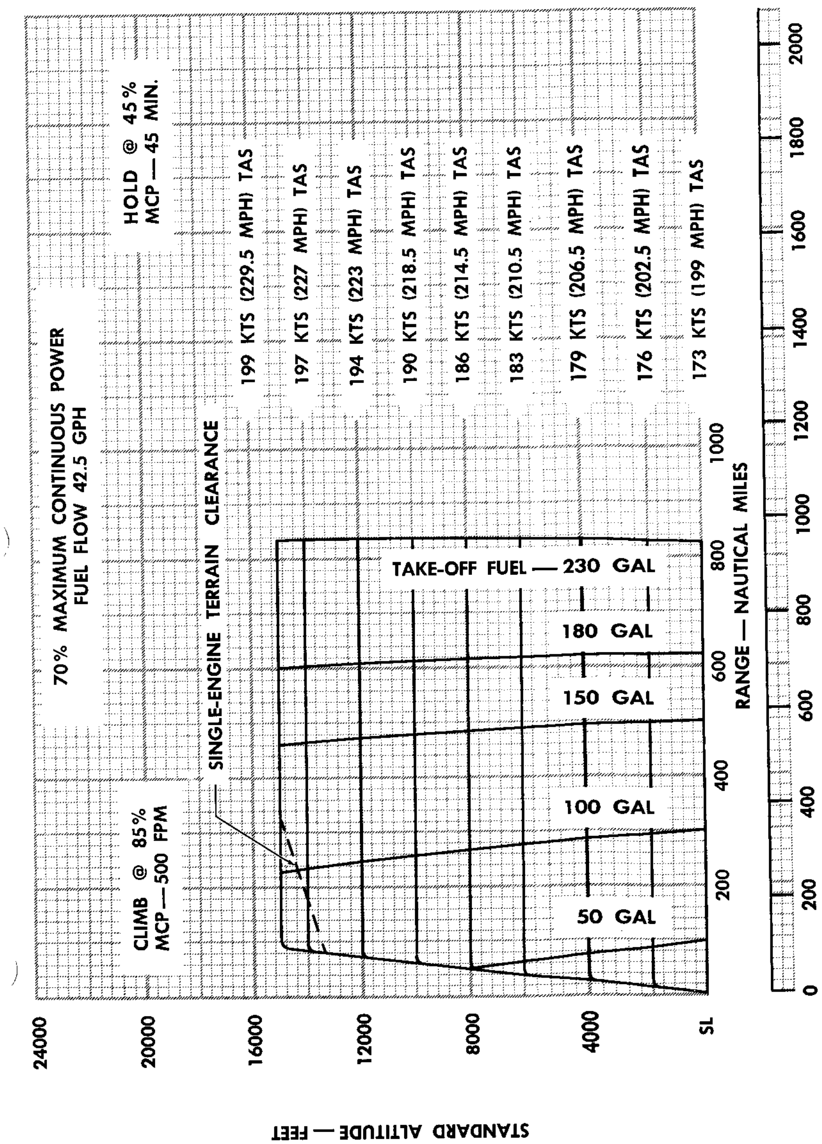
CLIMB @ 85%
MCP—500 FPM
55% MAXIMUM CONTINUOUS POWER
FUEL FLOW 31.5 GPH
HOLD @ 45%
MCP—45 MIN.
SINGLE-ENGINE TERRAIN CLEARANCE
182.5 KTS (210 MPH) TAS
179 KTS (206 MPH) TAS
176 KTS (202.5 MPH) TAS
173 KTS (199 MPH) TAS
169.5 KTS (195 MPH) TAS
166 KTS (191.5 MPH) TAS
163 KTS (188 MPH) TAS
160 KTS (184.5 MPH) TAS
157.5 KTS (181.5 MPH) TAS
TAKE-OFF FUEL—230 GAL
180 GAL
150 GAL
100 GAL
50 GAL
24000
20000
16000
12000
8000
4000
SL
STANDARD ALTITUDE—FEET
200
400
600
800
1000
RANGE—NAUTICAL MILES
0
200
400
600
800
1000
1200
1400
1600
1800
2000
RANGE—STATUTE MILES

RANGE



HOLD @ 45%
MCP — 45 MIN.
65% MAXIMUM CONTINUOUS POWER
FUEL FLOW 37 GPH
CLIMB @ 85%
MCP — 500 FPM
SINGLE-ENGINE TERRAIN CLEARANCE
198 KTS (228 MPH) TAS
196 KTS (225.5 MPH) TAS
192 KTS (221 MPH) TAS
188.5 KTS (217 MPH) TAS
184.5 KTS (212.5 MPH) TAS
181 KTS (208.5 MPH) TAS
178 KTS (204.6 MPH) TAS
174.5 KTS (201 MPH) TAS
171 KTS (197 MPH) TAS
167.5 KTS (193 MPH) TAS
TAKE-OFF FUEL — 230 GAL
180 GAL
150 GAL
100 GAL
50 GAL
STANDARD ALTITUDE — FEET
24000
20000
16000
12000
8000
4000
SL
RANGE — NAUTICAL MILES
200
400
600
800
1000
RANGE — STATUTE MILES
0
200
400
600
800
1000
1200
1400
1600
1800
2000

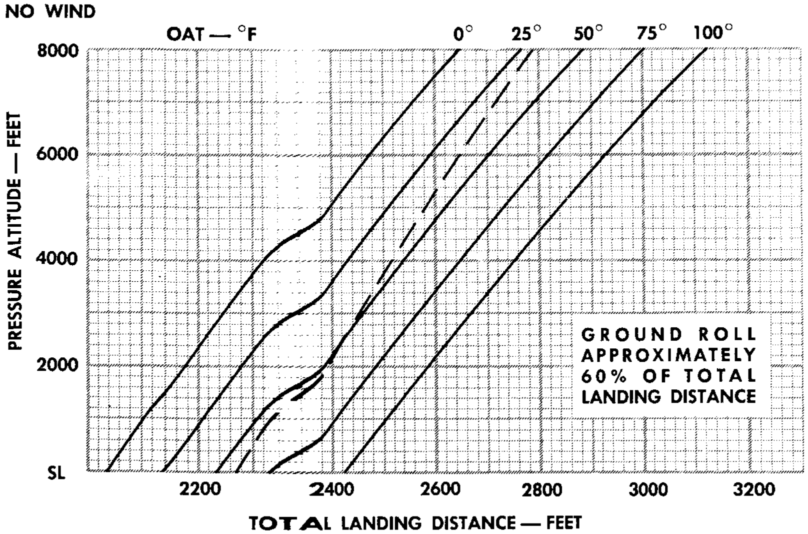
RANGE


70% MAXIMUM CONTINUOUS POWER
FUEL FLOW 42.5 GPH
HOLD @ 45%
MCP — 45 MIN.
CLIMB @ 85%
MCP — 500 FPM
SINGLE-ENGINE TERRAIN CLEARANCE
199 KTS (229.5 MPH) TAS
197 KTS (227 MPH) TAS
194 KTS (223 MPH) TAS
190 KTS (218.5 MPH) TAS
186 KTS (214.5 MPH) TAS
183 KTS (210.5 MPH) TAS
179 KTS (206.5 MPH) TAS
176 KTS (202.5 MPH) TAS
173 KTS (199 MPH) TAS
TAKE-OFF FUEL — 230 GAL
180 GAL
150 GAL
100 GAL
50 GAL
STANDARD ALTITUDE — FEET
24000
20000
16000
12000
8000
4000
SL
RANGE — NAUTICAL MILES
200
400
600
800
1000
RANGE — STATUTE MILES
0
200
400
600
800
1000
1200
1400
1600
1800
2000

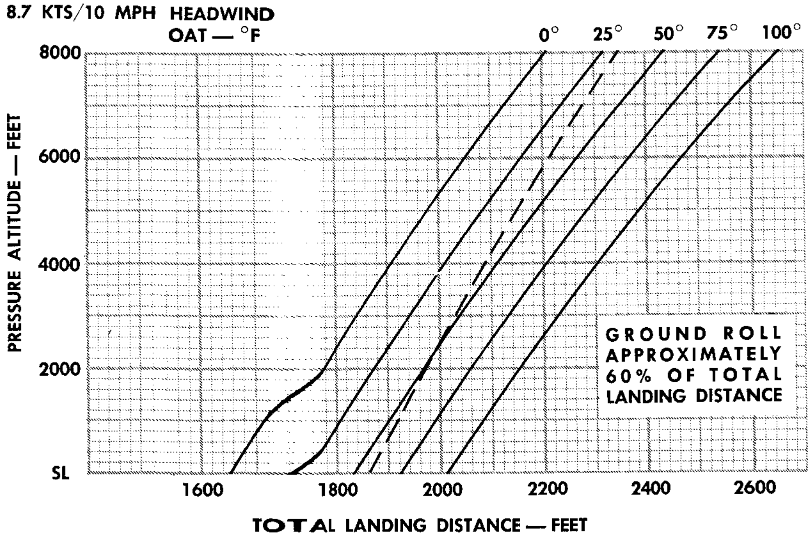
NORMAL LANDING

DISTANCE OVER 50 FEET
100% FLAPS
APPROACH SPEED — 93 KTS/107 MPH (IAS)
GROSS WEIGHT 7600 LBS
— — STD. TEMP.

NO WIND



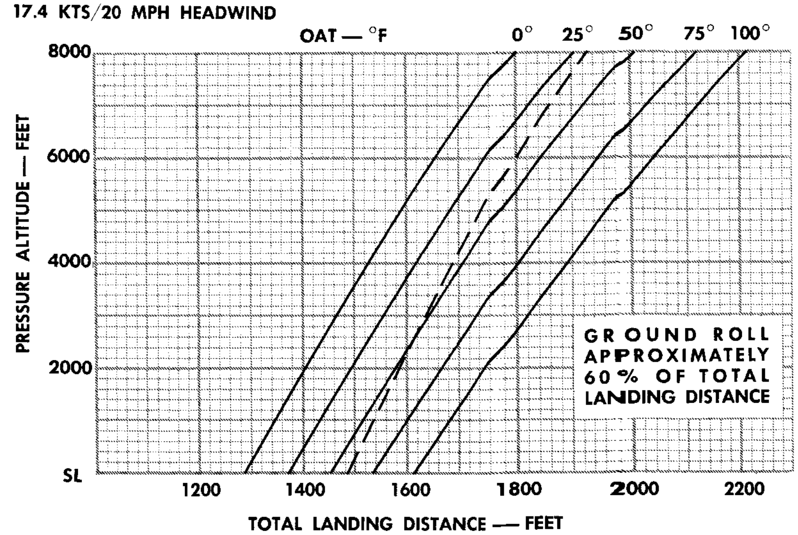
8.7 KTS/10 MPH HEADWIND



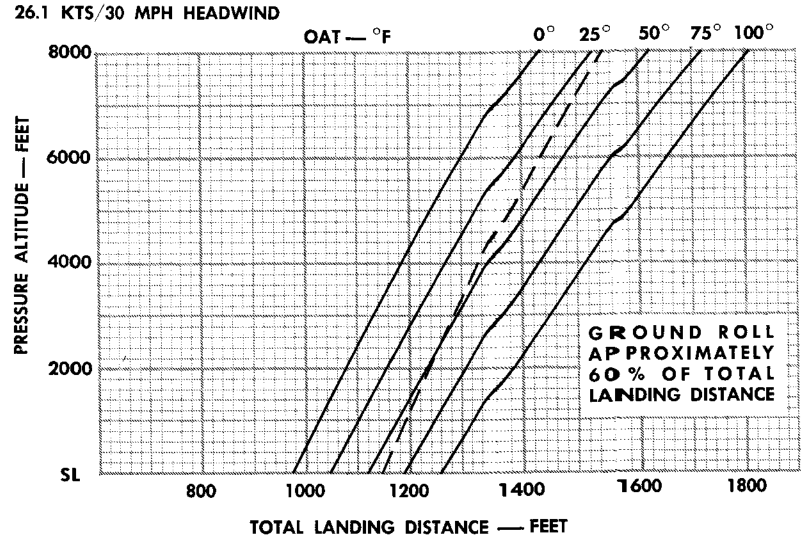
NORMAL LANDING

DISTANCE OVER 50 FEET
100% FLAPS
APPROACH SPEED — 93 KTS/107 MPH (IAS)
GROSS WEIGHT 7600 LBS
— — STD. TEMP.

17.4 KTS/20 MPH HEADWIND



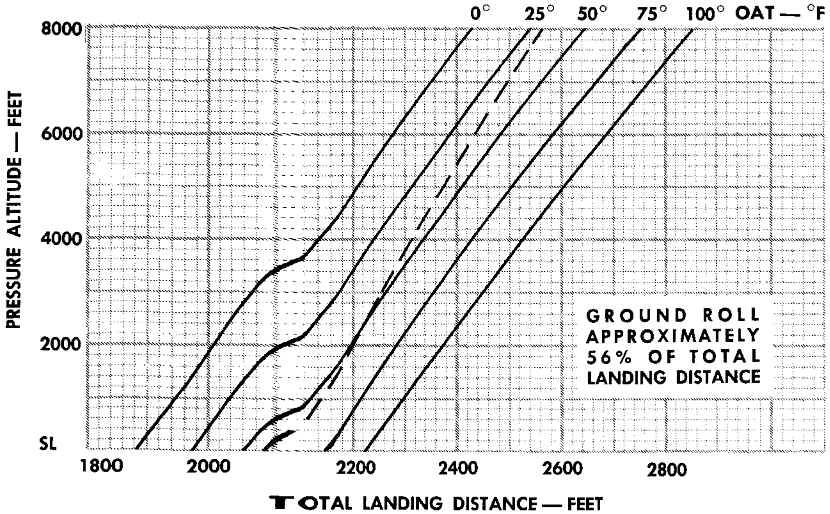
26.1 KTS/30 MPH HEADWIND



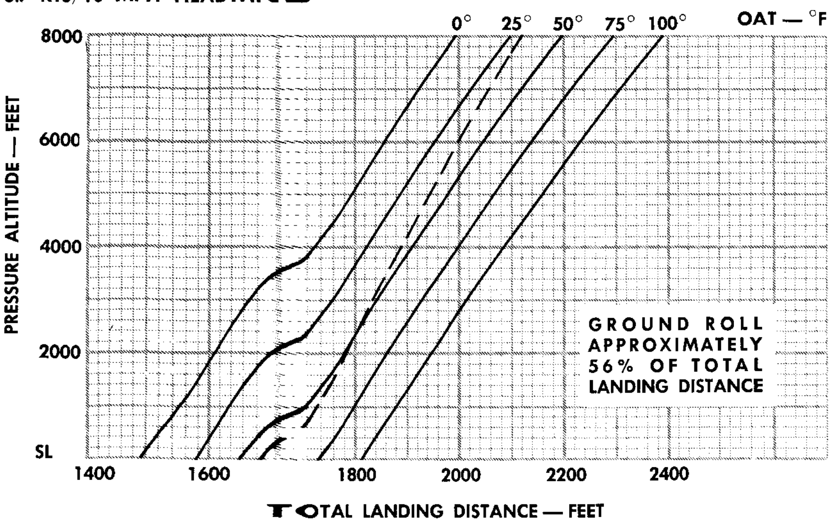
MAXIMUM PERFORMANCE LANDING

DISTANCE OVER 50 FEET
100% FLAPS
APPROACH SPEED — 83 KTS/96 MPH (IAS)
GROSS WEIGHT 7600 LBS
— — STD. TEMP.

NO WIND



8.7 KTS/10 MPH HEADWIND

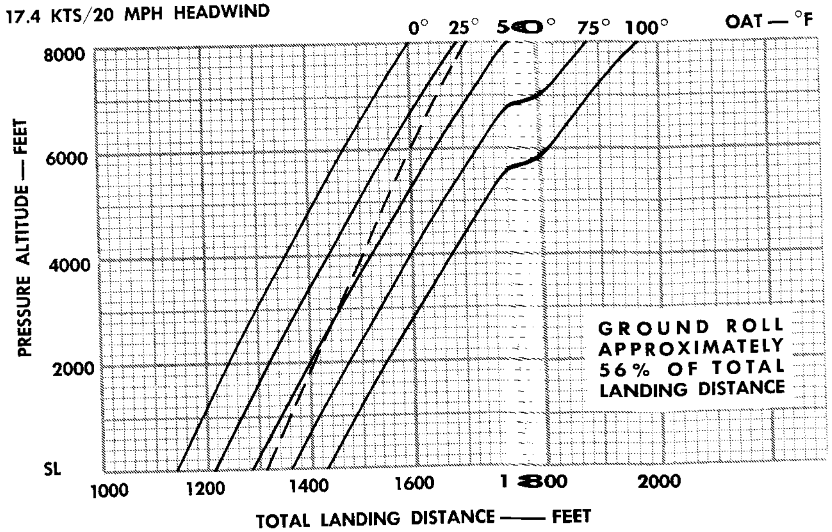


Revised January 15, 1963

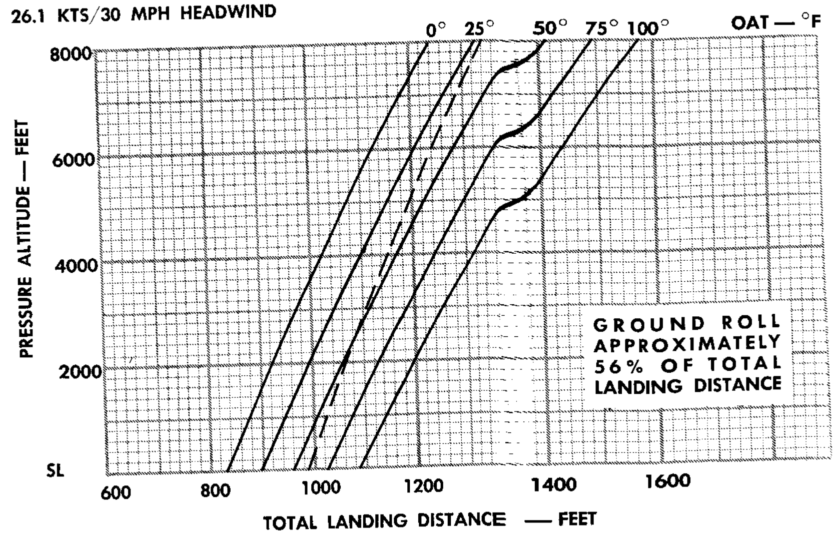
MAXIMUM PERFORMANCE LANDING

DISTANCE OVER 50 FEET
100% FLAPS
APPROACH SPEED — 83 KTS/96 MPH (IAS)
GROSS WEIGHT 7600 LBS
— — STD. TEMP.

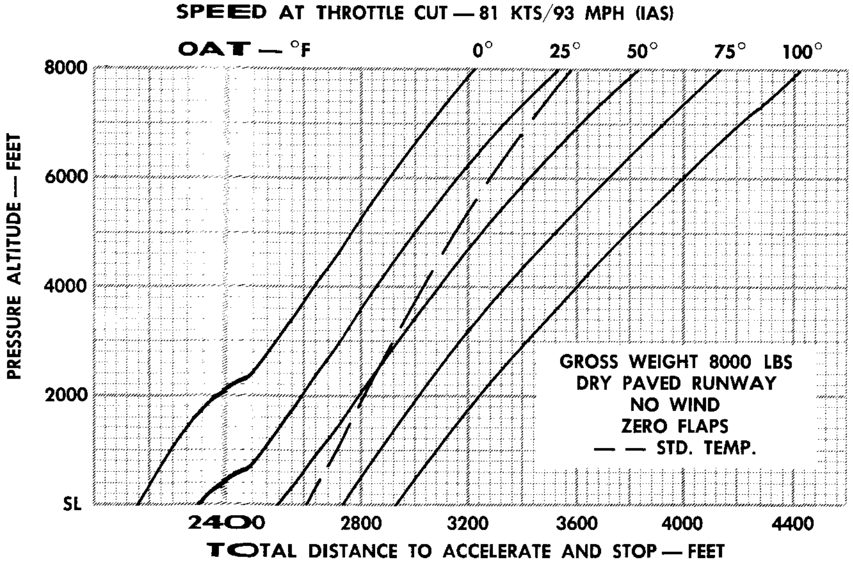
17.4 KTS/20 MPH HEADWIND



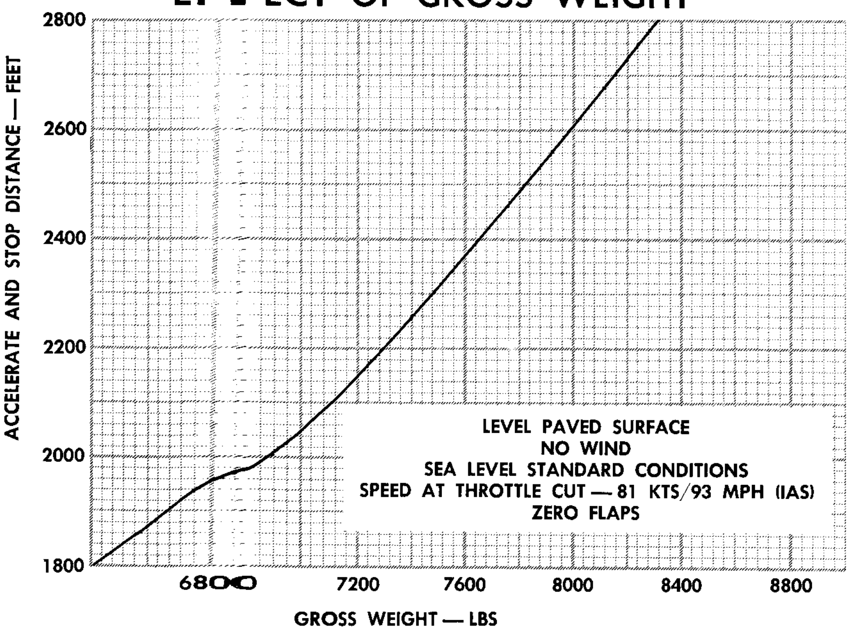
26.1 KTS/30 MPH HEADWIND



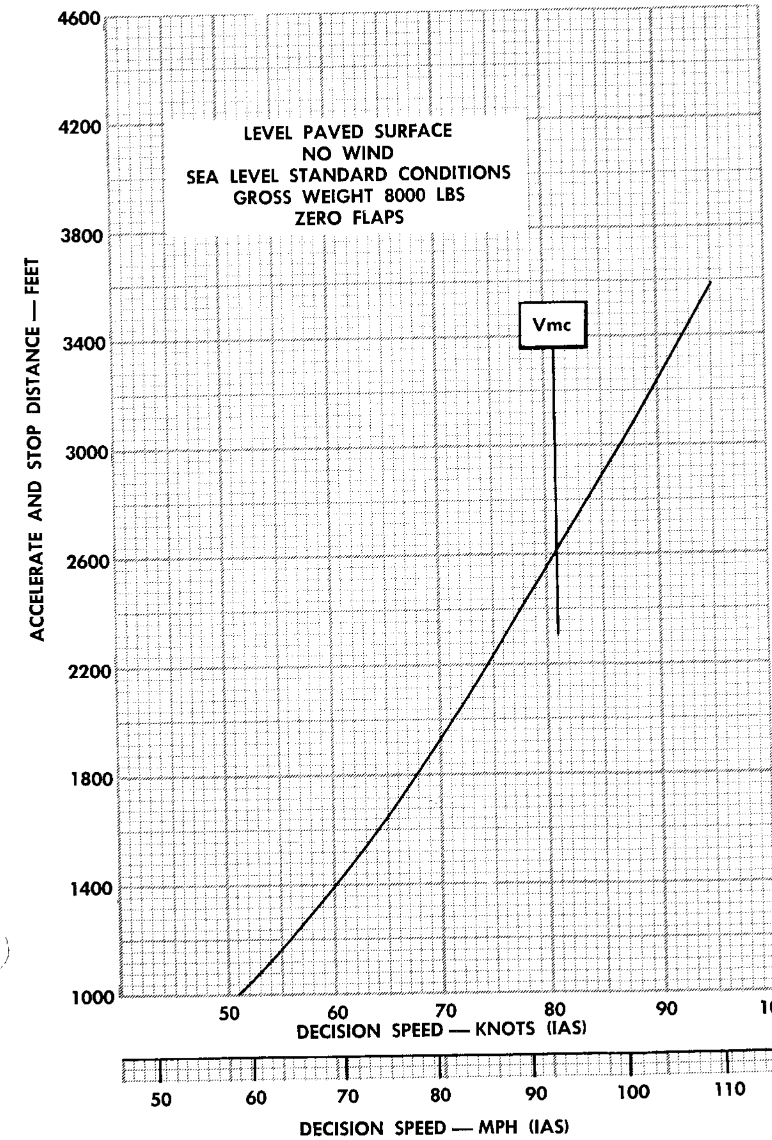
ACCELERATE AND STOP DISTANCE



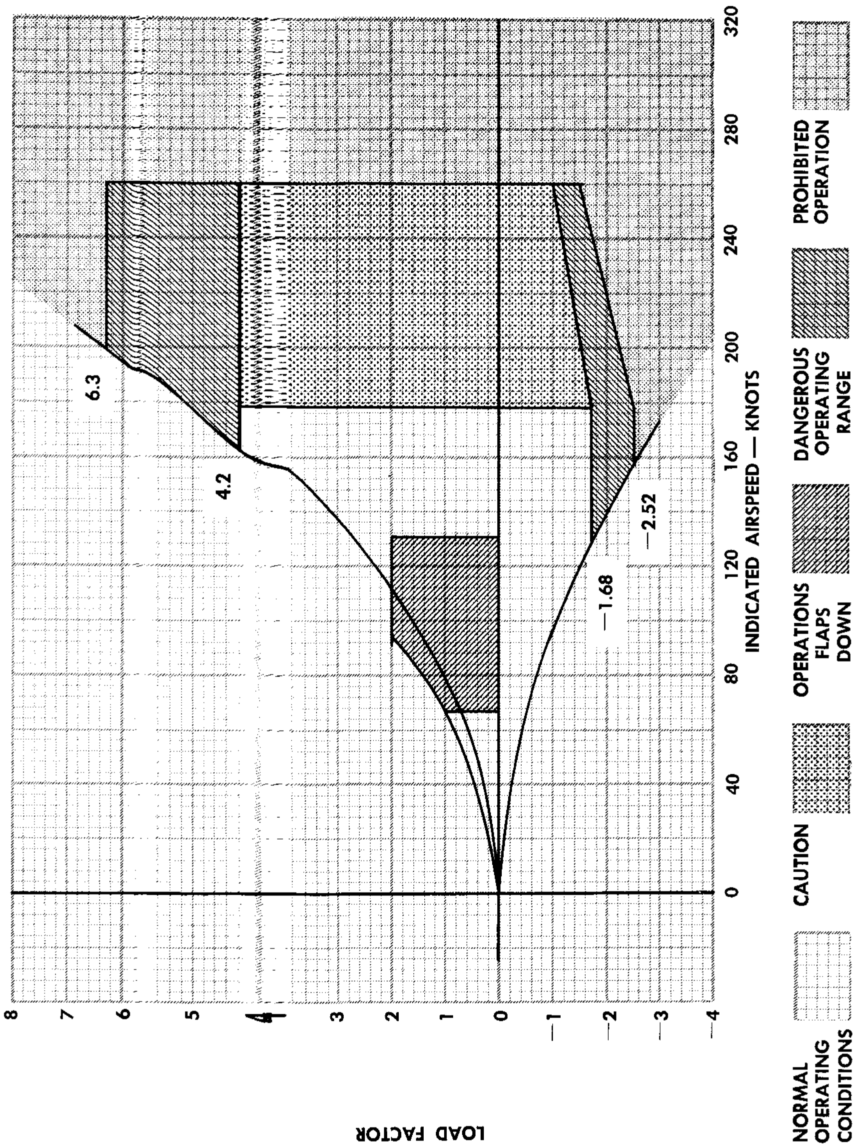
EFFECT OF GROSS WEIGHT



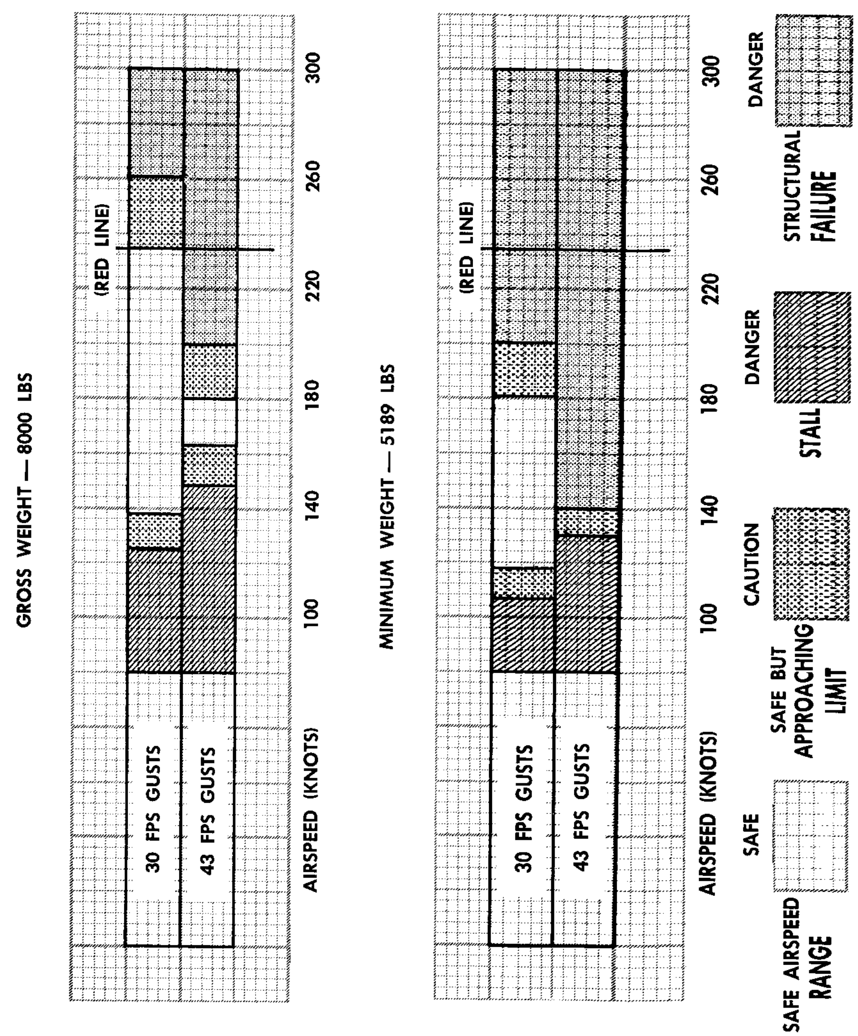
EFFECT OF DECISION SPEED ON ACCELERATE AND STOP DISTANCE



FLIGHT LOAD FACTORS



TURBULENT AIR PENETRATION



SECTION VII

Servicing and Maintenance

PREVENTIVE MAINTENANCE

Preventive maintenance is 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 information to assist you in deciding when the airplane should be sent to a shop, and second, to guide you should you choose, or be obliged by circumstances to do some minor servicing yourself. It is in no sense a substitute for the services of your BEECHCRAFT Distributor, Dealer or Certified Service Station. This section also includes information on ground handling, hangar clearances, oil and grease specifications and tire and strut inflation which will be useful at a strange airport.

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

BEECHCRAFT CERTIFIED SERVICE

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

SECTION VII

to the end that their personnel are kept informed of the latest techniques in servicing BEECHCRAFTS.

BEECHCRAFT SERVICE PUBLICATIONS

To bring the latest authoritative information to BEECHCRAFT distributors, dealers and Certified Service Stations and to you as the owner of a BEECHCRAFT, the Parts and Service Operations of Beech Aircraft Corporation publishes and revises as necessary the operating instructions, shop/maintenance manuals and parts catalogs for all BEECHCRAFT airplanes as well as service bulletins and service letters. These publications are available at your BEECHCRAFT dealer or distributor.

SERVICE BULLETINS AND SERVICE LETTERS

BEECHCRAFT service bulletins and service letters are occasional publications dealing with improved operating techniques, revised servicing instructions, special inspections and changes in detailed parts or equipment. Service bulletins and service letters differ mainly in the degree of urgency of their subject matter. Service letters usually will announce changes or new equipment which are available for purchase if you choose, or discuss improved operating techniques. Service bulletins on the other hand deal with operating techniques, special inspections or changes in the airplane which have a direct bearing on the safety, performance or service life of your Queen Air 80. Service bulletins carry definite time intervals for compliance, depending on the urgency of their subjects, and you should see that they are complied with before the expiration of the allotted time. One of the services offered by BEECHCRAFT Certified Service Stations is maintaining a record of all service bulletins complied with by them on your airplane.

GROUND HANDLING

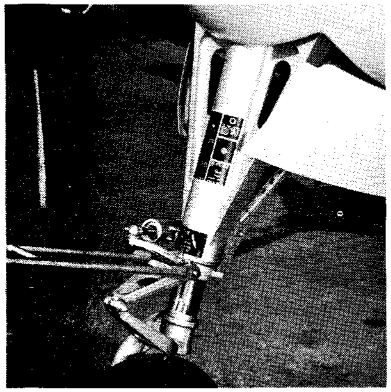
In addition to parking and mooring, you may find it necessary to maneuver into a hangar by hand or with a tug; or to jack up a wheel.

Doing these jobs is not difficult, but if they are done incorrectly, structural damage may result.

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

TOWING

Your BEECHCRAFT is equipped with a hand tow bar which is designed to clamp on to the extensions of the upper torque knee pin on the nose strut. In the Loose Tools and Accessories Listing, an optional tow bar assembly is available which permits machine towing of your airplane.



Although steering is automatic when the aircraft is being towed by the nose gear, someone should be in the cockpit to operate the brakes in case of an emergency. The nosewheel steering linkage will be seriously damaged if the aircraft is towed when the control lock is installed. Also, when spotting your aircraft, do not push on the propeller or the control surfaces. Further, do not place your weight on the horizontal stabilizer to raise the nose wheel off the ground.

MOORING AND TIE-DOWN

Three mooring or tie-down eyes are provided for your convenience; one on each wing and the third on the tail bumper. To moor the airplane, chock the wheels both fore and aft, install the control lock and tie the aircraft down from the three points provided. Avoid tightening the tie-down lines so tight that the shock struts are compressed and most importantly, do not tighten the rear line to a tension that raises the nose wheel. If the rear line is excessively taut, the nose will rise and consequently, lift can be produced by the angle of attack of the wings. In high wind conditions, it is advisable to nose the plane into the wind.

CONTROL LOCK

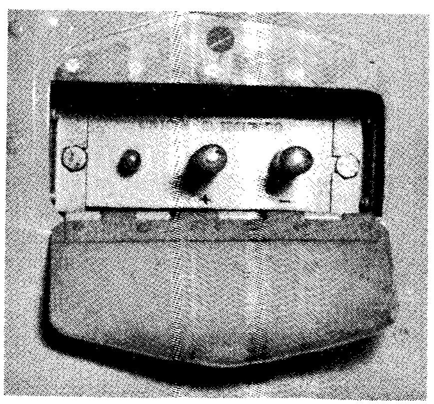
The control lock for your Queen Air 80 holds the throttles closed and all primary flight controls in the neutral position. The lock assembly consists of three pins connected together by a chain. Installation of these pins should be accomplished in the sequence: throttle, elevator-aileron, and rudder. To lessen the possibility of taxiing or take-off with the locking pins installed, remove them in the reverse order, i.e. rudder, elevator-aileron and throttle.

The throttle locking pin is inserted through the control pedestal, preventing operation of the throttle. The elevator-aileron pin is installed from above through the pilot's control column assembly. The rudders are held in the neutral by the largest of the three pins which is installed through the pilot's rudder pedals.

For added convenience and safety, the lock chain assembly is placarded with the proper installation procedure.

EXTERNAL POWER

Before connecting an external power unit, it is advisable to turn off the battery and generator switches. If the auxiliary power unit does not have the standard AN type plug, check the polarity of the unit and connect the positive lead to the center post and the negative lead to the rear post of the aircraft's external power receptacle. It is essential that the polarity of the auxiliary power source is known and that it matches that of the aircraft. Where reversed polarity exists and power is applied, system damage may result. After external power is applied the battery switches may be actuated and system maintenance or engine starting accomplished.



SERVICING

The following service procedures will help keep your Queen Air 65 in top condition between visits to your Certified Service Station. These procedures were developed from engineering information, factory practice and the recommendations of engine and parts suppliers, as well as operating experience with thousands of BEECHCRAFTS that use identical or similar components. These procedures are the essence of preventive maintenance.

MAGNETOS

CAUTION

> The S-200 series magnetos are not internally grounded. Therefore, when a primary lead is disconnected, the magneto will remain active. To ground a magneto, disconnect the magneto switch wire at the magneto capacitor and ground the capacitor pole. Otherwise, disconnect the spark plug leads or remove the cable outlet plate on the rear of the magneto.

BATTERY

The 24 volt, nickel-cadmium battery, which provides 24 volt dc current from a single battery housed in the left nacelle, requires little servicing during its long life. It is recommended that the electrolyte level be maintained at the top of the plates with distilled water. To remove the filler caps, on the individual cells, use the plastic filler cap wrench supplied with each battery.

Because of the nature of the battery and its potassium hydroxide electrolyte, the specific gravity of the electrolyte has little meaning and does not accurately indicate the state of charge of the battery. If the battery needs charging, as indicated by its performance or the reading on the aircraft's ammeters, attach a constant voltage charger to the battery, either directly or through the external power receptacle. Apply a maximum of 1.55 volts per cell to the battery from the power source. With the constant voltage type charge, you may expect the battery to accept current at a high rate initially, but as the battery comes up to strength, the charge rate falls rapidly. With external power, your battery should be completely charged within half an hour. If a slower charge is desired, it can be accomplished by using a constant current charger. Apply approximately 5.5 amperes to the battery for a period of 3.5 hours.

CAUTION

> Never add acid to the electrolyte of this battery. Use hydrometers, etc. which have not been used with lead-acid batteries. Add only distilled water which has not been contaminated with equipment used with lead-acid batteries.

SERVICING THE OIL SYSTEM

A four-gallon tank located in the top of each nacelle provides oil for the engine. To service the engine with oil, open the quick release access door on the top of the nacelle and remove the filler cap. A dip stick attached to the filler cap indicates the oil level in the tank. The oil should be changed every 100 hours under normal conditions, using only those oils listed in the Table of Consumable Materials. The oil system can be drained by the oil system drain valve located in the landing gear wheel well.

NOTE

> When the aircraft is delivered from the factory, the engines are treated with a special preservative oil. After 25 hours of operation, this oil should be drained, and the oil filters cleaned.

The oil filters should be cleaned and serviced every 50 hours and at every oil change, regardless of time interval. To service the filters, unscrew the filter cover and remove the filter assembly from the oil pump. Next, remove the disc retainer nut and disassemble the filter disc. Then clean the filter discs in Stoddard solvent, Specification P-S661 and check them for damage and note the amount and kind of solid material trapped by the filter. Finally, reassemble and install the filter discs in the pump. Tighten the filter to finger tightness in the filter chamber and then torque it to 40-50 inch pounds. Do not overtorque the body; deformation may result, changing the flow characteristics of the filter. Install the filter cover with a new gasket, tightening it to 100-200 inch-pounds torque.

At every oil change the fuel injector oil filter should be removed and cleaned with solvent and checked for damage. The fuel injector oil filter is located below the fuel injector pump and just ahead of the left magneto. Tighten the filter plug securely when it is installed.

SERVICING THE FUEL SYSTEM

Your Queen Air 65 has a 180 gallon, standard (or 230 gallon, optional) capacity fuel system which should be serviced with 100/130 octane fuel. This fuel supply is carried in two, 44 gallon, main cells; four 23-gallon auxiliary cells; and two, optional 25-gallon tanks. A filler neck is provided in the upper center section of each wing for servicing the main cells while a single filler neck in the upper, outboard section of each wing is provided for servicing the auxiliary cells.

When refueling the Queen Air 65, ground the refueling hose to one of the airplane's grounding jacks before beginning the transfer of fuel. Secure the filler cap immediately after servicing each tank.

A fuel sump and quick drain fitting is located in each main tank and each inboard auxiliary tank. These sumps should be drained of all condensed water vapor before the first flight of the day and after refueling.

NOTE

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

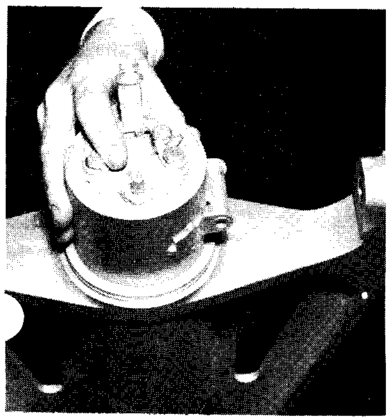
Most fuel injection system malfunctions can be attributed to contaminated fuel. At least every 50 hours the fuel selector valve strainer in each wheel well and the fuel strainer on the firewall should be inspected and cleaned with solvent. The frequency of inspection and cleaning will depend upon service conditions, fuel handling cleanliness, and local sand and dust conditions. If there is evidence of excessive foreign matter collecting in the strainers, or the fuel filter bowl, the system should be flushed. Any fuel lines or fittings disconnected for maintenance purposes should be capped to prevent foreign matter from entering the system.

SERVICING THE LANDING GEAR

The landing gear shock struts are of the air-oil type. To check the hydraulic fluid level in any of the three struts, deflate the strut by releasing air pressure through the filler valve.

WARNING

Do not attempt to remove the filler valve until all air pressure has been dissipated or it might blow off, causing injury to personnel or property.

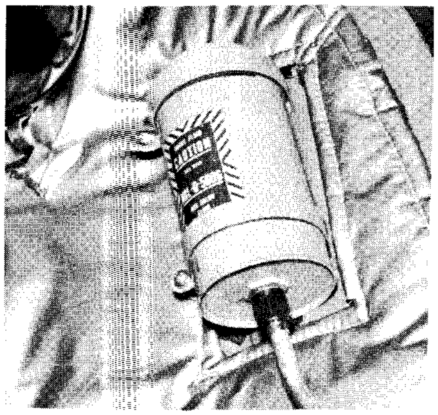


Remove the filler valve assembly and if fluid level is not within $1\frac{1}{16}$ inches of the top of the filler valve boss, add fluid until it reaches this level. When the proper fluid level has been reached, install the filler valve assembly and apply compressed air pressure sufficient to inflate the strut so that three inches of the piston (five inches for the nose wheel strut) are exposed. This inflation should be accomplished with the airplane empty except for fuel and oil.

It is essential to long life, that the shock strut pistons be clean and free from foreign material that might score their surfaces. Therefore, clean the pistons with a soft cloth containing hydraulic fluid whenever they are dirty or show evidence of grit.

SERVICING THE BRAKES

Each single disc brake consists of a disc, keyed to the wheel, and a housing which contains three interconnected wheel brake cylinders. Hydraulic pressure from the master cylinder pressurizes the wheel brake cylinders, forcing them against the rotating disc and forcing that disc against the stationary linings. Brake lining adjustment is automatic, eliminating the need for periodic take-up adjustment of the brake clearance.

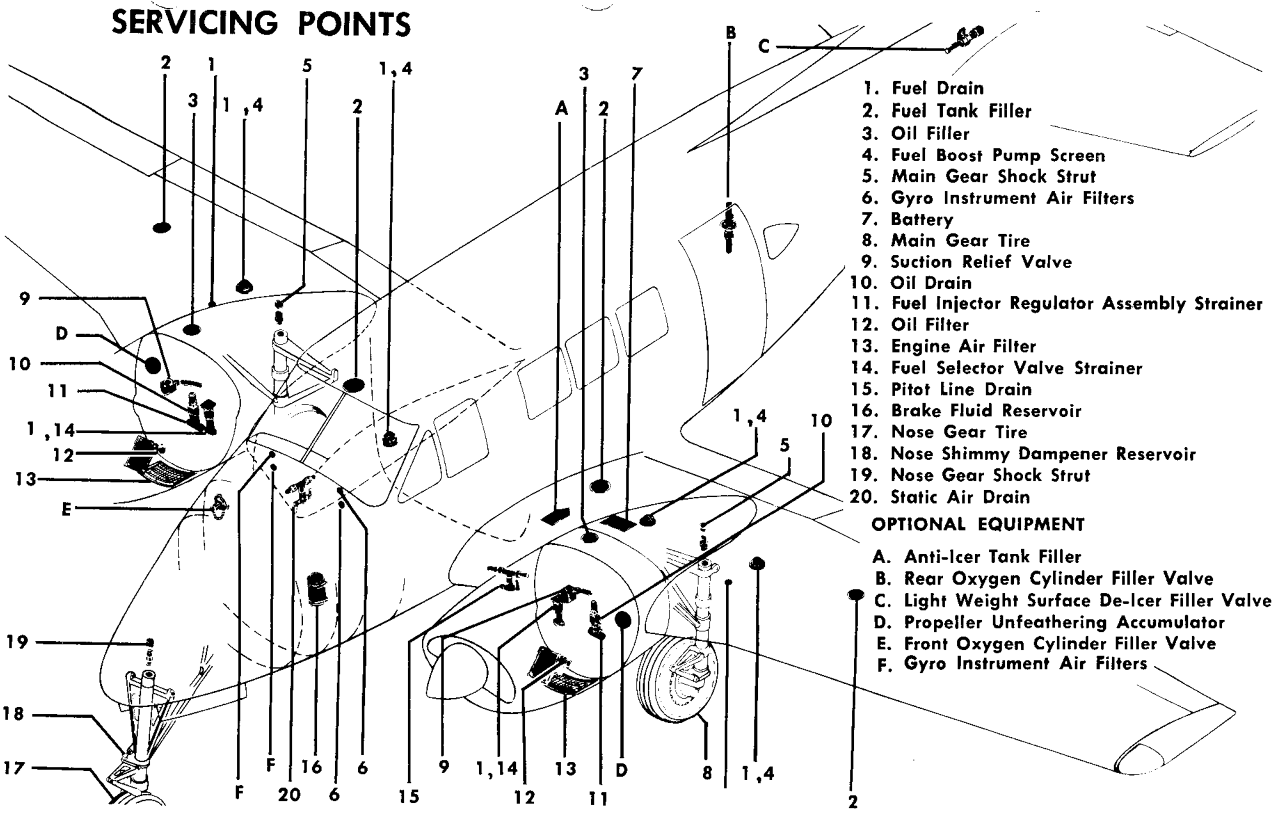


The two brake master cylinders are of the compensating barrel type which maintain constant and correct fluid volume in the system. Any fluid lost by leakage is immediately replaced from the system reservoir. The master cylinder pistons are actuated by toe pressure on either pilot's rudder pedals. The fluid reservoir, mounted immediately inside the left nose access door, should be checked regularly to assure that a sufficient hydraulic fluid reserve exists. A dip-stick is provided for measuring fluid level which should be 1" below the top of the reservoir.

SERVICING THE TIRES

The 8 ply, 8:50 x 10 tubeless tires on the main gear are inflated to a pressure of 47 +3 −0 psi while the tubeless 4 ply or optional 6 ply nose wheel tire is to be inflated from 30 to 35 psi. Maintenance of these pressures will lessen the wear incurred from landing or from running over sharp stones or ruts. When inflating the tires, inspect them for cracks, breaks or evidence of damage.

SERVICING POINTS

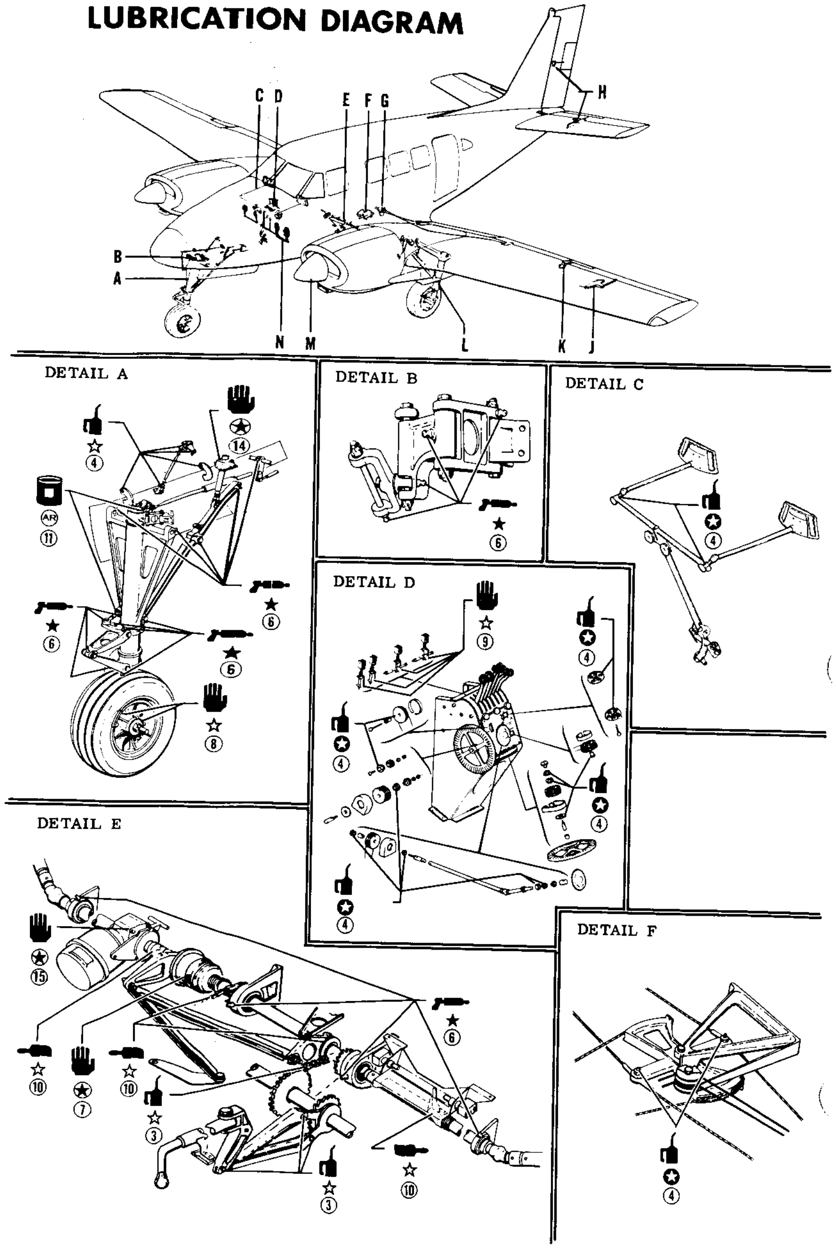


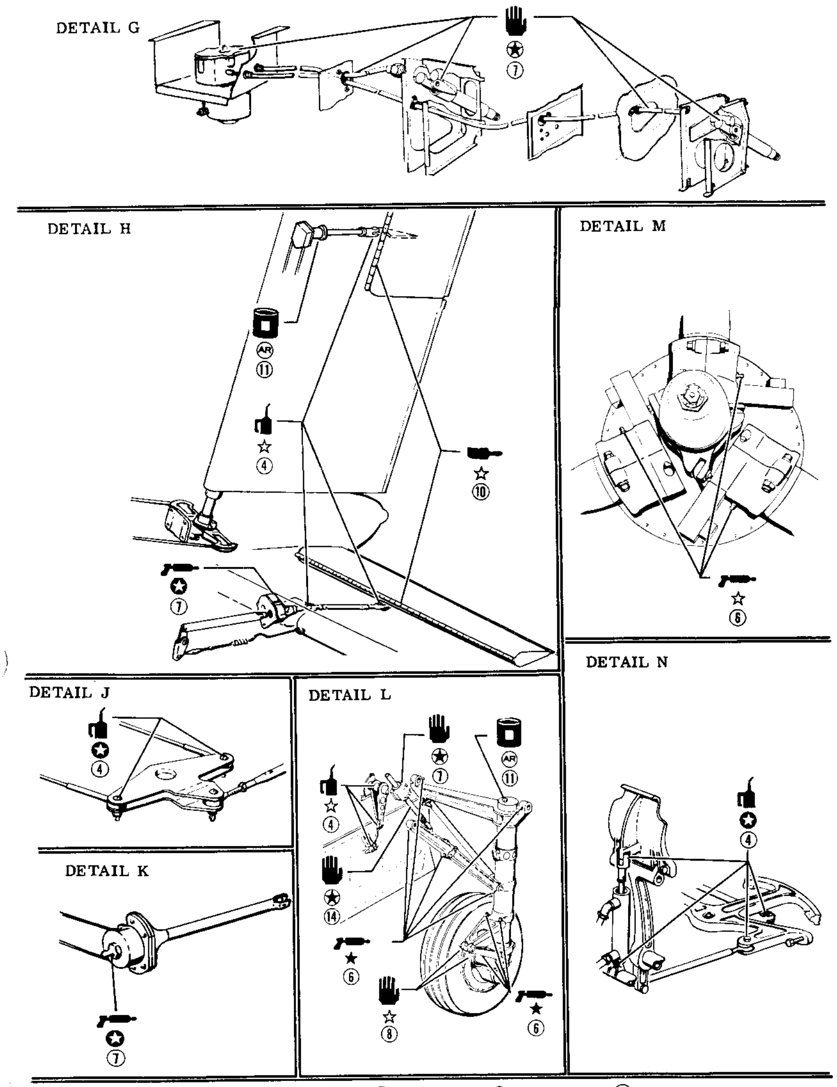
1. Fuel Drain
2. Fuel Tank Filler
3. Oil Filler
4. Fuel Boost Pump Screen
5. Main Gear Shock Strut
6. Gyro Instrument Air Filters
7. Battery
8. Main Gear Tire
9. Suction Relief Valve
10. Oil Drain
11. Fuel Injector Regulator Assembly Strainer
12. Oil Filter
13. Engine Air Filter
14. Fuel Selector Valve Strainer
15. Pitot Line Drain
16. Brake Fluid Reservoir
17. Nose Gear Tire
18. Nose Shimmy Dampener Reservoir
19. Nose Gear Shock Strut
20. Static Air Drain

OPTIONAL EQUIPMENT

A. Anti-Icer Tank Filler
B. Rear Oxygen Cylinder Filler Valve
C. Light Weight Surface De-Icer Filler Valve
D. Propeller Unfeathering Accumulator
E. Front Oxygen Cylinder Filler Valve
F. Gyro Instrument Air Filters

LUBRICATION DIAGRAM





★ 50 hours ☆ 100 hours ✪ 200 hours ⊛ 1,000 hours Ⓐ As Required

GREASE GUN | HAND OR PACK | OIL CAN | BRUSH | HYDRAULIC FLUID

NOTE - Numbers refer to items in the consumable materials chart type which maintain constant and correct fluid volume in the system. Any fluid lost by leakage is immediately replaced from the system reservoir. The master cylinder pistons are actuated by toe pressure on either pilot's rudder pedals. The fluid reservoir, mounted immediately inside the left nose access door, should be checked regularly to assure that a sufficient hydraulic fluid reserve exists. A dip-stick is provided for measuring fluid level which should be 1" below the top of the reservoir.

SERVICING THE TIRES

The 8 ply, 8:50 x 10 tubeless tires on the main gear are inflated to a pressure of 47 +3 −0 psi while the tubeless 4 ply or optional 6 ply nose wheel tire is to be inflated from 30 to 35 psi. Maintenance of these pressures will lessen the wear incurred from landing or from running over sharp stones or ruts. When inflating the tires, inspect them for cracks, breaks or evidence of damage.

JACKING

A three point jack-pad system has been provided in the Queen Air 80. The two aft pads are located on the center section rear spar inboard of each nacelle. The forward jack-pad is located near the aft edge of the nose wheel well, to the left of the fuselage center line. Jack points have been provided on each of the landing gear so that the wheels can be raised individually for changing tires or making minor brake repairs.

SERVICING THE PROPELLER

Since propellers will pick up those loose pieces of rock or debris from the ramp and runway, the blades should be checked periodically for damage. Minor nicks in the leading edge of blades should be filed out and all edges rounded, since cracks sometimes start from such defects. Use fine emery cloth for finishing the depressions. Refer to CAM 18 for blade repair limitations. Your daily inspection should include examination of blades and spinner for visible damage or cracks and inspection for grease or oil leakage.

At engine overhaul but not exceeding 1000 hours of operation, a complete disassembly and inspection of the propeller is recommended, with appropriate replacement and refinishing of parts.

Proper adjustment of the governor and propellers will produce the following:

Static RPM	3350 ±50 @ 45 in. Hg M.P. (Std. Day)
Low Pitch	18½° + 0 — ½ @ 30 inch station
Full Feather	87° ±½ @ 30 inch station
Low RPM (High Pitch) .	2400
Feathering RPM	2325

In operating situations, some variation from these rpm figures, may be experienced due to wind loads, altitude, and other aerodynamic variables. Consistent variation, however, would indicate the need for maintenance checks conducted under standardized conditions.

PROPELLER UNFEATHERING ACCUMULATOR (OPTIONAL)

To insure proper operation, you should check the propeller unfeathering accumulator periodically for correct pressure. To check the air pressure, position the propeller controls for low pitch to exhaust the oil from the accumulators. Maintain the pressure at 100 ±5 psi. The accumulators are located on the outboard side of each firewall.

ANTI-ICER SYSTEM (OPTIONAL)

The purpose of the anti-icer system is to prevent the formation of ice on the propeller blades during flight. The prevention of icing is accomplished by wetting the blades with isopropyl alcohol anti-icer fluid. The system consists of a supply tank, pump, filter, quantity transmitter and indicator, check valves, slinger rings, circuit breaker, control rheostat and anti-icer boots.

The anti-icer tank is located in the left wing, inboard of the nacelle, just forward of the main spar. The tank has a capacity of 3 U. S. gallons of anti-icer fluid (See Consumable Materials Chart). Access to the tank filler cap is through an access door in the upper wing skin. Check the fluid level and refill if necessary before each cold weather flight. The tank should be drained and flushed twice a year.

RESERVOIR TYPE DE-ICER SYSTEM (OPTIONAL)

The Light Weight De-Icer System in your Queen Air 80 will be charged to a reservoir pressure of 2800 ±200 psi prior to delivery. Maximum operating pressure for the system is 3000 psi, charged with DRY, oil-free, compressed air or nitrogen.

In total, seven de-icer boots are supplied with pressure from the reservoir, mounted aft of the rear, cabin bulkhead. The reservoir itself is charged through a filler valve mounted just forward of the horizontal stabilizer.

To service the reservoir, and thereby the system, pull the de-icer reservoir shut-off valve control fully out, remove the forward inspection door (ahead of the left stabilizer), and remove the yellow safety cap on the filler valve; then connect the filler hose and fill the reservoir to a pressure of 3000 psi. When the reservoir has been filled to this maximum pressure, remove the filler hose, tighten the filler valve hex nut, replace the yellow safety cap and the inspection door, and push the reservoir shut-off valve control fully in.

WARNING

Never service the de-icer system with oxygen or corrosive gases. Observe the maximum pressure limitation of 3000 psi.

The reservoir pressure, at any time that the shut-off valve control is pulled out, can be easily read by the pilot from the large pressure indicator which is mounted to the copilot's right.

HEATING SYSTEM

The heater ignition unit is equipped with two sets of ignitor points that are controlled by the AUTO-MANUAL switch. Should you experience heater failure when this switch is in the "AUTO" position, go to "MANUAL." If heater operation is restored by this changeover, malfunction within the automatic control system might be suspected.

The vibrator and the ignitors are incorporated in a single, sealed unit which plugs into the rear of the ignition coil. Access to the vibrator and ignition units is through the right radio compartment door and requires the removal of the outboard radio compartment floor panel. To replace the vibrator-ignitor unit, simply break the safety wire that runs from the ignition unit to the knurled nut, unscrew the nut, remove the vibrator unit, and plug in the new unit.

The ignition unit itself lies longitudinally on top of the heater jacket below the floorboard. To remove the heater ignition unit (part number 11C30), release the two clamps that hold it in place and disconnect the 7mm ignition cable. Then lift the unit.

Fuel pressure to the heater, drawn from the left engine pump, is controlled by a fuel pressure regulator mounted on the left side of the nose wheel well. The heater fuel line is equipped with a solenoid valve in the nose wheel well and a second solenoid valve in the left engine compartment. The two valves prevent any seepage of fuel from the line into the heater when the heater is not operating.

Three heat sensing elements are wired into the automatic heat control system to set up a Wheatstone Bridge arrangement. Comprising this bridge system are the outside air sensing element, located on the rear face of the forward plenum assembly; the heater discharge sensing element, mounted in the hot air exit duct of the rear plenum chamber; and the cabin air sensing element, positioned in a panel overhead, just aft of the cockpit entry.

A temperature limit switch in the rear plenum hot air duct cycles the system off when temperatures reach 200°F. The system is further guarded by a thermoswitch that opens the system's electrical circuits, by blowing a 5 amp fuse, should temperatures reach 300°F.

VACUUM SYSTEM

Your vacuum system should indicate near the high limit with both engines running to assure that 4.0 in. Hg is available should one pump fail in flight. To set the suction, start one engine and allow it to warm up to normal operating temperature. The suction gage should read at least 4.0 in. Hg with engine operating at 2600 rpm. If a lesser reading is noted, adjust the suction relief valve, located on the lower aft side of the firewall.

To adjust the suction, release the locknut pressure and turn the adjustment screw counterclockwise to increase suction or clockwise to decrease suction, then set the locknut.

Shut down the first engine when the proper adjustment has been made and then repeat the procedure with the second engine. When the proper adjustment has been made on both engines, run them simultaneously at 2600 rpm and check that the combined output of both pumps is within the upper limit for system operation.

The minimum and maximum suction red line markings are 3.75 and 5.25 inches of mercury respectively. The normal two-engine inflight suction gage reading should be 5.0 in. Hg in order to get the best practical directional gyro precession characteristics. If a vacuum pump fails, the gage reading will drop somewhat, depending on the number of air gyro instruments installed. The desired single pump indications are as follows:

No. of Instruments Installed	Gage Indication with One Pump
4	Approximately 4.0 in. Hg
3	Approximately 4.25 in. Hg
2	Approximately 4.5 in. Hg

(The exact pressure can be read from the gage with only one engine operating.)

OXYGEN SYSTEM (OPTIONAL)

Your Queen Air 80 can be equipped with an oxygen system that is supplied by one of three cylinders. The available cylinder capacities are: 38.4 cu. ft; 48.3 cu. ft and 63.3 cu. ft. The 38.4 and the 48.3 cu. ft cylinders are located in the same position in the nose radio compartment. The 63.3 cu. ft cylinder is mounted on the rear face of the aft cabin bulkhead. In each case, the regulator automatically adjusts the oxygen flow as determined by the demands of altitude. Further, the regulator automatically reduces the system pressure of 1800 psi to a suitable working pressure at the outlets.

The filler valve for the forward systems is on the aft bulkhead of the nose compartment and is serviced by opening the right nose compartment door. The 63.3 cu. ft. cylinder is serviced through its filler valve located to the left on the rear cabin bulkhead. To charge the oxygen system, remove the protective cap from the filler valve and attach the fitting from an oxygen recharging cart.

CAUTION

> Inspect the filler connection for cleanliness before attaching it to the filler valve. Be sure that your hands, tools, and clothing are very clean and free from grease and oil since these contaminants will ignite when in contact with pure oxygen under pressure.

Open the cylinder supply valve on the airplane and fill the system slowly by adjusting the recharge rate with the pressure regulating valve on the cart. When the pressure gage on the cylinder reads 1800 psi, close the pressure regulating valve and replace the protective cap on the filler valve.

EXTERIOR CLEANING

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

CAUTION

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

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

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

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

INTERIOR CLEANING

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

Commercial foam type cleaners or shampoos can be used to clean rugs, fabrics, or upholstery. However, be sure to follow the cleaner manufacturer's instructions.

CLEANING PLEXIGLASS WINDOWS

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

NOTE

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

INSPECTION

Correct servicing is half the secret of preventive maintenance, the other half is inspection. Proper servicing will prolong the life of your Queen Air 80 and careful regular inspections will not only assure that servicing has been done correctly, but will disclose minor troubles so that they can be corrected before they become malfunctions. Patronize your BEECHCRAFT Certified Service Station. They are equipped and especially trained to service your Queen Air 80.

CONTROL SURFACE CHART

CONTROL SURFACE	CABLE TENSION	SURFACE TRAVEL*
Aileron fuselage cables	40 +5 −0 lbs	20° Up & Down
around sprocket on "T" column	70 ±10 lbs	
$\frac{3}{16}$" wing center section	50 +5 −0 lbs	
Aileron Tab	10 +3 −2 lbs	7½° Up & Down
Aileron Anti-Servo (RH)		14° +2 −1 Up, 8° +2 −1 Down
Elevator	31 ±4 lbs	25° +1 −0 Up, 15° +1 −0 Down
Elevator Tab	5 +2 −0 lbs aft of "Y" splice	10° Up, 21° Down
Elevator Anti-Servo		12° Up, 8° Down
Rudder	75 +5 −0 lbs	25° ±1 Left & Right
Rudder Tab	10 +3 −2 lbs	30° Left & Right

* All travel ±1½° at extremes of cycle except as noted above.

CONSUMABLE MATERIALS CHART

ITEM	MATERIAL	SPECIFICATIONS
1.	Fuel, Engine	100/130
2.	Engine Oil	SAE 20 (Below 10°F) SAE 40 (30° to 90°F) SAE 30 (0° to 70°F) SAE 50 (Above 60°F)
3.	Lubricating Oil (Special Preservative)	MIL-L-644
4.	Lubricating Oil (General Purpose, Low Temperature)	MIL-L-7870
5.	Lubricating Oil [Aircraft Reciprocating (Piston) Engine]	MIL-L-6082
6.	Lubricating Grease (General Purpose)	MIL-G-7711
7.	Lubricating Grease (Aircraft and Instruments, Low and High Temperature)	MIL-G-3278
8.	Lubricating Grease (High Temperature)	MIL-L-3545
9.	Lubricating Grease, Graphite	MIL-G-7187
10.	Lubricant, Powdered Graphite	MIL-G-6711
11.	Hydraulic Fluid	MIL-H-5606
12.	Anti-icer Fluid	MIL-F-5566
13.	Solvent	Federal Specification, P-S-661
14.	Lubricating Grease, Special	Mix 30 grams Molykote Type "Z" (Product of the Alpha Molykote Corporation, Stanford, Conn.) per pound of MIL-G-7118
15.	Lubricating Grease, Automotive	MIL-G-7118

CONSUMABLE MATERIALS CHART, Cont'd

14.	Lubricating Grease, Special	Mix 45 grams Molykote Type "Z" (Product of the Alpha Molykote Corporation, Stanford, Conn.) per pound of MIL-G-3278
15.	Lubricating Grease, Automotive	MIL-C-10924A

NOTES

1. If 100/130 octane fuel is not available, use 115/145 octane fuel. Never use less than 100/130 octane fuel.
2. Powdered graphite, MIL-G-6711, may be mixed with quick evaporating liquid naphtha for brush application of this lubricant.
3. Painted surfaces are subject to discoloration when exposed to MIL-G-7711 and MIL-G-3278 lubricants.

LAMP REPLACEMENT GUIDE

LOCATION	NUMBER
Instrument Lights	MS25237 - 327
Oxygen Quantity Indicator Light	MS25237 - 327
Free Air Temperature Light	MS25237 - 327
Cabin Door Unlocked Light	MS25237 - 327
Fuel Enrichment Lights	MS25237 - 327
Alternate Air Lights, Top	MS25237 - 327
Alternate Air Lights, Bottom	MS25237 - 327
Fuel Control Panel Lights	MS25010 - 3A
Fuel Control Panel Cross-Feed Light	MS25010 - 3A
Map Light	AN3122 - 1524
Overhead Instrument Light	AN3124 - 307
Lighting Panel Edge Light	MS25010 - 3A
Cabin Reading Lights	MS25231 - 313
Aft Baggage Compartment Light	MS25233 - 303
Threshold Light	MS25231 - 313
Taxi Light	4587
Landing Lights	4523
Wing Tip Navigation Lights	A7512 - 24
Belly Beacon Light	A7079A - 24
Rotating Beacon Lights	A - 7079 - 24
Tail Navigation Light	AN3124 - 307

TOPICAL INDEX

A

B

C

D

E

F

Revised November 20, 1962