BARON G58
PILOT TRAINING MANUAL

REVISION 0.2

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CHAPTER 1
AIRCRAFT GENERAL

INTRODUCTION

This chapter provides a brief history of the Beech Baron, as well as a partial list of the significant design changes that have been made on the Baron G58 aircraft. Descriptions of the general structure of the aircraft, baggage compartments, and interior are discussed.

GENERAL

HISTORY AND SIGNIFICANT DESIGN CHANGES

The Beech Model 95-55 Baron was the founding member of a remarkable family of aircraft. First flown on February 29, 1960, the Model 95-55 was developed from the earlier Model 95 Travel Air, differing primarily in having more powerful engines, and design refinements. These improvements included a swept vertical tail surface and improved all-weather capability. Deliveries began in November 1960, and acceptance of the new twin-engine four/five-seat aircraft resulted in further improvement and development of the aircraft.

The Model B55, introduced in 1963, had four seats or an optional five/six-seat option. In 1965, a Model C55 was available with the more powerful

285-horsepower Continental IO-520-C engines. The Model C55 included increased tailplane span and an extended nose baggage compartment and evolved as a separate Baron model, distinct from the B55.

The United States Army selected the Model 95-B55 for military service as an instrument trainer under the designation T-42A Cochise. By 1982, production of civil and military 95-B55 Barons surpassed 2,400. A total of 1,201 examples of the Model E55 (formerly the C/D55) had been delivered when production ended.

In 1969, the Baron family introduced the Model 58 (Figure 1-1). It was first flown in June of that year. The 58 was a Model 55 fuselage lengthened 10 inches, providing a larger cabin. Double cargo doors (on the right side of the fuselage) created greater access to the aft cabin and rear baggage areas.

The Model 58 was initially powered by Continental IO-520-C engines (found on the E55), but was upgraded to the more powerful IO-550-C engines. The pressurized Model 58P was introduced in 1975, and the Model 58TC was introduced in 1976.

In 1984, Beechcraft changed the configuration of the Model 58 instrument panel, incorporating smaller, turbine-style engine instruments and a more conventional throttle quadrant with propeller and mixture controls.

In 1984, the 300-horsepower IO-550-C engines were made standard along with the addition of dual control columns and known-icing certification. The production total of all model Barons, as of August 2002, was approximately 6,500.

In December 2005, Hawker Beechcraft received certification for and began delivering the latest Baron Model G58 aircraft. The G58 Baron introduced the technically advanced Garmin G1000 avionics suite. The avionics suite utilizes Garmin's new GFC 700 automatic flight control system, as well as Garmin's new GWX 68 all weather radar platform. XM Satellite technology provides near real-time Nexrad composite radar information, while terrain and traffic awareness are enhanced by standard terrain awareness and warning system (TAWS-B), traffic information system (TIS), and optional traffic advisory system (TAS).

The Baron G58 is an all-metal, low-wing, four-to-six seat, twin-engine aircraft with retractable landing gear. It is constructed primarily of aluminum and is certified under Part 23 of the Federal Aviation Regulations in the Normal Category. The Baron G58 is approved for day and night visual flight rule (VFR) and instrument flight rule (IFR) operations and is also approved for flight into known icing conditions when properly equipped.

Refer to Figure 1-2 for the Baron G58 dimensions.

Figure 1-1. Beechcraft Baron 58

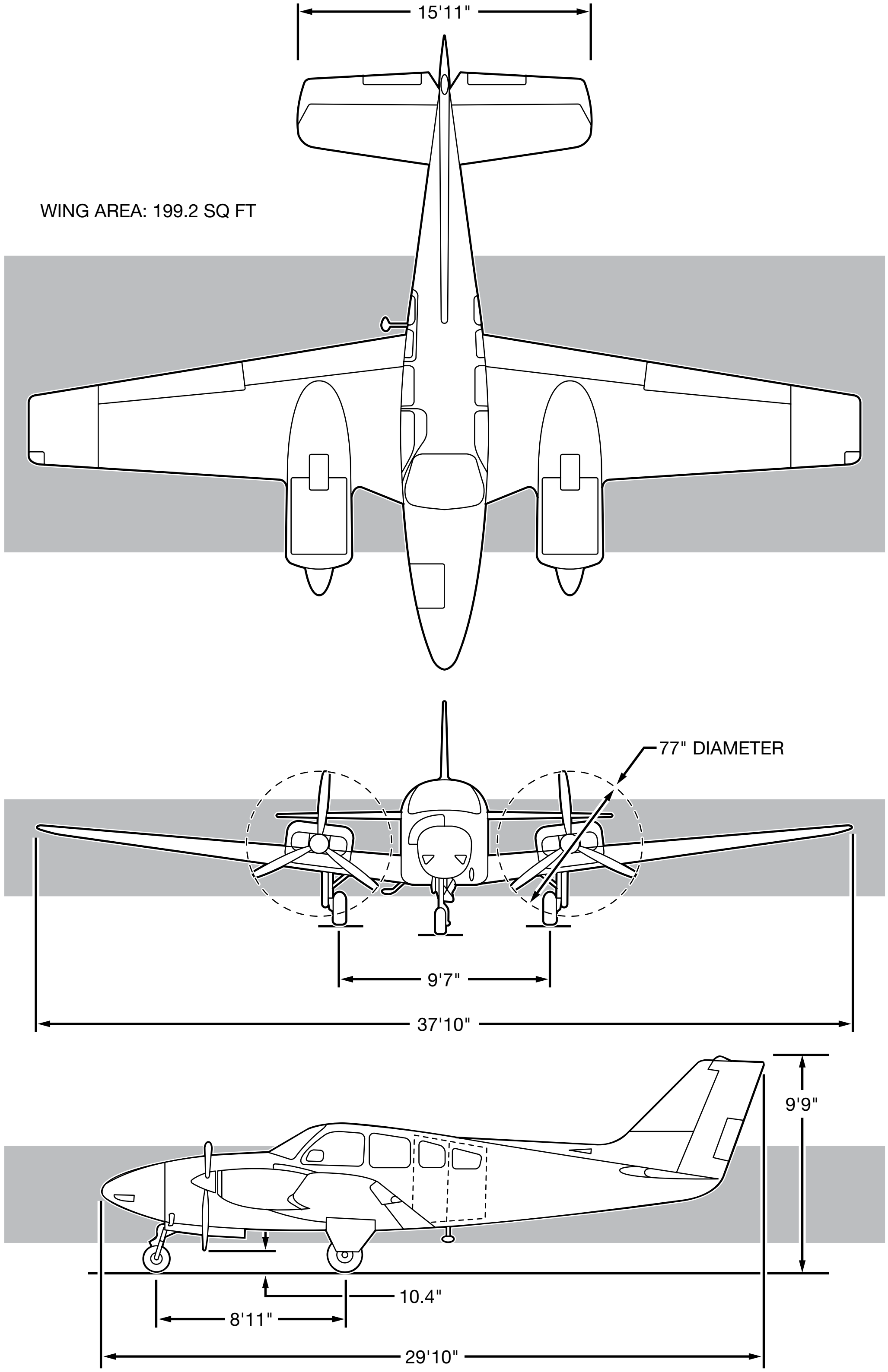


Figure 1-2. Baron G58 Dimensions

STRUCTURES

AFT FUSELAGE AND CABIN

The aft fuselage contains control cables, bell-cranks, pulleys, autopilot servos, and the emergency locator transmitter (ELT). The aft cabin contains a cargo/baggage compartment and net, coat hanger, hat shelf, and display area for aircraft documentation. The maximum weight allowable for the aft baggage compartment is 120 pounds. Baggage should be secured with the installed cargo net (Figure 1-3). Heavy objects must not be placed on the hat shelf, or damage may result. Objects in the aft compartment must always be secured properly.

Figure 1-3. Aft Cargo Area

NOSE BAGGAGE COMPARTMENT

The nose baggage compartment (Figure 1-4) is an unheated cargo/baggage area that contains avionics and electrical equipment. The maximum allowable weight in the nose baggage compartment is 300 pounds. Refer to Section 6, Weight and Balance of the Pilot's Operating Handbook (POH) for information regarding the proper loading of cargo and/or baggage, as well as any limitations that apply.

Figure 1-4. Nose Baggage Compartment

The nose baggage compartment door is on the right side of the fuselage (forward of the cockpit), and is held open by a lever during the loading or unloading of baggage. The door is held closed by two latch mechanisms and can be secured for flight (or storage) with lock and key. An additional safety latch is on the door to prevent the door from opening in flight. The nose baggage lock prevents operation of the forward latch mechanism, but does not otherwise physically secure the door. The door must be locked prior to flight to prevent movement of the forward latch due to vibration. There is no cockpit annunciation or indication to warn the pilot of an unsecured nose baggage door.

A light for the nose baggage compartment is powered by the hot bus and controlled by a switch. All G58 models have manual ON/OFF switches but no AUTO switches.

FORWARD CABIN DOOR

The forward cabin entry door is on the right side of the aircraft for use by the pilot and front seat occupant (Figure 1-5). If seats No. 3 and No. 4 are configured for forward facing passengers, the occupants of seats No. 3 and No. 4 also use this door.

Figure 1-5. Forward Cabin Door

The forward cabin door is held closed by two pins that insert into the fuselage door frame and a hook-and-latch mechanism on the top of the door. The front door is unlatched from inside the cabin by depressing the lock button and then rotating the handle to the most clockwise position. To open the door from the outside, pull the handle out from its recess until the door opens.

The forward cabin door is held open by a stay bar that slides up and into the bottom of the door when fully opened. To avoid damage to the stay bar and door, park the aircraft facing into the wind.

To close, pull the door firmly into position and rotate the handle to its most counterclockwise position. Two distinct clicks are heard and the handle swings freely through a small arc.

To ensure the door is properly secured for flight, complete the following checks:

1. Verify that the interior handle swings freely through an approximate 3-inch arc.
2. Press firmly on the upper rear corner of the door. The top door latch must be properly engaged. Pressing the door verifies security. If the door corner moves outward, the latch is not engaged.
3. Courtesy lights—Off.

If not properly latched, the forward door may open during takeoff or in flight. Aircraft controllability is not affected, but a large amount of wind noise and some slight aerodynamic buffeting occurs. Do not attempt to close an open door in flight. Make a normal landing and secure the door properly when clear of the runway.

The forward cabin door can be used as an emergency exit and, while unattended, the aircraft may be locked with the key for security.

AFT CABIN DOORS

Dual cabin doors are installed for use by the rear seat passengers (Figure 1-6). If the aircraft is configured for club seating, all passengers use these doors for entry and exit.

The aft cabin door assembly consists of two halves. The forward door is held closed by two bayonet pins actuated by an exterior D-ring handle and an interior conventional handle. The rear half of the aft cabin door is held closed by two J-hooks actuated by a lift lever recessed into the edge of the aft door. The aft cabin doors are held open by stay bars that lock overcenter when fully opened. The forward door overlaps and secures the aft door (the aft door must be closed prior to closing and securing the forward door).

The pilot should secure the aft cabin doors. The doors can be used as an emergency exit and can be locked from the outside for security.

Do not lock the rear doors prior to flight. This prevents them from being used as an emergency

Figure 1-6. Aft Cabin Doors

exit. If the doors are not locked, they can be opened in flight by simply rotating the interior handle. To prevent an inadvertent opening of the doors in flight, brief the passengers on door operation prior to flight. If the aft cabin doors are not properly latched, an AFT DOOR alert displays on the primary flight display (PFD).

To ensure that the doors are secure for flight, perform the following checks:

1. Ensure that the aft door J-hooks fully engage against the door frame.
2. Ensure that the exterior D-ring handle is in a horizontal position.
3. Verify that the AFT DOOR alert on the PFD is cleared.
4. Courtesy lights—Off.

The aircraft may be flown with the aft cabin doors removed provided that all applicable limitations are complied with.

CABIN WINDOWS

The Baron G58 windows are of Plexiglas construction and are cleaned using only a soft cloth and nonabrasive soap and water. Never use gasoline, benzene, alcohol, acetone, carbon tetrachloride, fire-extinguisher fluid, anti-ice fluid, lacquer thinner, or glass cleaner to clean the windows. After drying, apply a thin coat of wax to help prevent scratches, buffing by hand only.

The windscreen is a one-piece, wraparound assembly. Four side windows are on each side of the cabin. The pilot side window has an openable storm window. The forward passenger windows may be opened for ventilation on the ground, but must be closed for flight and may also be used as emergency exits (Figure 1-7). The procedure for opening the windows for emergency exit is described on a placard near the window and in the FlightSafety Training Checklist. When the emergency exit latch is disengaged, the window swings up allowing exit. Brief passengers on window operation prior to flight.

Figure 1-7. Emergency Exits

The windows are safety-wired to prevent inadvertent release of the emergency exit mechanisms and .020 copper wire is specified for use (refer to the POH). Preflight inspection must include verifying the use of proper wire and its condition after maintenance prior to carrying passengers.

EXECUTIVE WRITING DESK

The Baron G58 is equipped with an executive writing desk on the side wall of the aft cabin area (Figure 1-8). The desk is is for light loads and must be stowed for takeoff and landing. Brief passengers on its use before flight.

Figure 1-8. Executive Writing Table

SEATS AND SEAT BELTS

Standard seats in the aircraft are adjustable fore and aft by a latch release bar under the seat. The seat backs of the four standard seats can also be adjusted to any of four positions by a release lever on the inboard side of each seat.

The No. 3 and No. 4 seats can be folded over by rotating the red handle on the lower inboard side of the seat back. Seats No. 5 and No. 6 are not adjustable but may be placed in the stowed position to provide additional floor space, or folded down for access to the aft baggage compartment.

Some passenger seats may be fully reclined but must be in the upright position for takeoff and landing. Outboard armrests for all seats are built into the cabin sidewalls. Center armrests can be elevated or positioned flush with the seat cushion.

The aircraft can be flown with the aft four seats removed if the Weight and Balance Data and Equipment List is updated.

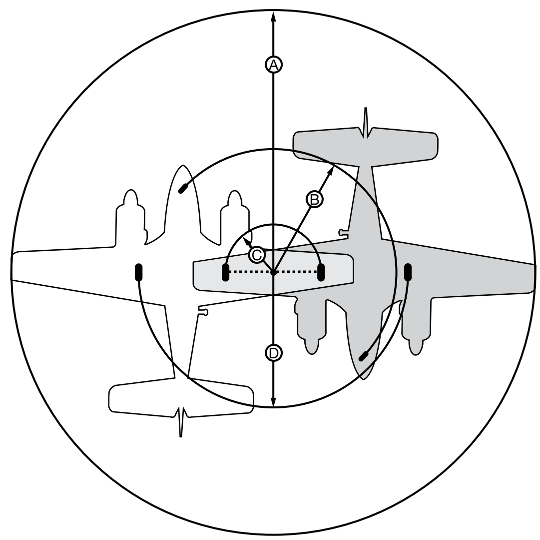
The center row of seats can be installed in a forward- or rear-facing configuration. If reversing the seats, ensure that the center armrests are positioned correctly and the seat stops are installed properly to preclude the seats from rolling off their rails.

When installed in the club-seating configuration, the No. 3 and No. 4 seats must have the headrests fully raised during takeoff and landing. Lap belts and shoulder harnesses are standard for all seats in the aircraft and all occupants are required to wear these for takeoff and landing. The pilot is required to wear a seat belt and shoulder harness at all times during flight.

GROUND CONTROL

The Baron is maneuvered on the ground using a combination of differential power, differential braking, and nosewheel steering. A spring-loaded linkage from the nosewheel to the rudder pedals provides nosewheel steering.

Smooth turning is accomplished by allowing the aircraft to roll while pressing the appropriate rudder pedal (Figure 1-9). Sharper turns require light rudder/brake pedal pressure. The inboard wheel must rotate during a sharp turn to prevent the nosewheel from dragging across the ground. If a wingtip can clear an object in the turn, the tail will also.



Ⓐ RADIUS FOR WINGTIP.................. 31 FEET 6 INCHES
Ⓑ RADIUS FOR NOSEWHEEL........... 15 FEET 6 INCHES
Ⓒ RADIUS FOR INSIDE GEAR........... 7 FEET 11 INCHES
Ⓓ RADIUS FOR OUTSIDE GEAR....... 17 FEET 6 INCHES

Figure 1-9. Baron G58 Ground Turning Clearance

LIMITATIONS

The limitations of the aircraft and subsystems are discussed in this manual as they apply to each system. For the full list of limitations, refer to the POH.

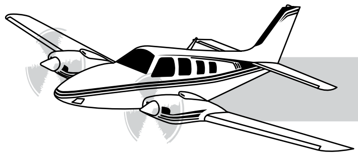
Airspeed limitations are shown in Table 1-1. Airspeed indicator markings are shown in Table 1-2.

Table 1-1. AIRSPEED LIMITATIONS

SPEED	KCAS	KIAS	REMARKS
Never Exceed (V_{NE})	223	223	Do not exceed this speed in any operation.
Maximum Structural Cruising (V_{NO} or V_C)	195	195	Do not exceed this speed except in smooth air and then only with caution.
Maneuvering (V_A)	156	156	Do not make full or abrupt control movements above this speed.
Maximum Flap Extension/ Extended (V_{FE}) Approach (15°) Full Down (30°)	 152 122	 152 122	Do not extend flaps or operate with flaps extended above this speed.
Maximum Landing Gear Operating/ Extended (V_{LO}/V_{LE})	152	152	Do not extend, retract or operate with gear extended above this speed.
Single-Engine Minimum Control Speed (V_{MCA})	83	83	Minimum speed for directional controllability after sudden loss of engine.
Maximum With Utility Doors Removed	174	174	Utility door removal kit must be installed.

Table 1-2. AIRSPEED INDICATOR MARKINGS

COLOR CODED SPEED RANGE STRIP OR MARKING	KIAS RANGE	SIGNIFICANCE
White Strip	74–122	Full Flap Operating Range Lower Limit = Stall speed with flaps down at maximum weight. Upper Limit = Maximum speed permissible with flaps fully extended.
White Triangle	152	Maximum Speed for approach flaps
Blue Strip	101	Minimum Single-Engine Control (V_{MCA})
Red Strip	84	Normal Operating Range Lower Limit = Stall speed with flaps up at maximum weight. Upper Limit = Maximum Structural Cruise Speed
Green Strip	84–195	Do not extend, retract or operate with gear extended above this speed.
Yellow Strip	195–223	Caution Range. Approved for smooth air only. Upper Limit = Never Exceed Speed. Maximum speed for all Operations.
Red & White Strip	>223	High Speed Warning



QUESTIONS

To answer the following questions, refer to the *FlightSafety Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. What cockpit indication alerts the pilot that the nose baggage door is not properly secured?

2. List the three checks that ensure the forward door is properly secured for flight:

1.

2.

3.

3. List the four checks that ensure the aft door is properly secured for flight:

1.

2.

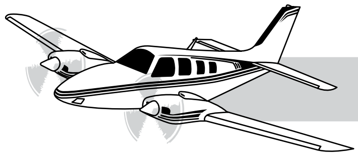
3.

4.

4. Should the rear doors be locked for flight?

5. When are crewmembers and passengers required to wear seat belts and shoulder harnesses?

6. What procedure is followed if the forward door opens in flight?



CHAPTER 2
ELECTRICAL POWER SYSTEMS

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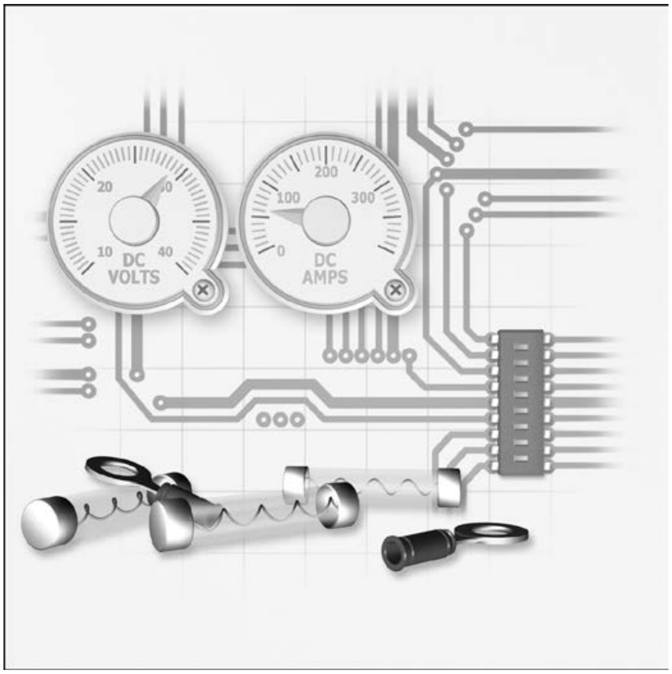
CHAPTER 2
ELECTRICAL POWER SYSTEMS



INTRODUCTION

This chapter provides the pilot with an understanding of the electrical system in the Baron G58. In the event of a component malfunction or failure, familiarization with the electrical system allows the pilot to continue to operate the aircraft by effectively troubleshooting and securing the affected component. A glossary of electrical terms is provided at the end of the chapter.

GENERAL

DESCRIPTION

The Baron G58 electrical system is a 28 VDC (volts, direct current) single wire type architecture with the aircraft main structure used for a negative ground return. Two 24 volt batteries and two 28 volt alternators provide the system with the required electrical power.

The electrical system is protected through the use of fuses, circuit breakers, circuit breaker type switches, and current limiters.

COMPONENTS

BATTERIES

A 13-amp/hour air cooled lead acid battery is located under the left nose baggage floor and another battery is under the right nose baggage floor. Each battery is individually capable of supplying power to the entire aircraft electrical system.

ALTERNATORS

A gear-driven alternator is on each engine. The 100-amp, 28.5-volt alternators are capable of delivering 100 amps at 2,300 rpm or greater to the respective engine.

The left alternator is connected to the left bus through a 100-amp current limiter. It is capable of supplying power to the entire electrical system when the right bus is manually tied to the left bus.

The right alternator is connected to the right bus through a 100-amp current limiter. It is capable of supplying power to the entire electrical system when the left bus is manually tied to the right bus.

If either (or both) the left or right alternator is off the line, a red warning advisory appears on the primary flight display (PFD). Take corrective action using the appropriate *Pilot's Operating Handbook (POH)* checklist.

BUS TIE RELAYS

The left and right buses are connected by a normally open electrical relay that can be manually closed by the pilot anytime the left or right alternator fails.

STARTERS

Each starter is energized by its respective battery through its battery master relay. Each starter is actuated by a magneto/start switch.

EXTERNAL POWER RECEPTACLE

The external power receptacle is in the outboard side of the left engine nacelle (Figure 2-1). External power can be used to power the electrical system with the engines shutdown to charge both the L BAT and R BAT or to assist an engine start during battery discharged conditions.

Figure 2-1. External Power Receptacle

Both the left and right battery must be installed in the aircraft (and connected to the electrical system) prior to the application of external power. The bus tie relay is powered closed with the application external power.

With the batteries in the system, any voltage transients or spikes from the external power unit are absorbed by the batteries.

Additionally, with the BAT switches ON, and the AVIONICS MASTER switch OFF, the avionics master relay is powered open and the entire avionics bus is protected during application of external power. Without the batteries in the system prior to application of external power, avionics damage from voltage transients could occur.

CONTROLS AND INDICATIONS

ALTERNATOR SWITCHES

The L ALT and R ALT toggle switches are on the MASTER electrical switch panel (Figure 2-2). The switches have three positions:

- L ALT or R ALT
- OFF
- BUS TIE—Forces the remaining alternator to power both the left and right buses. BUSES TIED message appears on the primary flight display (PFD) as an advisory alert.

BUSES TIED MESSAGE

When the BUSES TIED message appears on the PFD, monitor the appropriate BUS VOLTS and ALT LOAD indications on the multifunction display (MFD) to verify that both buses are being powered adequately and that ALT LOAD is less than 100% on the remaining alternator. If ALT LOAD exceeds 100%, shed the appropriate loads according to the *Pilot's Operating Handbook (POH)* Abnormal Procedures checklist.

BATTERY SWITCHES

The L BAT and R BAT toggle switches are on the MASTER electrical switch panel (Figure 2-2). Each switch has two positions:

- L or R BAT
- OFF

START MAGNETO SWITCHES

Each starter is actuated by an associated rotary magneto START switch on the pilot subpanel (Figure 2-2). The switches have five positions:

- OFF
- R
- L
- BOTH
- START

When either switch is rotated to the START position, the associated starter relay is energized, allowing power from the associated battery to begin rotating the starter. When the starter relay is energized, an R (or L) START ENGD advisory message appears on the PFD.

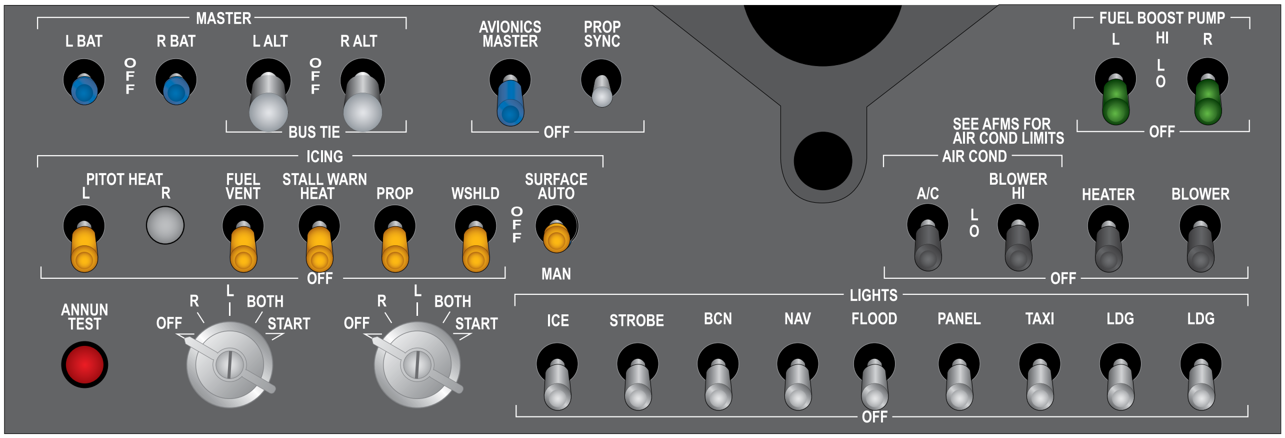


Figure 2-2. MASTER Electrical Toggle/Breaker Switches

When the magneto/start switch is released, power disconnects from the start relay and starter, and the START ENGD message clears. If the message remains on the PFD after the START switch is released, turn off both batteries and alternators and perform an engine shutdown. Failure to do so may result in electrical component failure and/or damage to the engine and starter.

NOTE

An absence of the STARTER ENGD message during engine start indicates a failure of the warning system.

INDICATORS

The load indications for the left and right alternators display on the default engine display on the MFD (Figure 2-3) An L and R pointer indicates the alternator output from 0–100% on a horizontal tape display. Left and right alternator output at 100% is 100 amps and is indicated by the top of the green bar.

Figure 2-3. Alternator Load Display on Default Engine Page

Alternator loads:

- Operating range (green bar)—0% to100%
- Caution range (yellow bar, yellow digits)—More than 100–110%

ELECTRICAL BUSES

The left battery and alternator are connected to the left bus. The right battery and alternator are connected to the right bus. The left and right buses are individually comprised of and power three smaller sub-buses through appropriately rated current limiters (Figure 2-4).

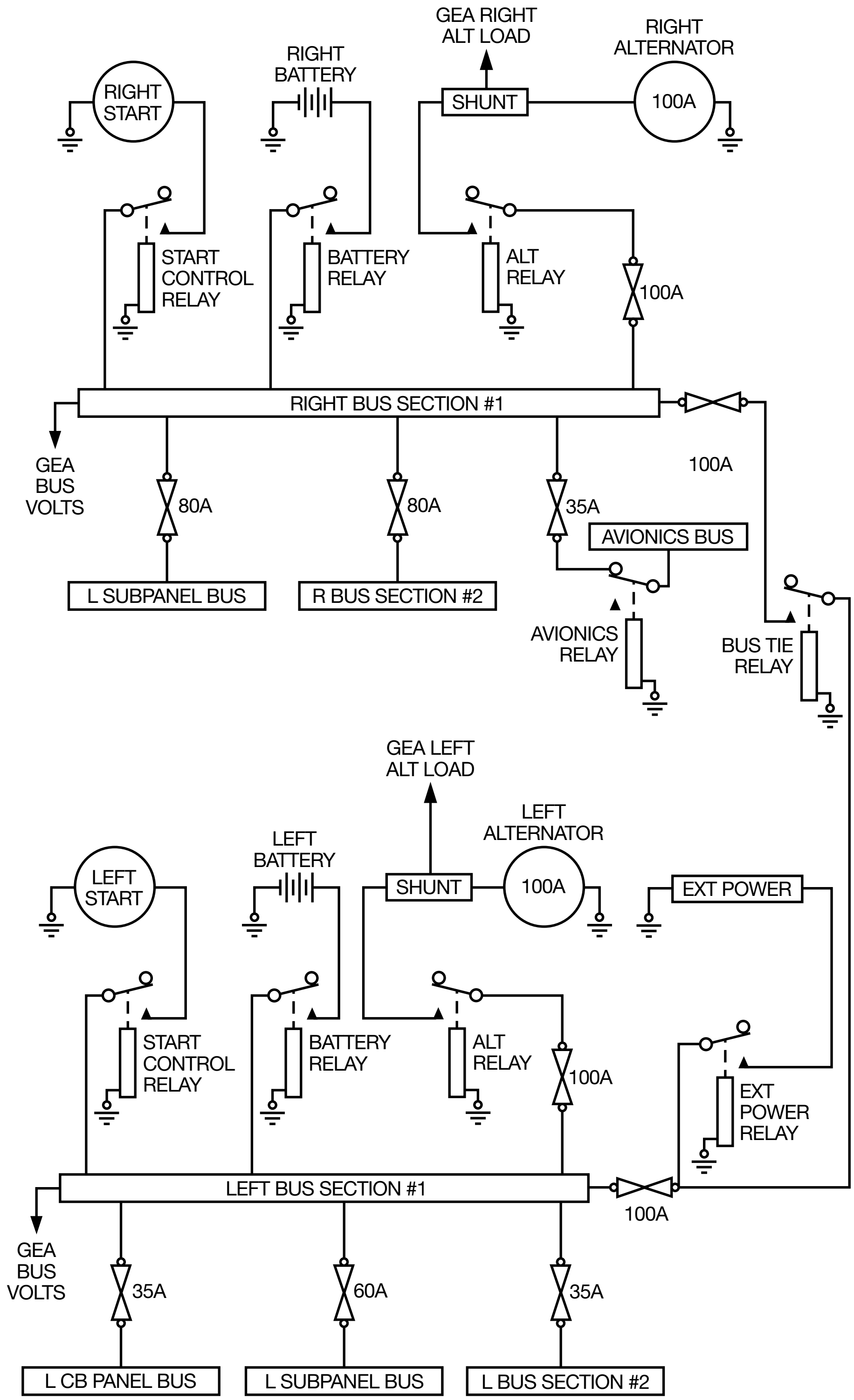


Figure 2-4. Electrical System Diagram

Figure 2-5. Circuit-Breaker Panels

The left bus (essential bus) is comprised of three smaller buses on various CB panels in the cockpit. The left side of the avionics CB panel below the copilot control column (Figure 2-5) houses the essential left bus avionics circuit breakers.

CIRCUIT BREAKERS

Essential left bus circuit breakers are also on the left CB panel (Figure 2-5) and supply power to the:

- LDG GR POS LTS
- CABIN LTS
- LEFT START RELAY
- LEFT FUEL BOOST PUMP
- AIR COND
- AIR COND BLOWER

Switch-type circuit breakers on the pilot subpanel protect the left battery and alternator, as well as the essential lighting and ice protection items (see Figure 2-2).

The right bus is comprised of three smaller subbuses on the various CB panels in the cockpit. The right side of the AVIONICS BUS CB panel below the copilot control column houses the right bus avionics circuit breakers for nonessential avionics items (Figure 2-5).

All remaining circuit breakers on the left CB panel power right bus items, including the AVIONICS MASTER, LANDING GEAR MOTOR, and LANDING GEAR RELAY (Figure 2-5).

Switch-type circuit breakers on the pilot subpanel protect right bus nonessential lighting and ice protection items (Figure 2-5). These circuit breakers turn off when the associated component is short-circuiting and/or the wiring is overheating. After allowing the affected circuit to cool, only reset a circuit breaker if the affected component is necessary to complete the flight safely.

CURRENT LIMITERS

Current limiters serve as large load circuit protection for each of the individual buses and CB panels in the electrical system. Current limiters are large amperage fuses that sever when a continuous high load is placed on the affected circuit. Current limiters are not available to the pilot for resetting or replacement in flight.

OPERATION

The system is operated by turning the battery and alternator switches on. The pilot should be familiar with the normal indications on the loadmeters and voltmeters, and they should be monitored throughout the flight.

Electrical switches are color-coded as follows:

- Blue—Electrical System
- Gold—Ice Protection Systems
- Silver—Lighting
- Green—Powerplant/Fuel
- Black—Environmental

For specific, current instructions on operating procedures, refer to the *Pilot's Operating Handbook (POH)*.

EMERGENCY/ ABNORMAL

If an electrical system malfunction is suspected, refer to the appropriate emergency procedures checklist and land as soon as practical. For specific, current instructions on operating procedures, refer to the *Pilot's Operating Handbook (POH)*.

GLOSSARY OF ELECTRICAL TERMS

Amperage—The measure of flow rate in an electrical circuit. Amperage is analogous to fluid flow rate in a hydraulic system.

Bus—A central distribution point for electrical power. The bus is where power is divided among circuits.

Circuit Breaker—A circuit protection device that responds to excessive amperage by heating up and opening the circuit. Most aircraft circuit breakers are push-pull type or switch-type, and are resettable.

Current Limiter—A large, slow-blow fuse, which is used to protect large capacity circuits.

Diode—An electrical check valve that limits flow in one direction.

Fuse—A circuit protection device that responds to excessive amperage by heating up, melting, and opening a circuit. An open or "blown" fuse must be replaced.

Ground—The return path used to complete a circuit. Electrical power must be able to return to ground to do any work. In metal aircraft, the structure is commonly used as ground.

Hot-wired—Hot-wired items are wired directly to the battery through the hot-wired bus. The battery switch does not need to be on for these items to operate.

Open circuit—A circuit without a complete path. This condition may be created deliberately by turning a switch off, or may be due to a fault in a circuit (e.g., broken wire).

Relay—A device used to close a circuit in a location remote from the control switch. Generally used to reduce long runs of heavy wire or to control several circuits at once with a single switch. Relays are moved in one direction by a spring and in the other direction by energizing an electromagnet. The spring-loaded position is referred to as the "normal" position and the relays are designated as "normally open" or "normally closed" (N.O. or N.C.)

Resistance—The measure of a conductor's tendency to impede the flow of electricity.

Short Circuit—A fault condition of a circuit wherein electricity bypasses the load and goes directly to ground usually resulting in excessive current flow. This condition is usually due to a broken wire and typically opens a circuit breaker or blows a fuse.

Solenoid—A relay-type device used to control a mechanical function electrically. Solenoids are commonly used to open and close valves.

Voltage—The measure of electrical potential. Voltage is analogous to pressure in a hydraulic system.

QUESTIONS

To answer the following questions, refer to the *FlightSafety Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. What is the normal operating voltage of the electrical system?

2. Where are the batteries located?

3. List the four functions of the batteries:

1.

2.

3.

4.

4. What is the engine rpm required to obtain full output from the alternators?

5. What causes an R or L ALT INOP annunciation on the PFD?

6. What is meant by the term "hot-wired"?

7. List the four types of circuit protection in the system:

1.

2.

3.

4.

8. What type of circuit breakers are installed for the external lighting and heated anti-icing equipment and where are they located?

9. If the batteries are too weak to close the battery master relays, what should be done? Why?

10. During an IFR flight, there is a dual alternator failure. Should the landing gear be extended electrically? Why or why not?

11. How can you determine whether a starter has remained engaged after engine start?

12. What should never be done with a circuit breaker, and why?

13. Why should the battery switches be on before connecting external power?

CHAPTER 3
LIGHTING

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CHAPTER 3
LIGHTING

INTRODUCTION

The lighting on the Baron G58 aircraft includes interior and exterior lighting systems.

GENERAL

Interior lighting provides illumination of the cockpit, avionics, flight instruments, and cabin areas. Exterior lighting consists of landing, taxi, navigation, anticollision, and strobe lights.

INTERIOR LIGHTING

NOSE BAGGAGE COMPARTMENT LIGHT

The nose baggage compartment contains a light that is controlled by a manual ON/OFF switch located in the nose baggage compartment.

COCKPIT LIGHTS

On the Baron G58 aircraft, a pair of on-off switches on the pilot subpanel (Figure 3-1) control instrument flood and panel lighting. The intensity of the lights is controlled by four rheostats on the copilot subpanel (Figure 3-2):

- INST FLOOD rheostat—Adjusts the intensity of the flood light in the glare- shield
- FLIGHT INST rheostat—Adjusts the intensity of the primary flight display (PFD) and multifunction display (MFD)
- LIGHTING rheostat—Adjusts the intensity of the PFD and MFD bezel backlighting, as well as the subpanel backlighting
- STANDBY INST rheostat—Adjusts the lighting intensity of the standby instruments that are next to the MFD

A push on/push off switch on the right horn of the pilot control wheel activates lighting for the OAT gage, the magnetic compass, and the red light-emitting diode (LED) map light under the pilot yoke. A similar switch on the copilot control wheel activates only the red LED map light under the copilot yoke.

Figure 3-1. Interior Light Switches

Figure 3-2. Interior Light Intensity Rheostats

CABIN LIGHTS

The Baron G58 is equipped with rear seat overhead reading lights. The lights are controlled by a push on/push off switch, which is adjacent to the light (Figure 3-3).

Courtesy lights illuminate whenever the cabin doors are unlatched. The three right side cabin reading lights illuminate as courtesy lights whenever the forward or aft cabin doors are unlatched. A timer extinguishes the courtesy lights after 15 minutes.

Figure 3-3. Overhead Courtesy Lights

A step courtesy light is on the right fuselage (Figure 3-4). This light, controlled by a 15-minute timer, illuminates if the doors are unlatched.

Figure 3-4. Courtesy Step Light

EXTERIOR LIGHTING

LANDING LIGHTS

The G58 has landing lights that are in the engine nacelles (Figure 3-5).

Figure 3-5. Landing Lights

The landing lights are controlled by individual switch-type circuit breakers on the pilot subpanel. Operation of the landing lights for longer than 10 minutes on the ground should be avoided to prevent overheating the bulbs.

Use of landing lights is recommended during takeoff and landing to aid other pilots in seeing and avoiding your aircraft.

TAXI LIGHTS

The taxi light is on the nosewheel (Figure 3-6). The light is controlled by a switch-type circuit breaker on the pilot subpanel. The taxi light turns with the nosewheel but does not automatically turn off with gear retraction.

Figure 3-6. Taxi Light

WING ICE LIGHT

The wing ice inspection light is mounted in the left engine nacelle and illuminates the left wing leading edge (Figure 3-7). The light is controlled by a switch-type circuit breaker on the pilot subpanel.

Figure 3-7. Wing Ice Light

NAVIGATION LIGHTS

The navigation lights are on each wingtip and tail. The right wingtip has a green light, the left wingtip has a red light (Figure 3-8), and the tail has a white light.

Control of the navigation lights is accomplished by a switch-type circuit on the pilot subpanel. A vertical glareshield is on each wing to prevent the pilot from being blinded by the strobe lights. Two small holes are in each vertical glareshield: one for verification of strobe operation and the other to confirm navigation light operation.

BEACON LIGHTS

Two anticollision beacon lights are on the Baron G58 aircraft. One is on top of the vertical stabilizer and the other is on the belly of the fuselage. Control for the lights is provided by a switch-type circuit breaker on the pilot subpanel.

STROBE LIGHTS

The strobe lights are in each wing tip (Figure 3-8) and on the tail. The lights are controlled by a switch-type circuit breaker on the pilot subpanel.

Strobe lights should be left off when on the ground to prevent interference with pilots of other aircraft. It is also recommended that the strobe lights not be used in instrument or low-visibility conditions due to an increased chance of vertigo from strobe reflection off clouds, dense haze, fog, or dust.

Figure 3-8. Navigation and Strobe Lights

QUESTIONS

To answer the following questions, refer to your FlightSafety *Pilot Training Manual (PTM)*, *Pilot Training Checklist* and ground school notes:

1. Which lights illuminate when the cabin doors are opened?

2. How are the cockpit lights turned on and how is the intensity of the lights controlled?

3. What is the maximum recommended duration for use of the landing lights on the ground?

4. Where is the ice light located?

5. When should the strobe lights not be used?

6. After takeoff, how is the taxi light turned off?

CHAPTER 4
MASTER WARNING SYSTEM

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CHAPTER 4
MASTER WARNING SYSTEM

INTRODUCTION

This chapter describes the master warning system on the Baron G58 aircraft. For more information about the alerting system and annunciations, refer to the Garmin G1000 G58 Annunciations and Alerts Pilot's Guide supplied with the aircraft, or visit **http://www.garmin.com** to download a replacement copy.

GENERAL

Warning annunciators may be the first indication of malfunction in a system. Status indicators provide information helpful to the safe operation of the aircraft. The pilot should be aware of annunciator meanings and causes for illumination, as well as any necessary corrective action to be taken in the event of annunciator illumination.

ALERTING SYSTEM

The G1000 provides an ANNUNCIATION and an ALERTS window on the primary flight display (PFD) to inform the pilot of any warning, caution, or advisory alerts that may occur during the operation of the aircraft. The pilot should become familiar with all alerts and annunciations prior to operation of the aircraft.

ALERTING SYSTEM DISPLAYS

Whenever a malfunction occurs affecting a component that is monitored by the numerous sensors of the G1000, an appropriately colored alert message illuminates on the PFD. Depending on the malfunction, it may be accompanied by an aural warning tone.

When an alert occurs, a banner above the ALERTS softkey on the PFD assumes an appropriate label and color. A flashing red label appears for warning alerts, a flashing yellow label for caution alerts, and a flashing white label for advisory alerts. A continuous aural tone sounds for each warning alert until the pilot acknowledges the alert by pressing the softkey or corrects the triggered indication. The aural tone only sounds once for caution alerts and no pilot acknowledgement is required to silence the tone. No aural tone is provided for advisory alerts so the pilot must occasionally scan the alerts window for advisories.

PILOT ACTIONS DURING ALERTS

When the pilot recognizes an ALERT, the pilot first acknowledges the alert by pressing the softkey below the annunciation. This also cancels the continuous aural warning tone. When the ALERTS softkey is pressed twice, the appropriate annunciation displays in the ALERTS window. If more than one ALERT occurs, they display in order of priority (highest-priority items at the top of the list). Pressing the ALERTS softkey again displays the ALERTS window and a brief textual description of each ALERT. For guidance on how to appropriately respond to an ALERT, refer to the *Garmin G1000 Annunciations and Alerts Pilot's Guide* and the appropriate *Pilot's Operating Handbook Checklist*.

GFC 700 AFCS ALERTS AND ANNUNCIATORS

All autopilot status and malfunction annunciators display on the PFD in the AFCS System Status Field. Consult the *Garmin GFC 700 Pilot's Guide* for more detailed information concerning autopilot annunciators and alerts.

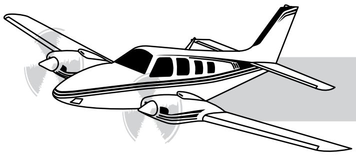
ANNUNCIATOR TESTING

Annunciator testing can be accomplished by pressing the red ANNUN TEST button on the lower left corner of the pilot subpanel. When the ANNUN TEST button is pressed, the landing gear and flap position indicators illuminate (Figure 4-1). Any bulb that does not illuminate during the test should be replaced prior to flight. The landing gear and flap annunciator lights should be tested before each flight and anytime that the integrity of a bulb is in question.

The intensity of the annunciators is controlled by a photoelectric cell on the pilot subpanel (Figure 4-2). Whenever the ambient light in the cockpit is low, the photoelectric cell automatically dims the intensity of all annunciators.

Figure 4-1. Annunciator Test Button

Figure 4-2. Photoelectric Cell



QUESTIONS

To answer the following questions, refer to the FlightSafety *Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. Where are caution and warning alerts displayed?

2. What must be done to silence the continuous aural tone associated with warning alerts?

3. How are the landing gear and flap annunciators dimmed?

CHAPTER 5
FUEL SYSTEM

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CHAPTER 5
FUEL SYSTEM

INTRODUCTION

A complete understanding of the fuel system is essential to safe and efficient operation of the aircraft. This section gives the pilot the information needed for competent and confident operation of the fuel system.

GENERAL

The Baron G58 fuel system supplies fuel to the engines during normal and emergency conditions. Fuel crossfeed lines make all fuel onboard available to either engine. The system is a gravity-fed system. Each wing tank has a quantity indicator to give the pilot indications of the amount of fuel in the tanks.

DESCRIPTION

The fuel system capacity is 200 gallons (194 usable gallons). The system is comprised of three interconnected rubber bladders in each wing to provide all usable fuel to either engine and a 14-gallon wet wing tip cell is added and interconnected to the bladder system.

Rubber bladder cells are susceptible to damage from improper fueling techniques. Observe fueling operations to ensure fuel filler nozzles are not inserted more than three inches into the filler port. If the aircraft is to be out of service for an extended period, fill the bladder cells to prevent them from drying out.

APPROVED FUELS

100LL (blue) and 100 (green) octane aviation fuels are approved for use in the G58 aircraft. If either of those is not available, use 115/145 (purple) octane fuel. Never use auto-gas, jet fuel, or 80 (red) octane fuel in the aircraft. Use of these fuels can cause engine detonation and failure.

COMPONENTS

FUEL BOOST PUMPS

Fuel boost pumps are in the main landing gear wheel wells and are controlled with the FUEL BOOST PUMP switches. The boost pumps increase the pressure in the fuel lines between the respective fuel tank and engine.

FUEL FILLERS

The standard fuel system incorporates a single filler in the leading edge of each wing. The optional system includes an additional filler in the wingtip (Figure 5-1) through which the system may be completely fueled. Due to the dihedral of the wing, the wingtip caps are higher than the leading edge caps. Always check the wingtip tanks for fuel first. If the wingtip tanks contain fuel, do not open the leading edge cap or fuel will exit from the opening.

Figure 5-1. Fuel Filler Ports

Inspect the fuel cap rubber O-rings for deterioration; if the O-rings are heavily cracked they should be replaced to prevent water from seeping into the tanks. A jet nozzle restrictor is in the filler openings to reduce the likelihood of misfueling the aircraft.

FUEL FLOW

Gravity forces the fuel to flow through the cells to the low point in the system. From the low point, the fuel flows into the fuel lines where some of the fuel flows to the fuel selector valve on the same side of the aircraft. The remainder of the fuel flows into the crossfeed line over to the opposite fuel selector valve for crossfeed operation. After passing through the fuel selector valve the fuel flows through the fuel strainer the engine-driven fuel pump, then is routed through the fuel flow transducer, fuel manifold valve and fuel injectors (Figure 5-2).

FUEL SELECTORS

A fuel selector valve for each wing tank system directs the flow of fuel from the wing tanks to the respective engine. The fuel selector valve receives fuel from two sources:

- Same side fuel tank through the normal supply line
- Opposite side fuel tank through the crossfeed line

Selector valve position is controlled by a selector control handle.

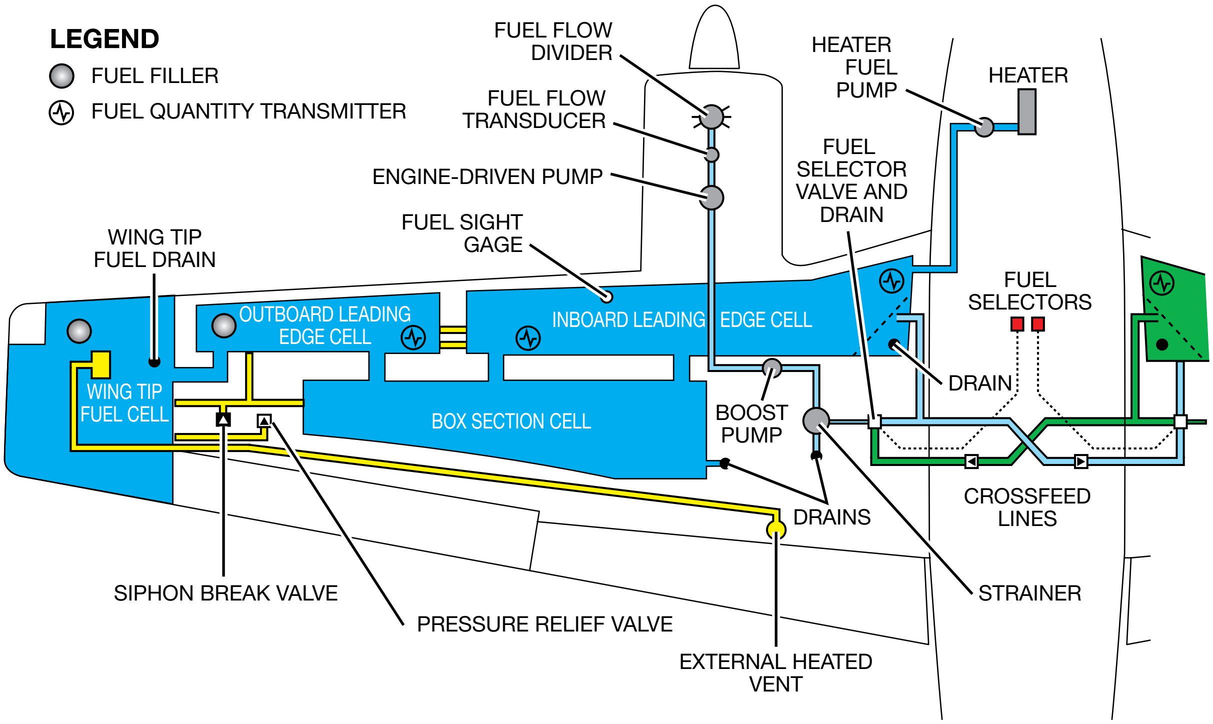


Figure 5-2. Baron G58 Fuel System

The minimum takeoff fuel requirements are stated on a placard on the fuel selector panel. The panel also shows a schematic of fuel flow.

FUEL VENTS

Each fuel tank is vented through an external, heated ram air fuel vent. The vent replaces consumed fuel with air to prevent the bladder cells from collapsing. A check valve prevents fuel from porting overboard through the vent line.

A pressure relief valve relieves excess pressure in the bladder cells due to fuel expansion by venting pressure overboard. A siphon break valve prevents the pressure relief valve from siphoning fuel overboard after relieving an overpressure condition. This vent may also prevent suction buildup in the tank if the normal vent line is not working.

Openings for these valves are on the underside of each wing. The ram air vent is forward of the flap near the wing root. The pressure relief and siphon break openings are near the wingtip. Visually check that all of the fuel vents and openings are free of obstructions prior to flight.

STRAINERS

A fuel strainer is in the forward section of each main landing gear wheel well. The strainer removes solid contaminants from fuel being supplied to the engine-driven fuel pump. A drain for the strainer is forward of the wheel well. The strainer should be cleaned every 100 hours.

DRAINS

Fuel drains are in the aircraft to remove water and sediment from the fuel system. The Baron G58 has 10 drains. The systems have snap-type drains in each wing near the fuselage for draining the inboard leading edge cell, as well as three flush-type drains around the main gear well for draining the box cell, the fuel selector, and fuel strainer (Figure 5-3). Flush-type drains near the wing tips for draining the wet wing tip cells (Figure 5-4).

Figure 5-3. Snap-Type Fuel Drain

Figure 5-4. Flush-Type Fuel Drain

To avoid damage to flush-mounted drains, do not push the fuel tester too far into the drain or they may be permanently damaged. All fuel drains should be drained prior to the first flight of each day and after each refueling.

CONTROL AND INDICATIONS

FUEL SELECTOR CONTROL HANDLE

A FUEL SELECTOR control handle on the cockpit floor controls selector valve position (Figure 5-5). The handle drives a cable connected to the valve in the wheel well. The handle has three positions: ON, OFF, and CROSSFEED.

Figure 5-5. Fuel Selector Panel

FUEL SIGHT GAGES

An external fuel sight gage is outboard of each engine nacelle (Figure 5-6). The gage is operated by a mechanical float and has a usable range of 40–60 gallons. The sight gages are helpful for partial fueling and should only be used when indicating within the calibrated range. If using the fuel sight gages during fueling, anticipate an approximate 5-gallon lag in quantity indications.

Figure 5-6. Fuel Sight Gage

FUEL QUANTITY INDICATORS

Each fuel tank system contains three fuel quantity transmitters. Floats in the tanks operate the transmitters to send an electrical signal to the GEA 71 unit. This information is then displayed on the default Engine page as a horizontal tape with pennants labeled "L" and "R" to indicate approximate fuel quantity in each wing (Figure 5-7).

The fuel tape indicates the approximate quantity of fuel in the tanks and should not be relied on as the sole source of fuel quantity information. Visually check the fuel level before flight and monitor fuel flow and operation time on the tanks to accurately determine the fuel quantity available.

The fuel quantity indicators read FULL until the quantity in the respective tank is below approximately 75 gallons, and then the respective pennants move, indicating fuel remaining. The fuel quantity indicators indicate values based on 150 gallons (75 gallons per side) or less. For example, the line in the middle of the tape display indicates half of 150 gallons, not half of the total fuel capacity. Therefore, when the indicators are positioned at the full tank index, the fuel quantity is 75 gallons, not half of the total usable fuel (97 gallons).

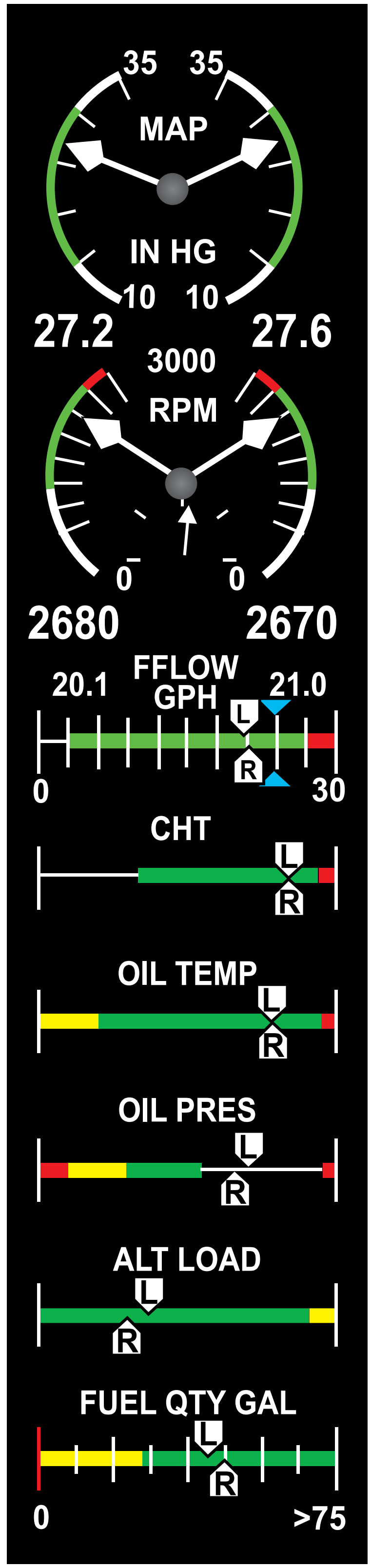


Figure 5-7. Fuel Quantity Indicators

FUEL BOOST PUMP SWITCHES

Individual three-position FUEL BOOST PUMP switches are on the pilot subpanel (Figure 5-8). Each switch has three positions: HI, LO, and OFF. The LO setting is recommended for operation in ambient temperatures above 32°C (90°F). The HI and LO positions perform the following functions:

- LO position:
  - Minor vapor purging
  - Increasing fuel flow
  - Crossfeeding fuel for one-engine inoperative operation
- HI position:
  - Normal start, priming
  - Extreme vapor purging
  - To provide fuel pressure in the event of engine-driven fuel pump failure

Figure 5-8. FUEL BOOST PUMP Switches

LIMITATIONS

- Usable fuel with full tanks:
  - 194 gallons
- Use only aviation-grade fuel. The accepted grades are:
  - 100LL
  - 100
  - 115/145 as an alternate
- Takeoff is prohibited with less than 13 gallons in either wing fuel tank or with either fuel quantity gage indicating in the yellow arc.
- Use the fuel crossfeed system during emergency conditions in level flight only.
- Slips are limited to a 30-second duration to avoid unporting the low points of the fuel tanks.

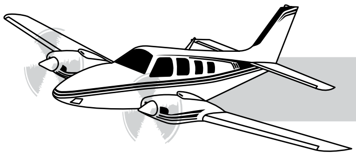
EMERGENCY/ ABNORMAL CROSSFEED

The fuel crossfeed system is used during emergency operations. Crossfeed lines connect the normal fuel supply lines so all usable fuel can be used by either engine. The system cannot transfer fuel from one tank to the other.

For crossfeed operation, the FUEL SELECTOR for the operating engine must be placed in the CROSSFEED position. The FUEL BOOST PUMP switch for the operating engine may also be turned to the LO position to help draw fuel out of the tank and through the crossfeed line.

Only use the crossfeed system during emergency conditions in level flight. If it is necessary to use crossfeed to complete the flight, enter crossfeed early enough to allow for approach and landing to be conducted with the FUEL SELECTOR in the ON (normal) position.

A crossfeed check during shutdown allows for dual crossfeed operation to prevent fuel stagnation in the crossfeed lines. Refer to the FlightSafety Training Checklist for the normal and emergency procedures concerning crossfeed.



QUESTIONS

To answer the following questions, refer to the FlightSafety *Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. State why a pilot should observe fueling operations.

2. What grades of fuel are acceptable for normal use in the aircraft?

3. How many fuel drains does the aircraft have and when should they be drained?

4. What precautions should be taken when draining the flush-mounted drains?

5. In what range is the FUEL SIGHT GAGE usable?

6. List the normal and emergency uses of the boost pumps.

7. When may the crossfeed system be used?

8. What is the purpose of the crossfeeding check conducted during shutdown?

9. What is the maximum slip duration?

10. What is the fuel capacity of your Baron G58 aircraft?

11. What is meant by usable and unusable fuel?

The information normally contained in this chapter is not applicable to this particular aircraft.

CHAPTER 7
POWERPLANT

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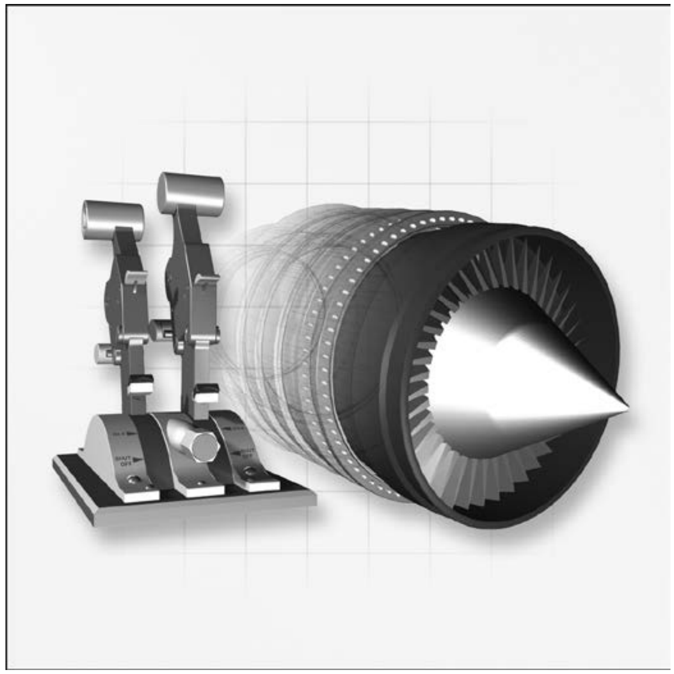
CHAPTER 7
POWERPLANT



INTRODUCTION

This chapter covers the engines on Baron G58 aircraft. A thorough knowledge of the powerplant is essential to good power management by the pilot. Operating within the parameters of the powerplant and propeller systems extends engine life and helps ensure safety. This section describes the basic components, limitations and checks of the engines and propellers.

GENERAL

The Baron G58 is equipped with two six-cylinder, air-cooled, fuel injected (Figure 7-1) Teledyne Continental IO-550-C engines, each rated at 300 horsepower.

These engines drive three-blade, constant-speed, full-feathering propellers. Each engine incorporates a dual magneto system for ignition, as well as a wet-sump, pressure-type lubrication system. The engine cowlings are equipped with mechanical cowl flaps to aid in cooling. Due to the IO-550-C manufacturing process, the engines may produce more than the rated horsepower when new. This may result in small, but noticeable, variations from published performance data, slightly higher fuel flows, and a slight increase in true airspeed.

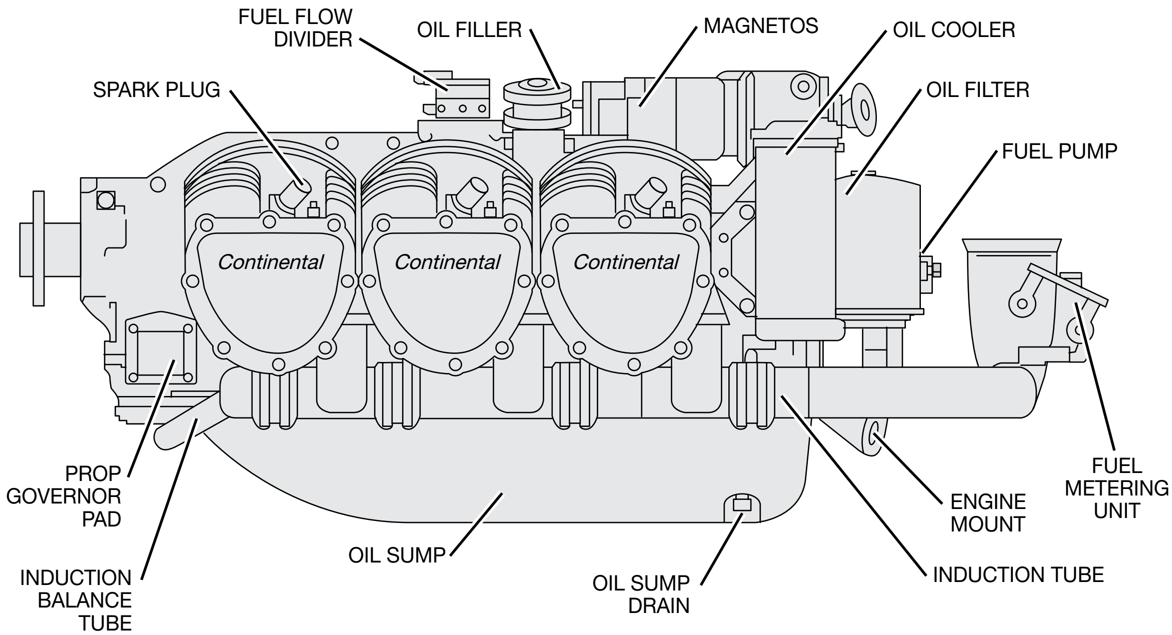


Figure 7-1. IO-550-C Engine

Engine nomenclature is as follows:

- I—Indicates the engine is fuel injected
- O—Indicates the cylinders are horizontally opposed
- 550—Indicates the cubic inches of piston displacement
- –C, –CB—Indicates configuration or application code

The recommended time between overhauls (TBO) is 1,700 hours.

INDUCTION AIR

Induction air is available to the engines from either filtered ram air or unfiltered alternate air. Filtered ram air enters the induction system through a scoop on the top of each engine nacelle (Figure 7-2). Directly below the inlet is an air filter that removes solid contaminants from the air before it enters the induction system. After the air filter, the induction air enters into the intake manifold.

If the intake or air filter become obstructed, a spring-loaded door in the alternate air intake (inside the nacelle) opens automatically. The engine then runs on unfiltered air drawn from inside the nacelle. There is no cockpit indication (i.e., annunciator or horn) to warn that the engine is running on the alternate air system. A small drop in manifold pressure occurs when operating on alternate induction air. This may be regained by advancing the throttle if throttle travel is available.

The amount of air the engine receives for combustion intake is controlled by a butterfly valve in the induction manifold. The valve is connected by a cable to the throttle control lever in the cockpit. By increasing or restricting the air available to the engine, the pilot controls power output. The air then enters into the cylinders to be mixed with fuel from the fuel injector nozzles to form a combustible mixture. Refer to Figure 7-3 for an illustration of the induction system air flow.

Figure 7-2. Induction Air Intake

EXHAUST AIR

After the combustion process, exhaust air is pushed out of the cylinders into the exhaust manifolds. The exhaust manifolds route the exhaust air overboard through the bottom of the nacelles aft of the cowl flaps.

FUEL INJECTION SYSTEM

DESCRIPTION

The G58 Baron is equipped with Teledyne Continental's position-tuned, fuel-injection system. Position-tuned fuel nozzles are calibrated to meter the amount of fuel proportionate to the amount of air being delivered to each cylinder (Figure 7-4).

The fuel injection system consists of:

- Engine-driven fuel pump
- Manual mixture control
- Various fuel delivery components

Fuel is supplied to the system by a sliding vane, positive-displacement engine-driven fuel pump. The pump assembly incorporates a bypass check valve for engine priming or engine-driven fuel pump failure and a swirl chamber with a vapor ejector and vapor return line to prevent cavitating of the pump. The pump supplies fuel to the metering unit (controlled by the throttle and mixture control position), the fuel flow divider, and the fuel nozzles. Moving the throttle control changes airflow and fuel flow in proportion by simultaneously adjusting the throttle butterfly valve and a rotary valve in the fuel metering unit.

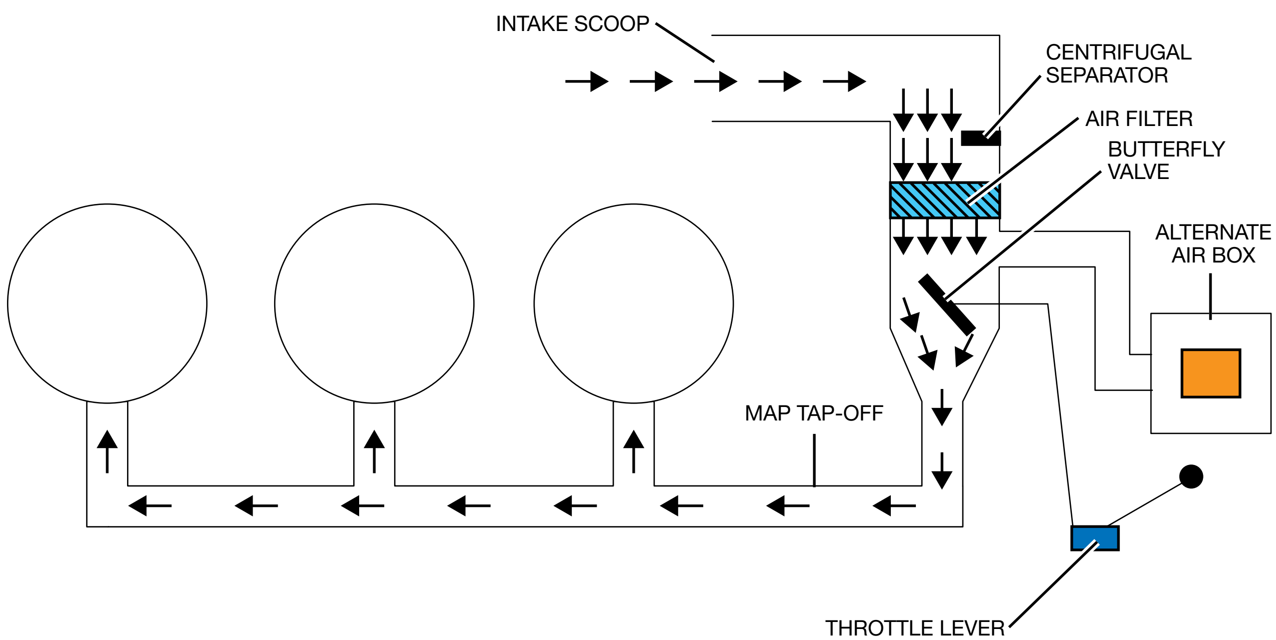


Figure 7-3. Induction System Airflow

COMPONENTS

Fuel Manifold Valve

Metered fuel from the fuel metering unit is supplied to a fuel manifold valve (divider) (Figure 7-5). This device is used to keep the fuel under pressure and evenly distribute it to each of the cylinders. Fuel pressure keeps the unit open to regulate fuel flow into the injector lines. When the mixture is brought to idle cut-off, the manifold valve closes, providing simultaneous cut-off of the fuel flow to all six cylinders.

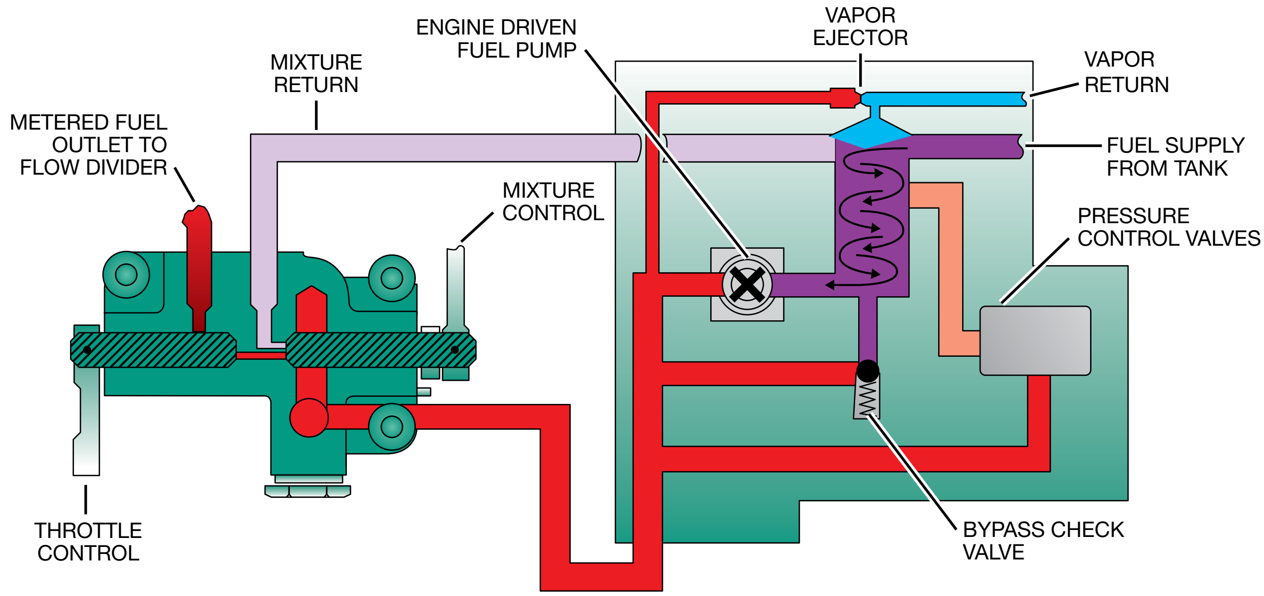


Figure 7-4. Continental Fuel Injection System

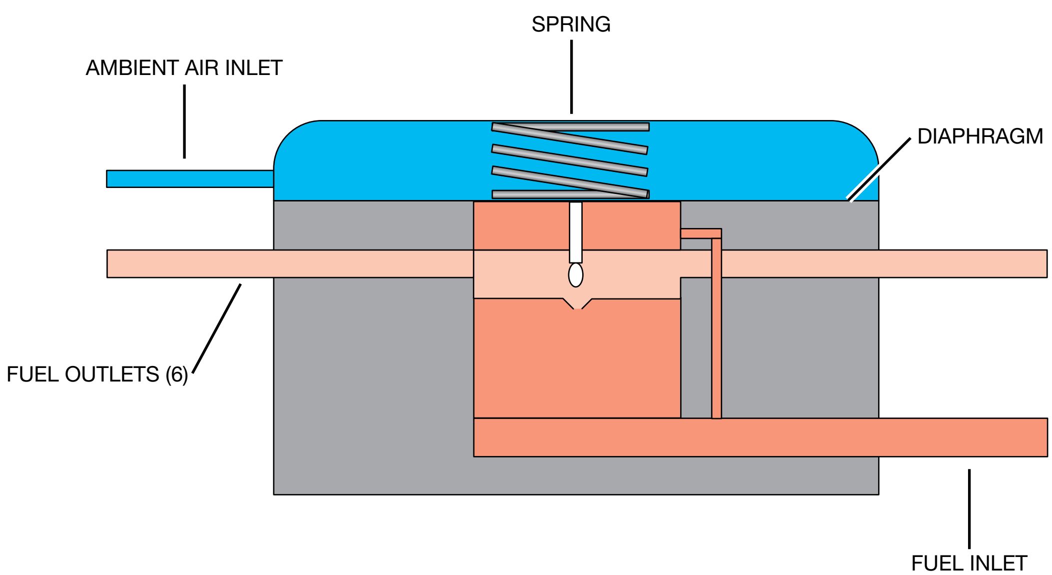


Figure 7-5. Fuel Flow Divider

Fuel Injector Nozzles

Fuel injector nozzles control the flow of fuel into each individual cylinder (Figure 7-6). The fuel injectors vaporize (atomize) the fuel as it enters the cylinders, which allows for more complete combustion of the fuel, resulting in greater engine efficiency.

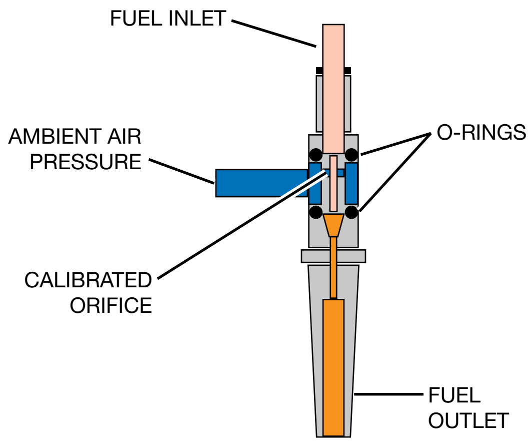


Figure 7-6. Fuel Injector

IGNITION SYSTEM

DESCRIPTION

The Baron G58 utilizes a dual ignition system (Figure 7-7) consisting of two engine-driven magnetos, each independent of the other. A dual magneto system provides redundancy and greater engine efficiency since each magneto fires a spark into each cylinder.

CONTROLS AND INDICATIONS

Magneto Start Switches

The Magneto start switches in the cockpit control the magnetos. When the switches are in the OFF position, the spark produced by the magneto is directed into the engine case through the P-lead. Magneto start switches are discussed in more detail in Chapter 2—"Electrical Power."

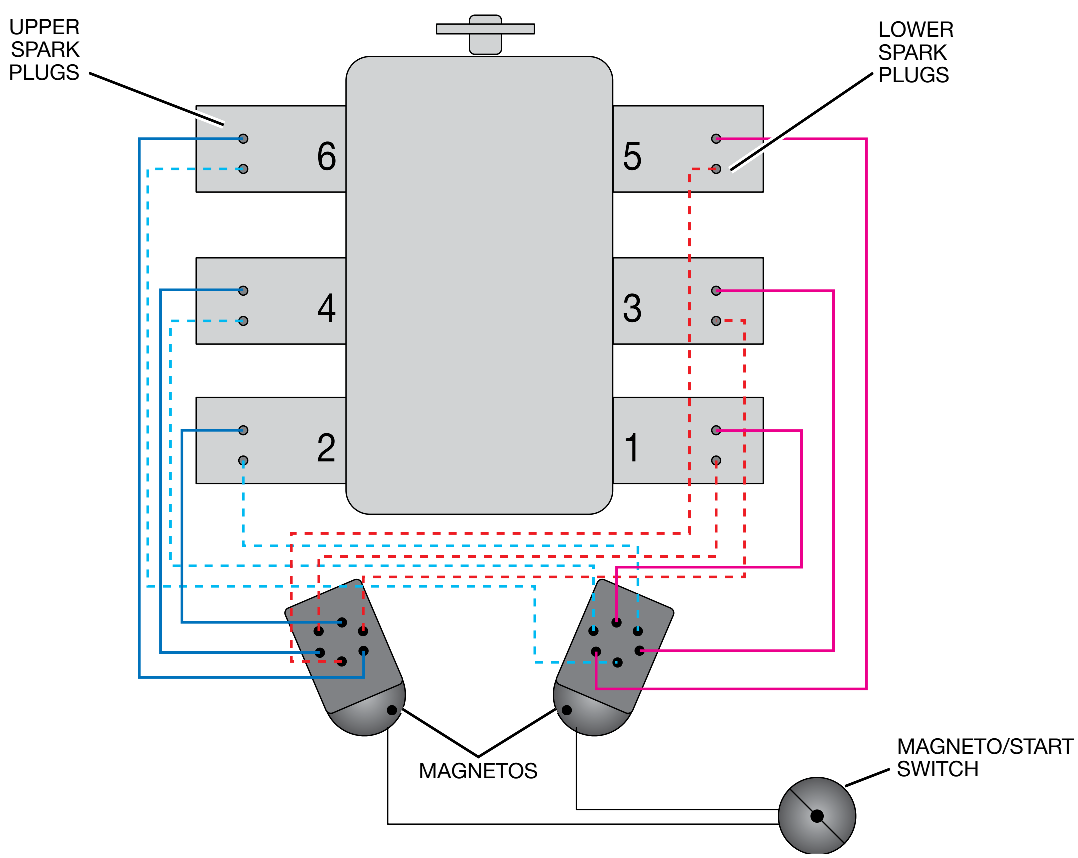


Figure 7-7. Ignition System

OPERATION

During normal operation, a spark is timed to occur before the piston reaches top dead center (TDC) to optimize engine efficiency. During startup, this advanced timing could cause the engine to "kickback," resulting in damage to the engine and starter. To make starting easier, the timing is delayed until the piston is at or near TDC, which reduces the risk of "kickback." When the engine starts, the timing returns to the normal setting.

During the engine runup, the magneto check evaluates the integrity of the magnetos, spark plugs, and P-leads. The maximum allowable rpm drop is 150 rpm per magneto. The magnetos on the same engine should be within 50 rpm of each other. If proper indications are not noted during the magneto check, maintenance should check the system prior to flight. Refer to the *FlightSafety Training Checklist* for engine start and runup procedures.

LUBRICATION SYSTEM

DESCRIPTION

Each engine contains a wet-sump, pressure-type lubrication system with a capacity of 12 quarts (Figure 7-8). An engine driven oil pump pushes oil from the sump to all of the components that use oil for operation. A pressure relief valve incorporated in the oil pump prevents excessive pressure by returning excess oil back to the sump. An externally mounted oil filter cleans the oil. Replace the oil filter at every oil change. If the filter becomes blocked, a bypass valve opens to allow oil flow into the engine.

Engine oil temperature is controlled by a thermostat/valve assembly (vernatherm), which routes oil either through or around the oil cooler. When the oil is cold, it bypasses the oil cooler and goes directly to the engine components. When the oil temperature reaches the setting

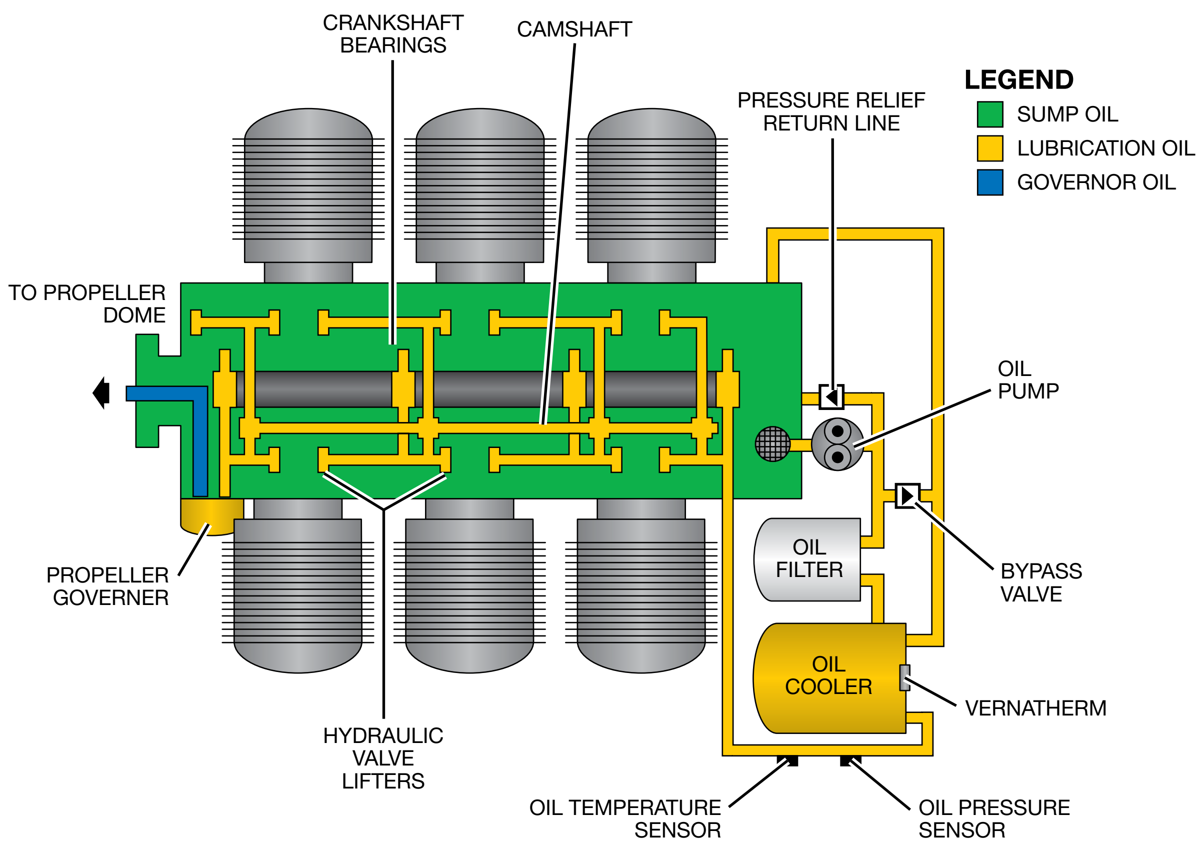


Figure 7-8. Lubrication System

of the vernatherm, oil is forced through the oil cooler. In the oil cooler, ambient air flows across the oil lines to dissipate heat from the oil before it is returned to the engine.

After leaving the cooler, the oil enters the crankcase where various passageways and channels direct it to the bearing surfaces and other areas requiring lubrication and cooling. The oil is also supplied from the sump to the propeller governor for propeller pitch control.

The oil temperature and pressure displays on the Engine pages provide the pilot with an indication of oil system conditions. A calibrated dipstick is attached to the oil filler cap to indicate the oil level in each sump. Occasionally wipe the inside of the oil filler cap and apply a moisture displacing lubricant to prevent corrosion. Refer to Section Eight of the *Pilot's Operating Handbook (POH)* for details concerning oil levels and servicing data.

ENGINES

DESCRIPTION

The engine indication system (EIS) displays all engine functions on the left side of the multifunction display (MFD). The EIS display is also on the primary flight display (PFD) when in operating in reversionary mode. The GEA 71 engine/airframe unit (GEA) receives data from various engine sensors and displays the associated values on the EIS.

The Default Engine page displays engine information vertically on the MFD with circular digital readouts for MAP and RPM and horizontal tape displays for all other vital engine information. If any measured parameter is not within acceptable limits, the indicator flashes repeatedly and changes to either yellow for caution indications or red for indications that exceed limits. The pilot then selects the Engine System page for more detailed information about the affected item. For more detailed information on the EIS, refer to the *Garmin G58 Engine Indication System Pilot's Guide*.

COMPONENTS

Cowl Flaps

The engine nacelles have mechanically operated cowl flaps.The cowl flaps can be opened to allow increased airflow through the engine nacelle for additional cooling.

Air cooling is accomplished by directing airflow through the engine nacelle. Airflow is directed through the nacelle and down through the cylinders by an arrangement of tightly sealed baffles. The volume of airflow is a factor of airspeed and cowl flap position.

The cowl flaps can be positioned fully open or fully closed with a lever in the cockpit. The lever is held in the desired position by mechanical detents.

CONTROLS AND INDICATIONS

Engine Controls

The Baron G58 engine controls are on the center pedestal (Figure 7-9). The controls are arranged from right to left and are:

- Mixture control knobs
- Propeller pitch control
- Throttle levers

Each lever has a distinctive tactile feel for ease of identification. An adjustable friction knob is provided to adjust tension of the levers.

Figure 7-9. Engine Controls

Manifold Pressure Gauge and Tachometer

Engine power output is measured by the manifold pressure gauge and tachometer. The manifold pressure gauge is sent information from an aneroid barometer that measures the air pressure in the induction manifold. When the engine is not running, ambient air pressure and the pressure in the induction manifold are the same, so the manifold pressure gauge indicates outside air pressure. A pressure tap-off line feeds directly into the GEA, which displays the information on the engine display. A green arc on the gauge marks normal operating manifold pressures. Manifold pressure values are in 5-inch increments.

Since the propeller is directly connected to the engine crankshaft, propeller and engine rpm are the same. Engine/propeller rpm is measured by a tach generator, then sent to the GEA to display on the EIS. A green arc on the gauge denotes the normal operating range for engine rpm. A red arc denotes maximum allowable engine rpm. The rpm displays in units of 10 below the gauge, and marks on the gauge denote 900, 1700, 2100, 2300, 2500, 2700, and 3000 rpm respectively.

Fuel Flow Gauge

The fuel flow indicator displays under the tachometer on the engine display. Two cyan pointers appear under the gauge and indicate proper fuel flow values for takeoff and climb when the power exceeds certain predefined parameters. The cyan pointer resets to the cruise climb schedule when propeller rpm is reduced during climb out. To reset the pointer for cruise climb, propeller rpm must be reduced below 2490 and then increased to 2500 while remaining below 2530 (refer to the *POH* for proper leaning procedures). Actual fuel flow displays in a digital readout in the upper right corner of the gauge.

Cylinder Head Temperature Gauge

The cylinder head temperature (CHT) gauge displays under the fuel flow indicator on the EIS. Cylinder temperatures provide the pilot a means to measure engine cooling. The number of the "hottest" cylinder displays on the indicator. Normal CHTs in cruise flight are approximately 150°–200°C. Maximum CHT is 238°C. Although there is no minimum CHT limit, it is preferable to indicate within the green band (116°C) for takeoff and to maintain constant CHT within the green band during flight. To display temperatures of all the cylinders, select the Lean Page from the EIS default page.

Oil Pressure and Temperature Gauges

The oil pressure and temperature indicators are on the EIS below the CHT indicator and can be used to monitor oil system integrity in flight. Minimum and maximum oil pressures are marked by red lines on the gauge. Although oil pressure within the yellow arc is permissible for ground operation, especially on hot days, indications below the green arc in flight could be an indication of developing engine problems. To ensure proper lubrication, the oil temperature should be above 24°C prior to operating the engine above 1200 rpm. Maximum oil temperature is 116°C. Normal oil temperatures in cruise flight are approximately 70°–82°C.

Exhaust Gas Temperature Gauge

The exhaust gas temperature (EGT) display on the EIS LEAN page is the pilot primary reference for leaning the mixture in flight. A bar graph displays EGT temperatures for each of the six cylinders in degrees Celsius. Utilize the ASSIST function in the leaning process by pressing the ASSIST softkey on the LEAN page of the MFD. The temperature in degrees Celsius of the first cylinder to peak displays under the bar graph and the respective cylinder number turns cyan in color. Above the bar graph, the "ΔPEAK" display indicates how many degrees Celsius below peak EGT the indicated cylinder is. Because proper leaning is important for engine life, follow leaning procedures according to the manufacturer's limitations in the *POH*.

OPERATION

Engine Management

For general operation procedures, refer to the *POH* and *FlightSafety Training Checklist*.

Engine Cooling

The Continental IO-550-C is an air-cooled engine; however, fuel and oil play an important part in regulating engine temperatures. Optimal engine performance can be attained through close monitoring and control of mixture settings and oil levels, as well as regulating airflow through the engine with the use of cowl flaps.

Air cooling is accomplished by directing airflow through the engine nacelle. Airflow is directed through the nacelle and down through the cylinders by an arrangement of tightly sealed baffles. The volume of airflow is a factor of airspeed and cowl flap position. The effects of engine cooling can be monitored by the pilot on the CHT gauge on the EIS. Open cowl flaps for ground operation and full power climbs to prevent engine "hot-spotting" or overheating. Close the cowl flaps for descent and landing to prevent overcooling. During cruise climb and cruise, position the cowl flaps as necessary to keep the CHTs relatively constant and within acceptable limits.

Mixture Control

Proper mixture control enhances engine performance, aids in engine cooling and reduces fuel consumption. The engine fuel/air ratio is controlled by the mixture control lever. Set the mixture per the *POH* for takeoff and climb.

A cyan pointer appears on the fuel flow indicator during takeoff and climb. Adjust the mixture as necessary to match the cyan pointers. Doing so ensures the mixture is appropriate for the specific pressure altitude. Position the throttles full forward during climbs at full power to ensure that adequate fuel supplies are present for cooling. In cruise flight, the engines are leaned in reference to peak exhaust gas temperatures. Peak EGT is the maximum temperature attained during the leaning process on any given cylinder. Using the LEAN ASSIST function on the MFD, peak EGT can easily be determined (Figure 7-10). It is the

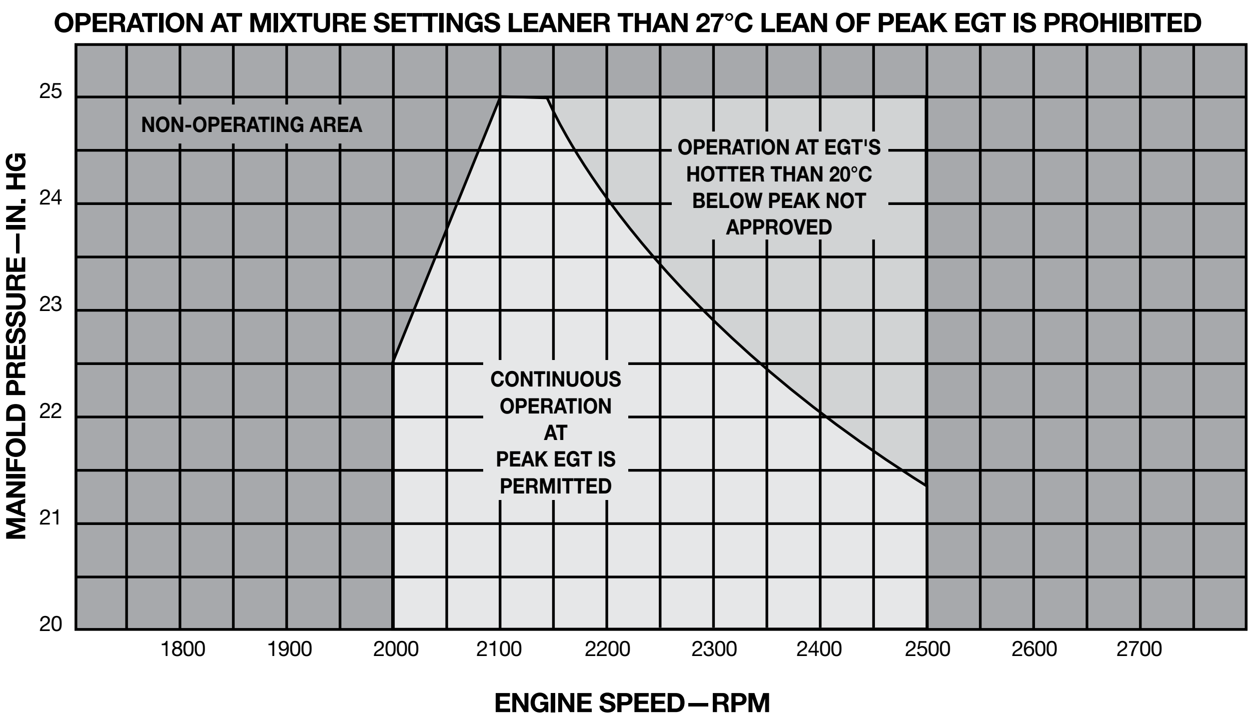


Figure 7-10. IO-550 Manifold Pressure vs. rpm

highest attainable exhaust gas temperature for the associated ambient temperature, air density and power setting (Figure 7-11). Once peak EGT is established, adjust the mixture, either lean or rich of peak, for the desired performance. Accomplish engine leaning in accordance with the Performance section of the *POH*. For changes in altitude and/or power settings, relean the mixture once cruise flight is re-established. The mixture may be ground leaned for ground operations to prevent an over-rich condition. This is most important at high-density altitude airports and after landing when the mixture is full rich and power settings are low. Engine combustion may cease if the mixture is not adjusted upon landing.

Engine Break-In

New engines, remanufactured engines, or engines with a "top overhaul" of one or more cylinders must be broken in correctly. When the cylinders are new, a cross-hatch pattern is etched on the interior surface of the cylinder walls.

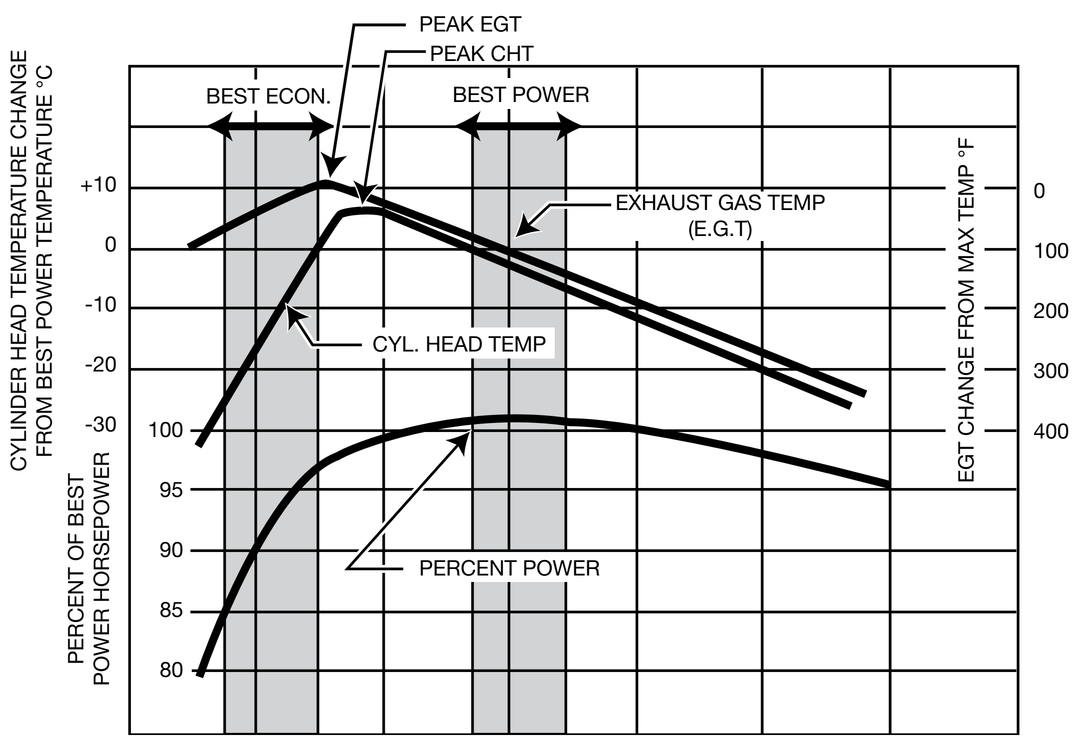


Figure 7-11. Power vs. Operating Temperature

During break-in, use mineral oil in the engine instead of the normal ashless dispersant oil because of its cleaning properties. High brake mean effective pressure (BMEP) or engine power forces the piston rings into contact with the cylinder wall cross-hatching (Figure 7-12).

The BMEP in the cylinder causes metal-to-metal contact between the rings and the cylinder walls. This contact eventually wears the piston rings smooth, creating a tight fit with the cylinder sleeve. Eventually, the cross-hatching fills with a combustion-produced varnish to provide a polished fit between the rings and cylinder walls.

If break-in is done properly, the engine should have low oil consumption and high compression. To ensure that break-in occurs properly, the engine must be run at high power settings to create the metal-to-metal contact needed. If the engine is "babied," proper break-in will not occur and the cylinders must be rehoned and the process started over to prevent high oil consumption and low compression throughout the shortened life of the engine. Break-in should be complete within 50 hours of engine operation. This is indicated by a stabilization of oil consumption. To ensure proper break-in, follow these rules:

1. Use a good quality mineral oil.
2. Change oil at recommended schedules.
3. Use full power for takeoff.
4. Cruise at high power settings.
5. Avoid long power off let-downs.
6. Avoid long ground running time.

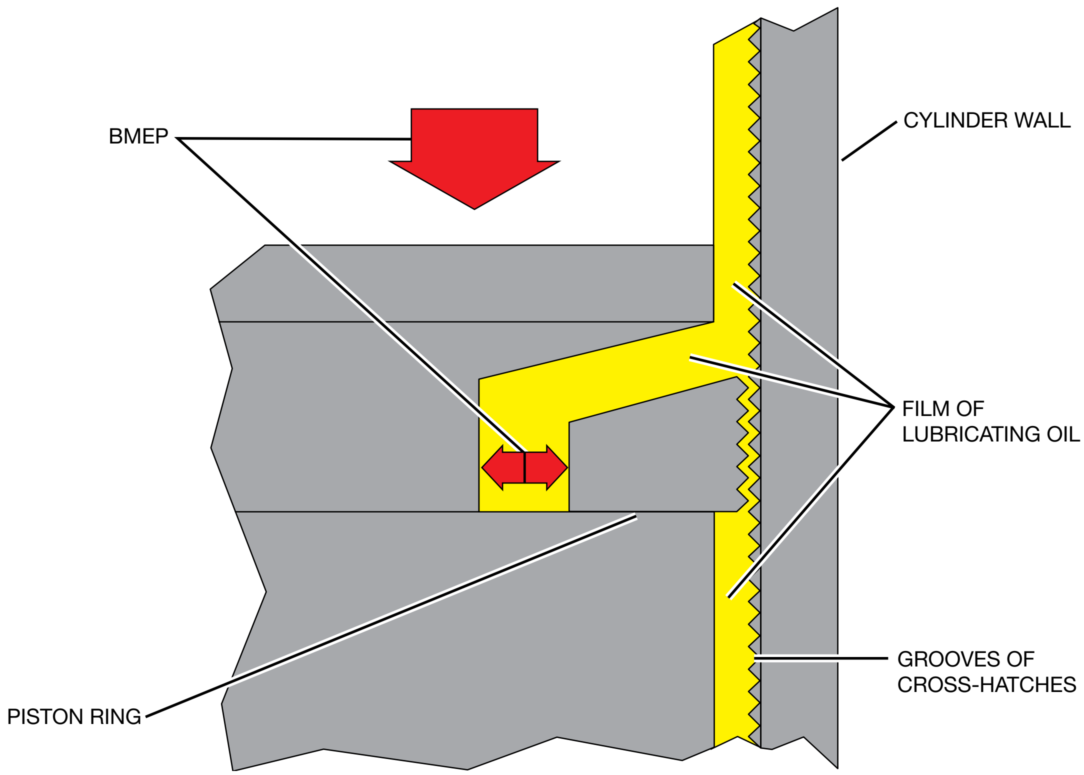


Figure 7-12. Engine Break-In

LIMITATIONS

Several operational precautions apply to the Baron G58 to prevent damage to the engine and associated equipment. Refer to the appropriate checklist for specific procedures and recommendations. Potential problems and solutions are described below.

Before Starting

Before starting, preheat the engines if the ambient air temperature is below 20°F. Thoroughly warm the oil in the engine sump, oil cooler, and propeller dome. Ensure that the proper grade of oil is used for the season.

Starting

When starting the engines, do not exceed the starter limitation of 30 seconds in a 4-minute period. Avoid backfires that could damage the air measuring system. Do not exceed 1200 rpm to prevent damage due to poor lubrication. Follow the starting procedure (see the FlightSafety Training Checklist).

After Starting (Warm-Up)

Do not exceed 1200 rpm until the oil temperature is above 24°C. "Ground lean" the mixture if necessary for high-density altitude operations. Leave the cowl flaps full open for adequate cooling.

Runup

Ensure that the oil temperature is above 24°C for operation above 1200 rpm. Advance the mixture to full rich before increasing rpm to 1700 rpm.

Takeoff

Set the mixture to the appropriate pressure altitude marking on the fuel flow gauge (cyan pointer). Open the cowl flaps. Although not required, the CHT should be within the green arc to prevent rapid heating. During power increase, pause at approximately 2000 rpm to ensure that all engine instrument indications are normal.

Climb

Adjust the mixture by referencing the pressure altitude markings on the fuel flow gauge (cyan pointer). Reduce power to cruise climb power at a safe altitude. Monitor CHT and adjust cowl flaps as necessary to maintain a constant temperature.

Cruise

Close the cowl flaps while accelerating to maintain a constant engine temperature. Do not exceed the leaning or power setting limitations.

Descent

Avoid large power reductions and keep the cowl flaps closed. The maximum recommended power reduction rate is 2 inches every 2 minutes. Observe maximum cooling rates to prevent engine overcooling. Use aircraft configuration (flaps and landing gear) to increase descent rate as necessary.

Landing

Leave the cowl flaps closed until on the ground and clear of the runway. Enrich the mixture to provide additional fuel in the event of a go-around. Increase the propeller to high rpm prior to touchdown.

After Landing

Ground lean the mixture if necessary. Open the cowl flaps fully for cooling during taxi.

Shutdown

Pull the mixture to idle cutoff to stop the engine and turn the magnetos off after the propeller stops rotating.

Piston Ring Flutter

Piston ring flutter can occur when insufficient manifold pressure is present to keep the piston rings firmly seated against the cylinder wall, which results in broken piston rings and early engine overhaul. Prevent this condition by avoiding low-power descents at high indicated airspeeds.

Detonation

Detonation occurs when the engine is run at excessive manifold pressure settings, excessive operating temperatures, excessively lean mixture settings, or if improper fuel grades are used. The result is a loss of engine power and/or engine damage. Avoid detonation by observing the manufacturer's limitations on power settings, leaning, engine temperatures, and fuel grades.

Crankshaft Counterweight Detuning

Crankshaft counterweight detuning can occur when crankshaft counterweights "jump" to a new position during abrupt power changes. Detuned counterweights create engine vibrations that lead to reduced engine life. Make all power changes smoothly and operate at the approved power and mixture settings to avoid counterweight detuning.

Thermal Shock

Thermal shock is the uneven expansion and contraction of engine parts due to rapid temperature changes. The result of thermal shock may be cracked cylinders, which causes early engine overhaul. Avoid rapid CHT changes, especially during descent, and observe temperature limitations to avoid thermal shock.

PROPELLERS

DESCRIPTION

The Baron G58 is equipped with constant-speed, fully feathering Hartzell three-bladed propellers (Figure 7-13).

Figure 7-13. Three-Bladed Propeller

COMPONENTS

Governors

The Baron G58 utilizes propeller governors to control propeller operation. A governor assembly (Figure 7-14) is on the forward left side of each engine and consists of:

- Oil pump
- Oil pressure pilot valve
- Set of centrifugal flyweights
- Opposing speeder spring

The governor assembly senses actual rpm through the centrifugal flyweights and desired rpm through the speeder spring. The pilot sets spring tension with the propeller control lever. The system then adjusts oil pressure in the propeller dome as necessary to maintain the desired rpm.

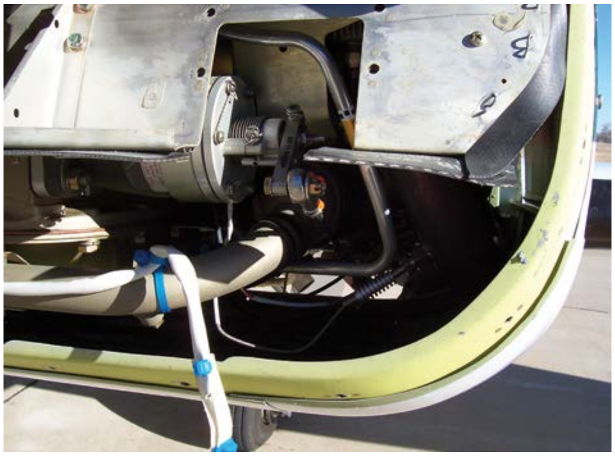


Figure 7-14. Propeller Governor

Feather Lock Pins

Oil pressure trapped in the propeller dome after engine shutdown gradually drains back into the engine sump. To prevent the propeller blades from going into feather due to the loss of oil pressure, feather lock pins are installed in the propeller hub. The feather lock pins save wear on the engine and starter during engine startup.

The pins engage at engine speeds less than 600–700 rpm and physically prevent the blades from moving into feather. At speeds greater than 700 rpm, centrifugal force disengages the lock pins and the propellers may be feathered.

To prevent wear on the feather lock pins, do not allow the rpm to fall below 1000 rpm during the propeller feather check. An engine failure that results in a reduction in rpm may eventually cause the lock pins to engage and prevent feathering. Attempt to restart a failed engine in a timely manner to ensure that the pilot can feather the propeller in the event the restart attempt fails.

Unfeathering Accumulators

Many Baron aircraft are equipped with unfeathering accumulators to facilitate an airstart. When airstart procedures are done correctly, unfeathering accumulators cause the propeller to windmill and turn the engine, which provides the fuel flow, airflow, and spark needed for combustion so the starter is not needed. The accumulator tanks are in the left, rear side of the engine nacelles (Figure 7-15).

Figure 7-15. Unfeathering Accumulator

The unfeathering accumulator system incorporates an oil reservoir divided by a piston (Figure 7-16). One side of the reservoir is filled with a dry nitrogen charge pressurized to 100 psi. The nitrogen charge is compressed by oil flow into the reservoir provided by the propeller governor. When the propeller is feathered, oil is trapped in the accumulator reservoir with the compressed nitrogen charge. When the propeller control lever is brought back out of the feather detent, the compressed nitrogen charge pushes the oil out of the reservoir into the propeller dome, causing the propeller to unfeather and windmill.

Unfeathering the propeller is not a guarantee that the engine will run. It must have the required ingredients for combustion. If the engine does not start and the propeller does not windmill greater than 700 rpm, the feather lock pins prevent refeathering of the propeller. Refer to the *FlightSafety Training Checklist* for airstart procedures.

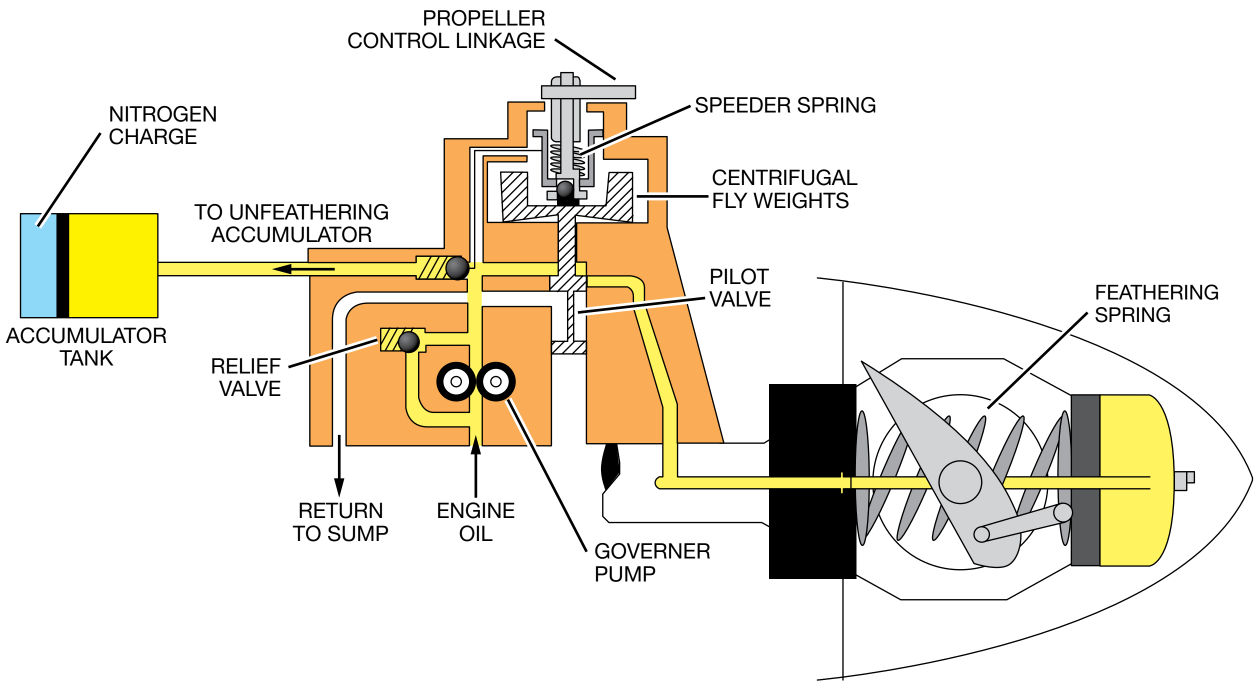


Figure 7-16. Unfeathering Accumulator System

Propeller Synchronizer, Synchrophaser, and Synchroscope

Use the synchronizer system to prevent the "throbbing" noise that is present when the propellers are spinning at different speeds.

A magnetic pickup in each propeller governor transmits signals to a control box. The control box then sends correction commands to the appropriate governor. The system range of authority is limited to approximately 25 rpm. To operate the system, turn on the PROP SYNC switch on the subpanel (Figure 7-17). Due to the limited authority of the system, the propellers must be manually adjusted to within 25 rpm of each other for the system to synchronize the propellers.

A propeller synchroscope displays as a pointer inside the propeller tachometer and points to the engine rotating at the slower rpm.

Figure 7-17. Propeller Synchronizer Switch

OPERATION

The governor assembly controls propeller rpm through a pitch change mechanism in the propeller dome. The pitch change mechanism consists of a moveable piston connected to the propeller blades, a feathering spring, and a compressed nitrogen charge. Check the nitrogen charge every 100 hours of engine operation. Refer to the *POH* for propeller servicing information. Refer to Figure 7-18 for an illustration of the propeller and governing systems.

To maintain a set rpm, the governor assembly changes oil pressure in the pitch change mechanism. This affects propeller blade angle and increases or decreases propeller speed to the desired rpm. The propellers are driven to low pitch (high rpm) by oil pressure and to high pitch (low rpm) by the feathering spring and nitrogen charge.

When the propellers are "on speed," an equilibrium state is present in the system and propeller blade angle remains constant to maintain the set rpm. If the propellers are turning slower than the desired rpm, the governor corrects for the underspeed condition by increasing oil pressure in the propeller dome. This drives the propeller blades to a lower pitch causing an increase in rpm. If the propellers are turning faster than the desired rpm, the governor corrects for the overspeed condition by decreasing oil pressure in the propeller dome. The reduction of oil pressure in the dome causes the feathering spring (and nitrogen charge) to increase the propeller blade angle and reduce the rpm.

The governor mechanism range of control is between 2000 and 2700 rpm. The combination of engine power and airspeed must be great enough to rotate the propellers within this range for the governing mechanism to have any effect. When the combination of airspeed and power cause the propellers to spin below the "governing range," the propeller blades come against the mechanical low pitch stops and propeller rpm is controlled by throttle position. Because of this, if power and airspeed are correct on final approach, the propeller levers may be pushed full forward prior to landing without an increase in rpm.

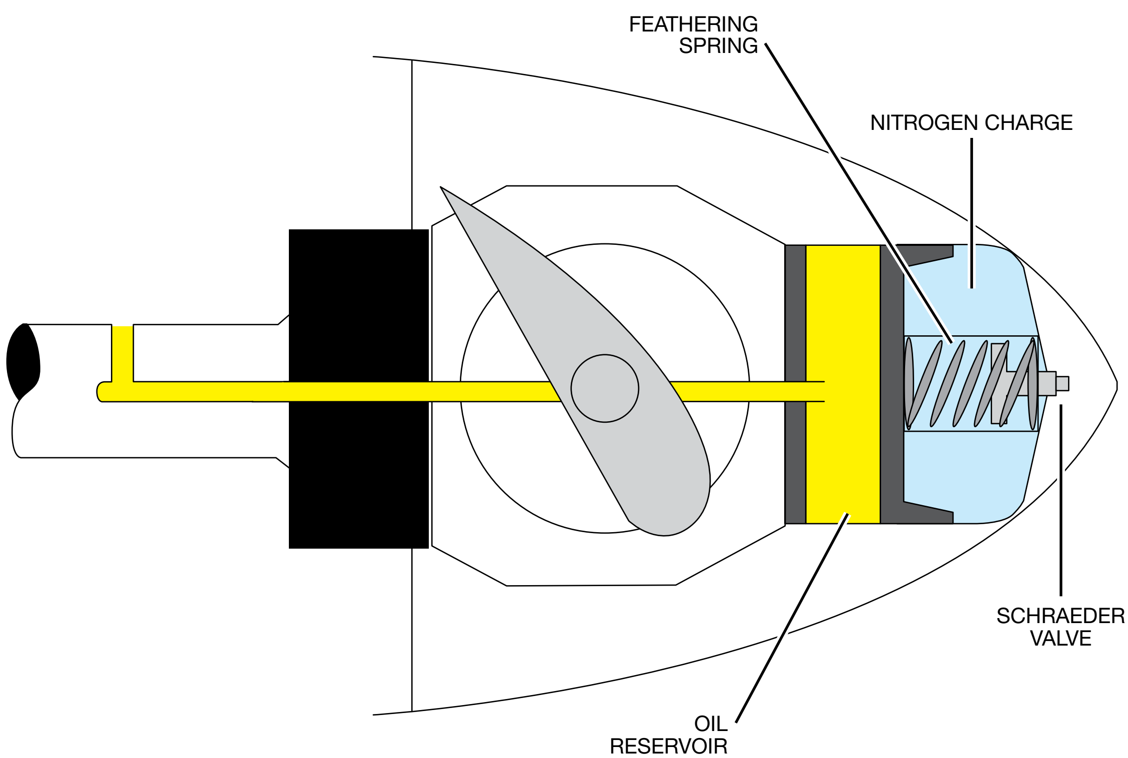


Figure 7-18. Hartzell Propeller System

The propellers are feathered by moving the propeller control lever aft, past a mechanical detent, and into the feathered position. The mechanical detent warns the pilot that the propeller lever is about to be moved into the feather position. When the lever is moved into the feather position, normal governor operation is overridden and the governor causes all the oil in the propeller dome to return to the engine sump. Due to the loss of oil pressure in the dome, the feathering spring (and nitrogen charge) moves the propeller blades into the feathered position. This position reduces propeller parasite drag in the event of an engine failure.

Maintenance Considerations

Check the *POH* handling and servicing section for detailed information about maintenance of the propellers. Check for nicks or scratches in the propeller blades during preflight inspection. The leading edges, near the propeller tips, are most vulnerable to damage that can cause propeller failure in flight. Small nicks can be filed out by a mechanic before they become dangerous.

If preheating the engine, direct preheat air on the propeller dome to warm the oil in the pitch-change mechanism. Beechcraft also recommends cycling the propeller rpm occasionally when flying in cold outside air temperatures to prevent oil trapped in the propeller dome from congealing.

Check propeller feathering at 1500 rpm during engine runup to ensure proper operation of the system. Do not allow more than a 300 rpm drop to prevent excessive stress on the engine. Check propeller governor operation at 2200 rpm by placing the propeller control levers at the detent and allowing the rpm to stabilize at 2000 rpm. Refer to the *POH* for preflight and warm-up procedures.

The Baron engines are certified for continuous operation with the propeller in the highest rpm setting. However, there are recommendations on the allowable engine power settings for a given propeller rpm. Refer to the Manifold Pressure versus RPM chart in the Performance section of the *POH* for these limitations.

Aircraft noise is due, in large part, to the speed of the propeller blade tips, which may approach or exceed the speed of sound (especially on longer, two-bladed props). Reducing propeller rpm can significantly reduce aircraft noise, which is often a consideration when flying in urban areas. Use discretion when reducing engine rpm after takeoff within the limits of operational safety to reduce noise when flying over residential or recreational areas.

QUESTIONS

To answer the following questions, refer to the FlightSafety *Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

ENGINES

1. What happens if the induction air filter becomes obstructed?

2. What is the minimum oil temperature for runup?

3. What are the starter duty limits?

4. Below what OAT is an engine preheat required?

5. What is the oil capacity for your engines?

6. What is the primary reference for leaning the mixtures?

7. Beyond what point should the mixtures not be leaned and why?

8. What is the minimum power setting for descent? Why?

9. Describe the procedure for engine break-in.

10. What are the acceptable magneto check drops?

11. To provide full cooling during takeoff, what two things need to be done?

12. What conditions may cause engine damage during startup?

13. How can you determine acceptable combinations of manifold pressure and rpm?

14. How can you avoid thermal shock?

PROPELLERS

1. What does the governor use to control propeller rpm?

2. What force moves the propeller blades to low pitch?

3. What is the propeller's governing range?

4. How is the propeller feathered and why?

5. What is the purpose of unfeathering accumulators?

6. What should be done about serious nicks or scratches found on the propeller blades during preflight?

7. What is the maximum rpm drop allowed during the runup feather check? Why?

8. When must the propeller synchronizer system be turned off?

9. When must power be reduced after takeoff?

CHAPTER 8
FIRE PROTECTION

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CHAPTER 8
FIRE PROTECTION

INTRODUCTION

The Baron G58 aircraft does not incorporate fire detection or extinguishing equipment in the engine nacelles. The aircraft may have a portable hand-held extinguisher in the cockpit. This chapter details smoke removal procedures in the event of a cabin fire.

DESCRIPTION

CABIN FIRE EXTINGUISHER

The fire extinguisher for the Baron G58 is between the spars in a quick-release locking bracket (Figure 8-1).

The fire extinguisher is a halon type and should be inspected periodically to ensure proper charging.

CABIN SMOKE REMOVAL

In the event that the cabin has filled with smoke or it is necessary to ventilate toxic fumes from the cabin, the cabin may be ventilated as follows:

- Always ensure that the fire is completely out before beginning ventilation procedures. Failure to do so may worsen the fire, as drafts may cause smoldering material to recombust.
- Fully open the overhead and floor ducting systems to increase airflow through the cabin. The pilot storm window may also be opened for additional ventilation.
- Operate the ventilation blower or air-conditioning blowers (if installed).
- If these procedures are not sufficient, unlatch the forward cabin door.
- Use oxygen as necessary if available.

Figure 8-1. Portable Fire Extinguisher

QUESTIONS

To answer the following questions, refer to the *FlightSafety Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. Does the aircraft have a portable fire extinguisher? If so, where is it located?

2. What should be done if the fire extinguisher has been discharged within the cabin?

3. How is smoke or toxic fumes removed from the cabin?

CHAPTER 9
PNEUMATICS

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CHAPTER 9
PNEUMATICS

INTRODUCTION

This chapter describes the aircraft pneumatic system, which powers the in-flight operation of the wing leading-edge deice system. Understanding the proper operation and interpretation of the indications of these systems helps the pilot control the aircraft in inclement flight conditions. This chapter identifies systems that use pneumatic air for operation, pneumatic air sources, and proper pneumatic system operation.

GENERAL

The Baron G58 pneumatic pressure system is supplied with air from engine-driven pressure pumps. Pneumatic air pressure, regulated by pressure relief valves, is used to operate the surface deice system. An analog pressure gage is provided for monitoring the system during normal and icing operations.

COMPONENTS

PNEUMATIC PUMPS

Two dry-air, carbon-vane type pumps supply pressure for the pneumatic system (Figure 9-1). Each pump is gear-driven by its respective engine. Each pump draws air into the system through a filter on the top of each engine and then pressurizes the air for pneumatic system operation.

Either pump may provide sufficient air pressure for normal system operation.

The GEA 71 unit monitors output from both pumps. In the event of pump failure, the unit triggers a primary flight display (PFD) warning/alert message to inform the pilot of the associated failure.

As the carbon-vane impeller rotates, carbon dust is created and acts as a lubricant for the pump. However, large amounts of carbon dust in the system could impair the proper operation of system components.

To prevent carbon dust from contaminating the system, two filters (one for each pump) are just downstream of the pressure regulators (Figure 9-1).

Carbon dust may be present on the aft part of each engine nacelle after engine operation, especially when the pumps are new. Most of the air and dust produced by the pumps is expelled by the first of two in-line pressure regulators.

DISTRIBUTION

Pneumatic air pressure from both pumps is routed to a common manifold in the fuselage (Figure 9-1).

Check valves are at each inlet of the manifold to prevent a loss of system pressure through the pneumatic plumbing of the opposite engine should an engine failure occur.

Two pneumatic lines, one on each side of the manifold, are used by the GEA 71 to sense pump output. As pressurized air travels through the manifold, a venturi (vacuum) is created in each of these two lines (Figure 9-1).

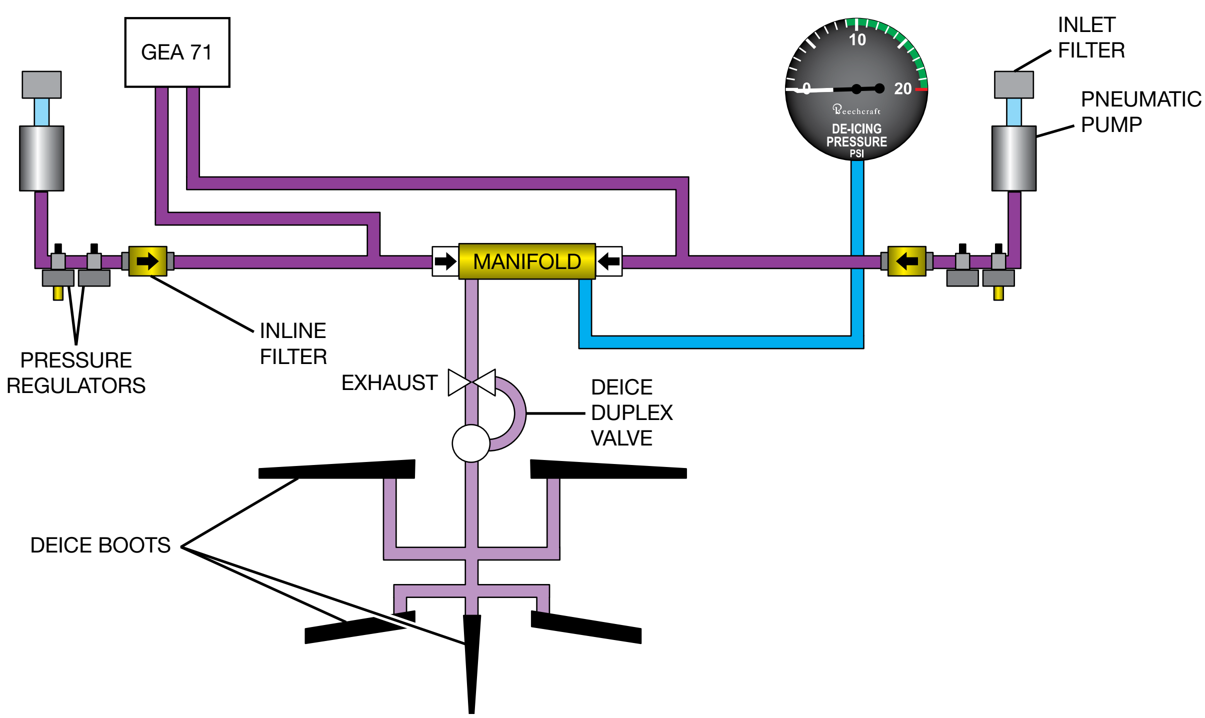


Figure 9-1. Baron Pneumatic System

In the event that pneumatic pressure is lost (during a pump failure), the suction being created by pneumatic air moving through the manifold is lost. This loss in suction alerts the GEA 71 to trigger a PFD warning to alert the pilot.

The common manifold routes pneumatic air pressure to the deice duplex valve for operation of the deice boots.

REGULATORS

Regulators are downstream of the pumps in the engine nacelles to control pneumatic system pressure (Figure 9-1).

Aircraft without deice boots utilize a single-stage relief valve to regulate normal system pressure at approximately 5.5 psi.

In aircraft equipped with deice boots, a two-stage relief valve controls system pressure as follows:

- A low-pressure regulator regulates normal pressure at approximately 5.5 psi.
- A high-pressure regulator sets system pressure at approximately 18 psi for deice boot inflation.

The low-pressure regulators are held closed by electric solenoids when high pressure is required.

CONTROLS AND INDICATIONS

DE-ICING PRESSURE GAGE

The DE-ICING PRESSURE gage monitors pneumatic system pressure (Figure 9-2). Normal system pressure is approximately 5–8 psi. A green arc between 9 and 20 psi indicates system pressure during deice boot operation.

When this system is in operation, the system pressure should be boosted to approximately 18 psi. Maximum pneumatic pressure is 20 psi, indicated by a red line on the deice pressure gage.

Figure 9-2. DE-ICING PRESSURE Gage

QUESTIONS

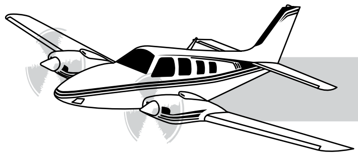
To answer the following questions, refer to the FlightSafety Pilot Training Manual, Pilot Training Checklist, and ground school notes:

1. Which aircraft system utilizes the pneumatic air pressure?

2. What is the indication of a failed pneumatic pump?

3. How will the failure of one pump affect the system?

4. State the normal operating pressure of the pneumatic system.



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ICE AND FIRE PROTECTION

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ICE AND RAIN PROTECTION

INTRODUCTION

This chapter describes the ice- and rain-protection system on the Baron G58. Flight into icing conditions requires knowledge of conditions conducive to icing, and the anti-ice and deice systems available to prevent excessive ice from forming on the aircraft. This chapter discusses the ice-protection equipment on the Baron G58, as well as normal and emergency procedures for operation of the equipment.

GENERAL

The Baron G58 is approved for flight into icing conditions as defined in FAR Part 25, Appendix C. This approval does not include flight into freezing rain, freezing drizzle, or severe ice. Flight into known icing conditions is permitted only when all the required equipment is installed and operational.

The equipment required is listed in the *Pilot's Operating Handbook* in the Limitations section under the heading Required Equipment for Various Conditions of Flight or Kinds of Operations Equipment List.

ICE-PROTECTION SYSTEMS

Ice-protection equipment includes deice and anti-ice systems:

- Deice system—Removes ice after it has accumulated on the aircraft
- Anti-ice systems—Prevent or limit the formation of ice; should be turned on prior to entering icing conditions

SURFACE DEICE SYSTEM

The surface deice system is made up of deice boots that inflate by pressure from the pneumatic system (Figure 10-1). Boots are on the following flight surfaces:

- Leading edges of the wings inboard and outboard of the engine nacelles (Figure 10-2)
- Horizontal stabilizer
- Vertical stabilizer

A SURFACE deice switch is on the pilot ICING subpanel (Figure 10-3). The three-position toggle switch is spring-loaded to the OFF position. When the switch is in the AUTO position, electrical power is used to engage a solenoid attached to the low-pressure regulator, which prevents the regulator from opening. High-pressure air is then directed through the 18-psi regulator. At the same time, an electric solenoid changes the position of the duplex valve, which routes the high-pressure air to the boots for inflation.

The boots automatically deflate after a 12-second timer has elapsed. Electrical power is removed from the low-pressure regulator and duplex valve solenoids, allowing the regulator to reopen and vent excess pneumatic air. This also returns the duplex valve to its normal position.

The boots may be inflated in either manual or automatic mode. When the SURFACE deice switch is in the AUTO position, the boots inflate for 12 seconds, then automatically deflate and return to the vacuum hold-down condition.

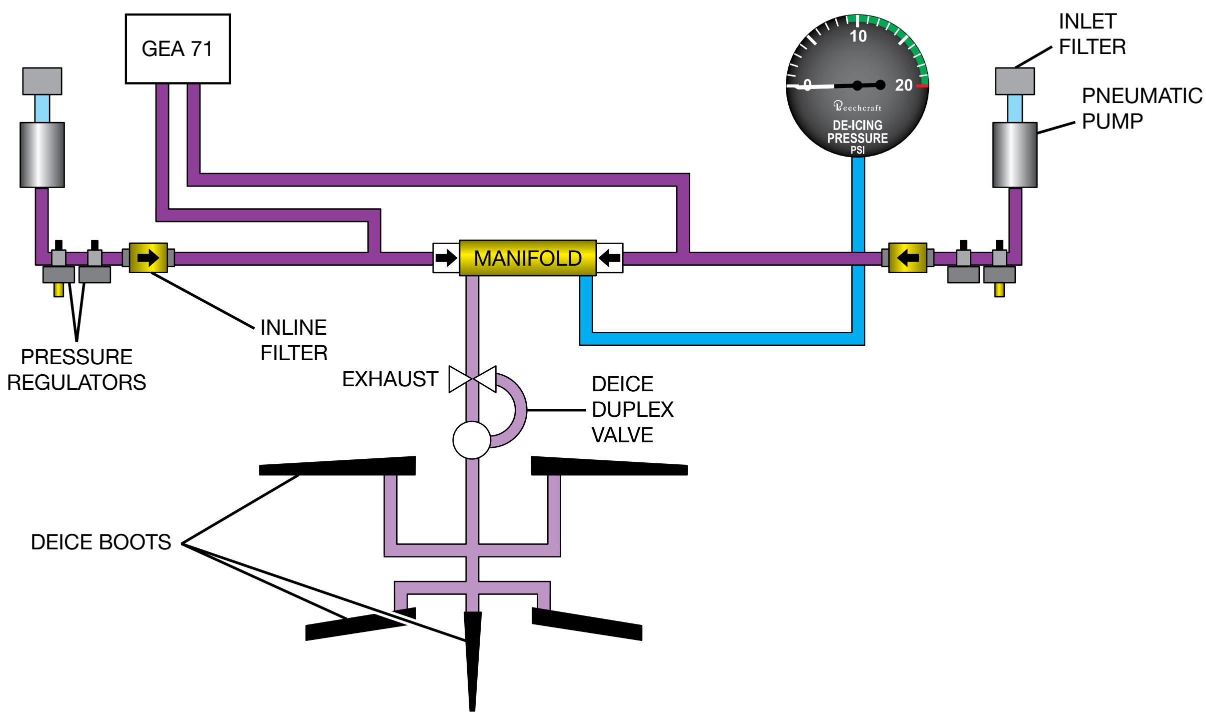

Figure 10-1. Baron Pneumatic System

10 ICE AND RAIN PROTECTION

Figure 10-2. Wing Deice Boots

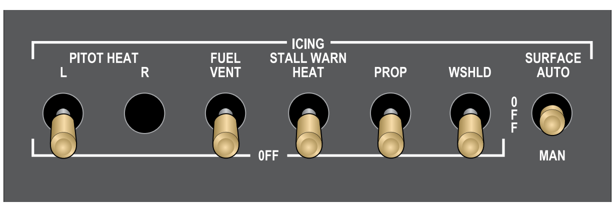

Figure 10-3. Ice Protection Switches

The switch must be operated for each complete cycle of the boots. The MAN position is used if the pilot wishes to bypass the timer or if the automatic system is inoperative. In the MAN position, the boots inflate only as long as the switch is engaged. When the switch is released, the boots deflate. It is recommended that the switch be held in the MAN position for no longer than 8 seconds to prevent a “bridge” of ice from forming around the inflated boots.

The deice boots remove ice after it has accumulated on the aircraft, rather than preventing its formation. Best results are obtained by waiting until at least 1/2–1 inch of ice accumulates prior to operation of the system. If the boots are operated too frequently or before sufficient ice has formed, the ice may stretch and form a bridge around the inflated boots, preventing proper removal of the ice.

The boots should never be operated at outside air temperatures lower than –40°C (–40°F) to prevent permanent damage to the boots. Maintain at least 130 KIAS when flying in icing conditions to prevent ice from forming on the underside of the wing where there is no ice protection. The deice boots should be checked during the walkaround for obvious damage such as cuts, nicks, or cracks.

Refer to the *FlightSafety Training Checklist* for the surface deice system preflight operational check and emergency procedures.

ELECTROTHERMAL WINDSHIELD ANTI-ICE

The electrothermal windshield anti-ice system prevents ice accumulation on a section of the windscreen. The "hot patch" conforms to the contour of the windshield and is in the center of the windshield (Figure 10-4). The windshield heating element is controlled by a two-position, toggle-switch-type WSHLD circuit breaker on the pilot ICING subpanel (see Figure 10-3). With the switch on (up), the temperature of the hot patch is maintained between 90°F and 110°F by an automatic temperature controller.

Figure 10-4. Electrothermal Windshield Hot Patch

The windshield heat system prevents the formation of ice and should be turned on prior to entering icing conditions. The system may be used continuously in flight, but it should not be used for longer than 10 minutes on the ground to prevent windshield damage. Operation of the hot patch may be confirmed by feeling the windshield for warmth and observing an increase in electrical load when the system is turned on.

Failure of the windshield heat system is evidenced by the formation of ice on the windscreen and a drop in electrical load.

The magnetic compass is erratic when the windshield heat is in operation. If the magnetic compass is to be used for navigation, turn the windshield heat off and wait at least 15 seconds for the compass to stabilize before using it for navigation.

Refer to the *FlightSafety Training Checklist* for the windshield heat operational preflight check and for procedures to achieve maximum defrosting with the heater.

ELECTROTHERMAL PROPELLER DEICE

Ice on the propeller blades is removed by electrically heated deice boots bonded to each propeller blade.

Operation of the propeller deice system is controlled by a two-position, toggle-switch-type PROP circuit breaker on the pilot ICING subpanel (see Figure 10-3).

Electrical power is transmitted to the blade elements through a brush block and slip-ring assembly at the rear of the propeller spinner. When the propeller brush blocks are replaced, they should be allowed to "wear in" for approximately 5 hours of engine operation prior to system operation. This prevents pitting of the slip rings due to electrical arcing.

A PROP AMPS deice ammeter (Figure 10-5) is in the cockpit to monitor system operation. When the system is on, the ammeter reads between 14 and 18 amps, which is indicated by the green arc on the gage.

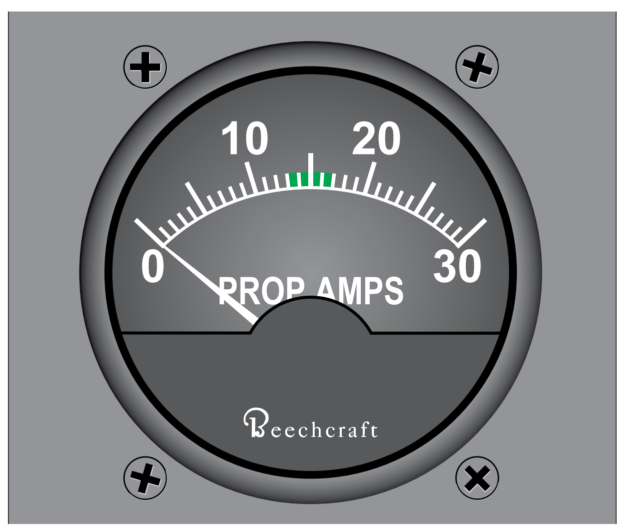

Figure 10-5. Propeller Ammeter

10 ICE AND RAIN PROTECTION

The propeller deice system, when activated, begins operating first on the right propeller for 90 seconds, then shifts operation to the left propeller for 90 seconds. As power is redirected from the right propeller to the left propeller, a slight fluctuation may be noticed on the PROP AMPS deice ammeter.

The propeller deice system may be turned on prior to takeoff and operated continuously in flight. The system functions automatically until turned off. Slight propeller imbalances due to irregular ice throw-off may be relieved by making small changes in rpm. The heating elements need airflow across them to keep from overheating. The propellers need to be turning to prevent slip-ring damage due to electrical arcing. For these reasons, do not operate the propeller deice system unless the propellers are turning.

Prop deice ammeter indications above or below the green arc indicate a malfunction in the system.

Refer to the *FlightSafety Training Checklist* for propeller heat preflight and emergency procedures.

PITOT HEAT

The pitot heat anti-ice system consists of an electrically heated pitot mast. The pitot mast contains internal heating elements that are activated by a switch-type circuit breaker on the pilot subpanel.

Operation of the system can be confirmed by observing an increase in electrical load when the system is on. Ground use of the pitot heat should be limited to 10 minutes to protect the heating elements. Continuous in-flight use of the pitot heat is permitted. The pitot heat should be turned on prior to flight in visible moisture.

Refer to the *FlightSafety Training Checklist* for the pitot heat preflight operational check.

FUEL VENT HEAT

The fuel vent anti-ice system electrically heats the externally mounted ram-air fuel vents. Electrical power is supplied to the heating elements of the externally mounted ram-air fuel vents through a two-position, toggle-switch-type FUEL VENT circuit breaker on the pilot ICING subpanel (see Figure 10-3).

Operation of the system can be confirmed by observing an increase in electrical load when the system is on. Continuous use of the fuel vent heat is permitted; however, it is recommended to limit ground use to protect the heating elements. The fuel vent heat should be turned on prior to flight in visible moisture.

Refer to the *FlightSafety Training Checklist* for the fuel vent preflight operational check.

STALL WARNING HEAT

The stall warning vane and mounting pad are equipped with electrical heating elements that are activated by a switch-type STALL WARN circuit breaker on the pilot subpanel.

Operation of the system can be confirmed by observing an increase in electrical load when the system is on. Continuous use of the stall warning heat is permitted.

Refer to the *FlightSafety Training Checklist* for the stall warning heat preflight operational check.

CONTROLS AND INDICATIONS

Surface Deice Switch

If the boots fail to deflate, the SURFACE DEICE circuit breaker must be pulled to deflate the boots.

LIMITATIONS

- Do not operate the deice boots at outside air temperatures below –40°C/F to prevent permanent damage to the boots.
- Maintain at least 130 KIAS when operating in icing conditions to prevent ice buildup on the bottom of the wings.
- Ground use of the windshield heat is limited to 10 minutes to protect the heating elements.
- The propeller deice system should not be operated when the propellers are static.
- Pneumatic pumps are limited to 400 hours of operation and must be replaced to maintain known ice certification.
- Use caution if physically checking for heat in the heated ice protection equipment. Most of the heating elements produce enough heat to burn the skin.

QUESTIONS

To answer the following questions, refer to the FlightSafety *Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. What is the operational difference between anti-ice and deice equipment?

2. How much ice should accumulate prior to deice boot inflation? Why?

3. What is the minimum airspeed for flight in icing conditions?

4. When may the windshield heat be operated?

5. When may the propeller heat be operated?

6. Can the windshield anti-ice be operated independently from the propeller anti-ice?

7. How often does the propeller heat system cycle between heating elements?

8. What are the limitations on windshield heat and pitot heat?

9. When should fuel vent heat and pitot heat be operated?

10. What action is required if the deice boots fail to deflate?

11. What caution is placarded about the use of windshield heat?

CHAPTER 11
AIR CONDITIONING

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CHAPTER 11
AIR CONDITIONING

INTRODUCTION

This chapter describes the operation and limitations of the Baron G58 environmental systems. Passenger comfort and safety are of prime importance during flight.

GENERAL

The purpose of the environmental systems is to increase passenger comfort during flight (Figure 11-1). The ventilation and heating systems utilize outside air to create a comfortable cabin temperature. Air conditioning may be installed as optional equipment.

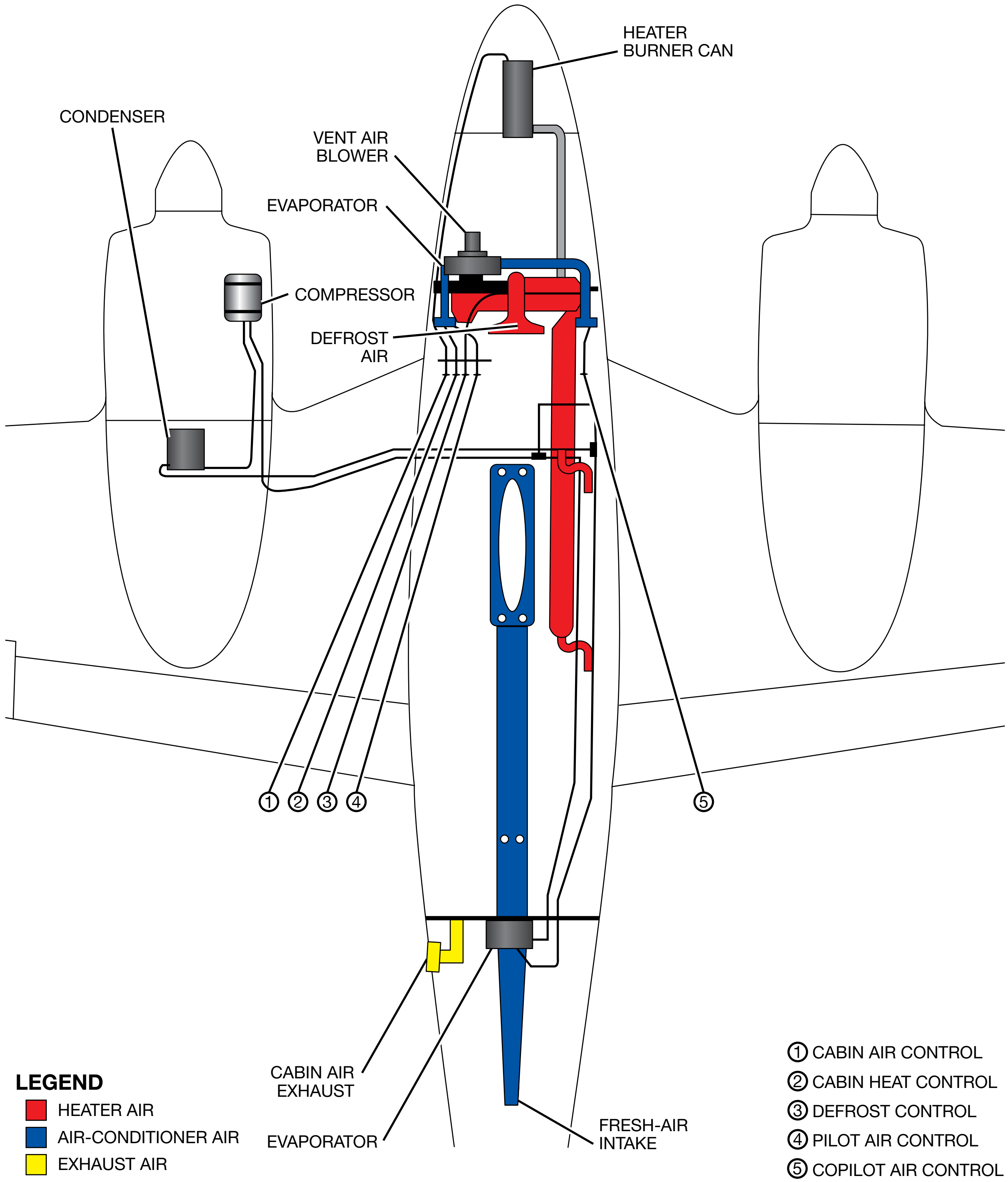

Figure 11-1. Baron G58 Environmental System

CABIN VENTILATION SYSTEM

DESCRIPTION AND OPERATION

The cabin receives ventilation air through a nose section inlet and a nonicing scoop on the left side of the dorsal fairing.

Air from the nose scoop enters the ducting system through an iris valve in the nose cone. Iris valve position is controlled by the CABIN VENT AIR control, which is a slide lever below the left CB panel and Hobbs meter (Figure 11-2).

Figure 11-2. CABIN VENT AIR Control

After entering the ducting system, the air passes over the heater and enters the cabin through the following:

- Adjustable defrost outlet on the glareshield
- Adjustable pilot and copilot air outlets above the rudder pedals
- Nonadjustable floor outlets aft of the copilot and No. 4 passenger seats

Controls for the adjustable outlets are along the bottom of the instrument subpanel.

Air from the dorsal scoop enters the overhead ducting through an adjustable door in the dorsal inlet. The door is controlled by a FRESH AIR knob on the overhead panel between the pilot and copilot seats (Figure 11-3). The air then enters the cabin through overhead adjustable "eyeball" outlets above each seat.

Figure 11-3. Overhead Fresh-Air Control

On the ground, the heater blower and/or air-conditioning blowers can be used to circulate air through the cabin. The blowers may be operated independent of their respective heating and air-conditioning systems. The two switches, labeled BLOWER, are adjacent to their respective system switches on the pilot subpanel. The air-conditioning blower switch has three positions: OFF, LO, and HI. This blower automatically operates in LO mode whenever the air-conditioning system is activated. To increase airflow from the system, place the BLOWER switch in the HI position. The heater blower will operate automatically when the heater is turned on with the landing gear extended.

In flight, ram-air pressure is sufficient to provide air circulation through the cabin. Therefore, the heater blower is disabled when the aircraft is airborne and the landing gear is retracted. If air conditioning is installed, the air-conditioner blowers may be used to increase the volume of airflow out of the overhead outlets. The pilot can regulate the amount of airflow into the cabin by adjusting the CABIN VENT AIR control and overhead FRESH AIR control. Air can then be directed as desired with the defrost control, pilot and copilot air controls, and individually adjustable overhead outlets.

A storm window that may be opened is on the pilot left side window. A fixed exhaust vent, aft of the windows on the left side of the fuselage, provides constant air circulation out of the cabin. Maximum ventilation may be achieved by fully opening the CABIN VENT AIR control and FRESH AIR control, opening the pilot storm window, and activating the blowers.

HEATING SYSTEM

DESCRIPTION

The Baron G58 uses a 50,000 BTU Janitrol combustion heater in the nose wheel well as the source for cabin heating (Figure 11-4). The heater system uses fuel from the left wing tanks for combustion. The heating system consists of:

- Burner can
- Electric fuel pump
- Ignition-vibrator-type ignition system
- Combustion air blower
- Ventilation blower
- Various controls and protection devices

Figure 11-4. Heater and Overtemperature Switch

Refer to Figure 11-5 for an illustration of the Baron G58 heating system.

OPERATION

The heating system warms ambient air ducted through an iris valve in the nose. The iris valve regulates the amount of air allowed to enter the heating chamber. To protect the burner can from overheating, the iris valve must be at least 50% open for the heater to operate. The heater ventilation blower automatically functions to supply sufficient airflow across the burner can if the HEATER switch (Figure 11-6) is on with the landing gear extended. In flight, the blower is deactivated and the system uses ram-air pressure. A combustion air blower is also activated when the heater is turned on.

Heated air enters the cabin through the adjustable defrost vent, adjustable pilot and copilot air vents, and nonadjustable floor vents aft of the copilot seat and the No. 4 passenger seat. A pressure switch monitors airflow into the burner can, energizing the igniter unit and fuel pump when sufficient airflow is established.

Once the heater is in operation, temperature is controlled by the CABIN HEAT control, which sets a thermostat in the heater outlet duct. Maximum temperature for the thermostat is 180°F. The heater operates until the duct temperature rises to the thermostat setting. At that time, the thermostat stops fuel flow into the burner can. When the duct temperature drops below the thermostat setting, the thermostat restarts fuel supply to the burner can.

To obtain maximum heat, position the CABIN VENT AIR control slightly more than 50% open. The amount of fuel consumed by the heater varies with outside air temperature and thermostat setting. Maximum consumption is approximately 1 gph. Heater exhaust exits the burner can on the left side of the nose radome.

Heater System Protection

The heater is protected by a manually resetable overtemperature switch on the burner can (Figure 11-4) that shuts the heater system off if the heater burner can temperature reaches 300°F. The heater system should be inspected and any malfunction corrected before resetting the overtemperature switch.

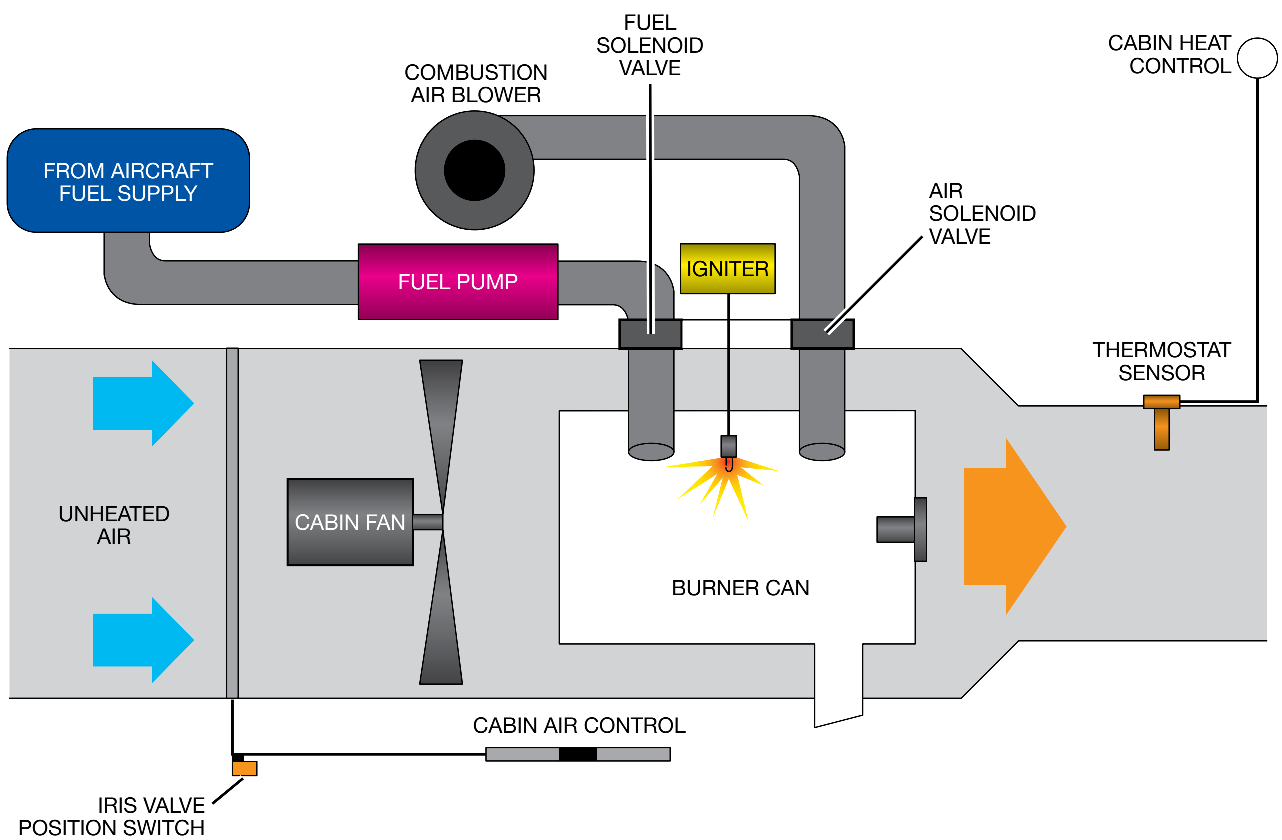

Figure 11-5. Baron G58 Heater System

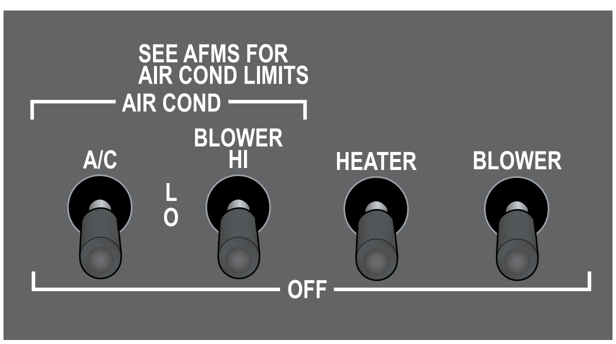

Figure 11-6. Heater and Air-Conditioning Switches

If the ventilation or combustion air blowers fail, a pressure switch removes power from the ignition and fuel pumps to prevent damage to the burner can. Also, if the fuel flow becomes insufficient for heater operation, a pressure switch shuts the system down. An iris valve position switch prevents operation of the heater unless the iris valve is at least 50% open to prevent the heater from excessive operation temperatures.

Airworthiness Directive 82-07-03 requires periodic inspection of the heater burner can to check for combustion leaks. The burner can must be inspected and hydrostatically tested every 500 hours of use, with subsequent pressure decay tests every 100 hours of operation or 24 calendar months, whichever occurs first. A heater hourmeter is in the upper framework of the nose baggage compartment door to measure heater operation time.

Heater Preflight and Shutdown

During the preflight inspection, check the overtemperature circuit breaker to ensure that it has not tripped. Check the heater air inlets, drains, and exhaust vent for obstructions.

To avoid overtemping the heater at shutdown, use the following procedure:

1. Push the CABIN HEAT control full forward to decrease heater temperature.
2. Turn the heater switch off.

3. Operate the heater BLOWER for approximately 2 minutes to dissipate burner can heat. This step can be omitted if the heater is turned off in flight and the iris valve is left open for a short period to cool the burner can.

AIR-CONDITIONING SYSTEM

DESCRIPTION

A 16,000 BTU vapor-cycle, air-conditioning system is optional on the Baron G58 aircraft. R-134A refrigerant is used for the air-conditioning system. The air-conditioning system cools and dehumidifies cabin air to increase passenger comfort. The system consists of:

- Belt-driven compressor on the left engine
- Condenser and blower in the left engine nacelle
- Pair of evaporators
- Various controls and protection devices

The evaporator and blower assemblies are in the nose baggage compartment and aft of the rear baggage compartment. A receiver-dryer and servicing ports are under the copilot seat. Refer to Figure 11-7 for an illustration of the air-conditioning system.

OPERATION

Turning the A/C switch on activates the air-conditioning system. The system runs continuously until turned off. When the system is turned on, the compressor (Figure 11-8) engages and the condenser scoop in the left engine nacelle (Figure 11-9) opens for condenser airflow.

When the air-conditioning system is operating, the condenser blower operates automatically when the landing gear is extended and continues to operate for 5 minutes after landing gear retraction. The condenser scoop opens approximately 1.5

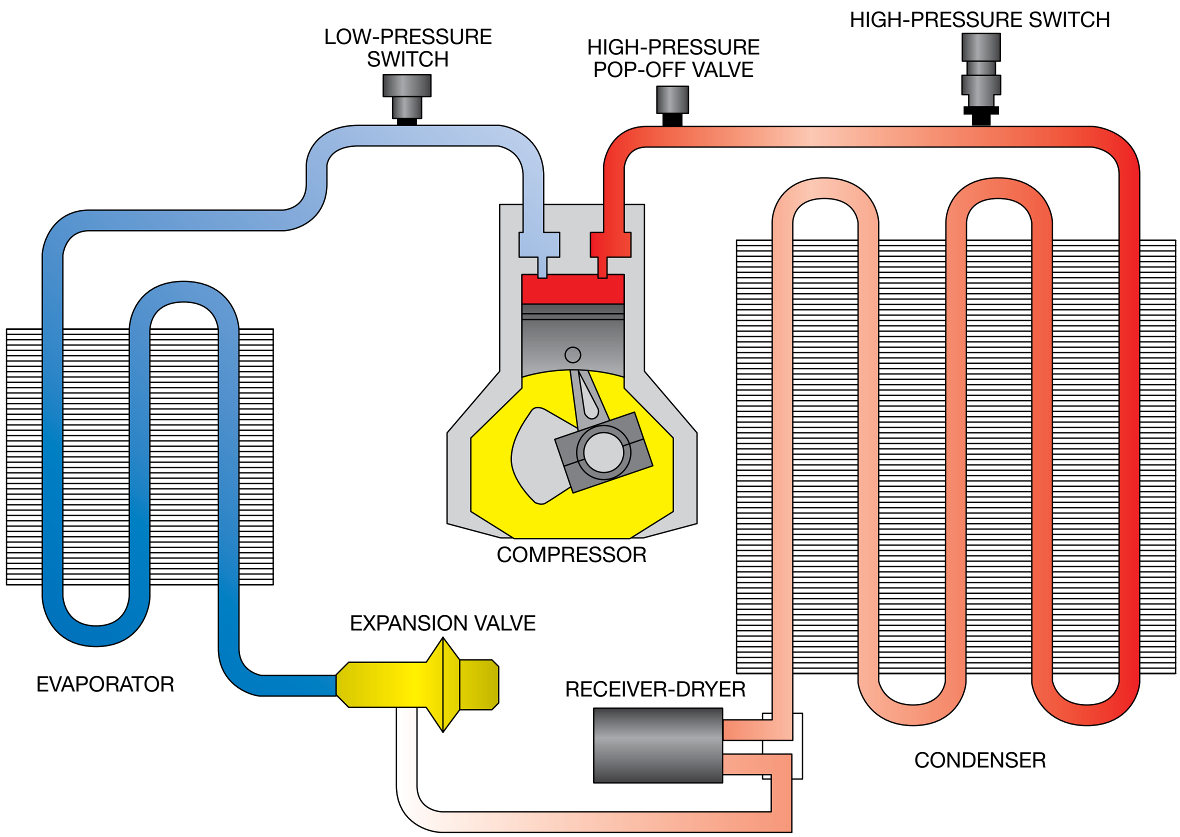

Figure 11-7. Baron G58 Air-Conditioning System

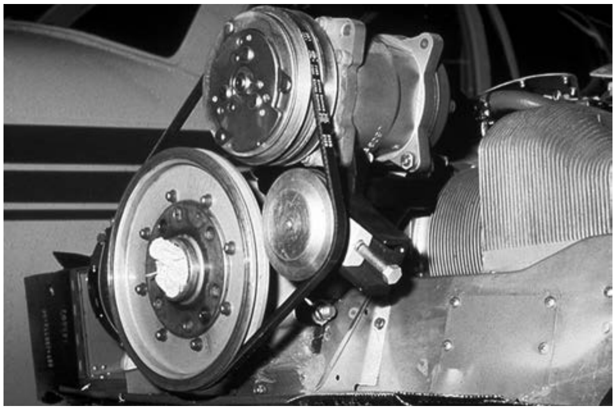

Figure 11-8. Air-Conditioner Compressor

Figure 11-9. Air-Conditioner Condenser Scoop

inches in flight and approximately 3 inches on the ground to compensate for reduced airflow through the condenser during ground operations. The condenser turns the air-conditioning refrigerant into a liquid before routing it to the receiver-dryer.

The receiver-dryer acts as a reservoir for the refrigerant and removes moisture from the system to protect the refrigerant lines. A sight gage in the receiver-dryer allows for inspection of the refrigerant level.

From the receiver-dryer, the refrigerant is routed to the evaporators. An expansion valve at each evaporator allows the refrigerant to expand rapidly, causing it to cool. Cabin air is routed through the cold evaporators and then returned to the cabin for cabin cooling. From the evaporators, the refrigerant returns to the compressor to repeat the air-conditioning cycle.

The evaporator blowers automatically function in the LO mode when the air-conditioning system is turned on. The HI mode may be selected with the BLOWER switch to increase the amount of cooled air from the system. Cooled air from the forward evaporator exits from the pilot and copilot outlets and the pedestal outlets. Air from the aft evaporator exits from the overhead outlets. Closing the FRESH AIR control and the CABIN VENT AIR control may increase air-conditioning efficiency.

Protection

The air-conditioning and blower circuits are protected by circuit breakers on the left side panel. A fuse in the left engine nacelle protects the system from excessive or inadequate refrigerant pressures. A high-pressure switch blows the fuse to prevent damage to the system if system pressure becomes too great. If the high-pressure switch fails, a high-pressure pop-off valve opens and vents the system into the atmosphere to protect the compressor and refrigerant lines. A low-pressure switch blows the fuse to protect the compressor if refrigerant levels are inadequate for lubrication.

LIMITATIONS

For best results during ground operation, operate the left engine at a minimum of 1,200 rpm when the air-conditioning system is on. The air conditioner must be off for takeoff. The system must be turned off for single-engine operations or any malfunction in the system itself. The air-conditioning system should not be operated at temperatures below 50°F to prevent the evaporators from icing. After turning the system off, allow at least 30 seconds for the system to reset before turning it back on.

QUESTIONS

To answer the following questions, refer to the *FlightSafety Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. State the source of cabin ventilation air.

2. How can airflow into the cabin be stopped?

3. When are the ventilation blowers operated?

4. Describe the procedure for achieving maximum heater output.

5. List the heater shutdown procedure.

6. State the limitations on the air conditioner.

7. Should the air conditioner be turned off for takeoff? Why?

8. What is the purpose for the heater inspection AD?

9. Which cockpit controls direct airflow in the floor ducting?

10. Describe the procedure for achieving maximum cooling.

CHAPTER 11A
AIR CONDITIONING

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CHAPTER 11A
AIR CONDITIONING

INTRODUCTION

This chapter describes the operation and limitations of the Baron G58 environmental systems. Passenger comfort and safety are of prime importance during flight.

GENERAL

The purpose of the environmental systems is to increase passenger comfort during flight (Figure 11A-1). The ventilation and heating systems utilize outside air to create a comfortable cabin temperature. Air conditioning may be installed as optional equipment.

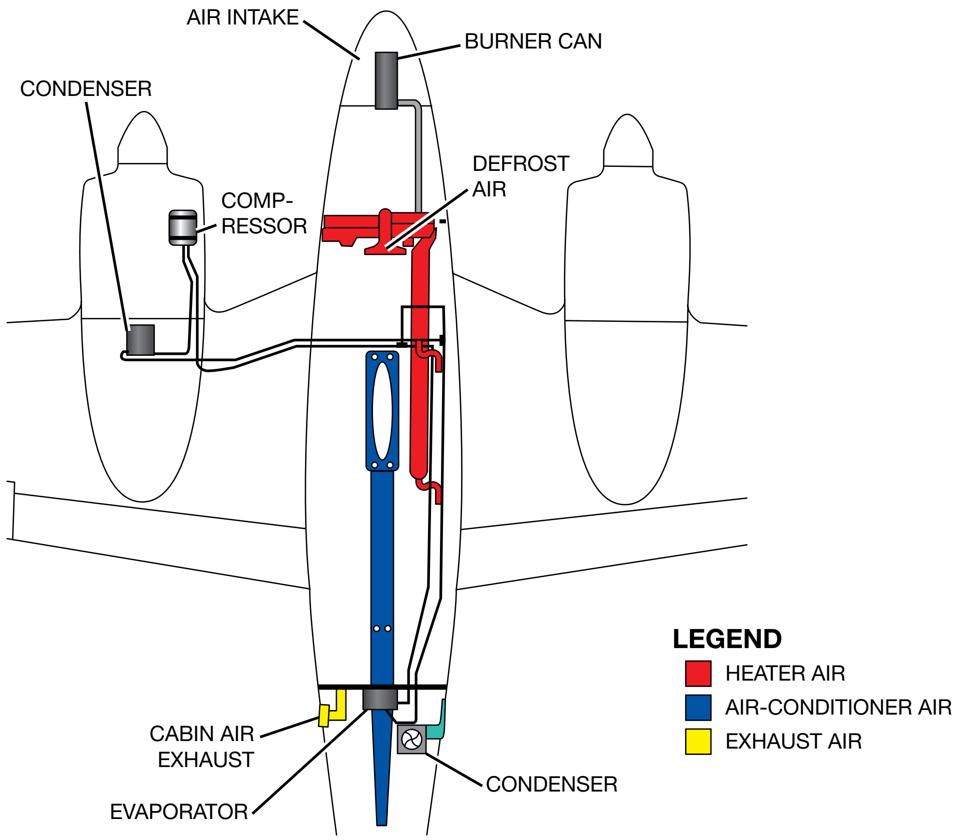


Figure 11A-1. Baron G58 Environmental System

CABIN VENTILATION SYSTEM (2012 MODELS AND AFTER)

DESCRIPTION AND OPERATION

The cabin receives ventilation air through a nose section inlet and a non-icing scoop on the left side of the dorsal fairing. This ventilation air is only available when the heating system is being used. If the heating system is not used, the air does not enter the cabin.

Air from the nose scoop enters the ducting system through an iris valve located on the cabin heater. Iris valve position is controlled by the Automatic Climate Control System controller which is located on the center pedestal.

After entering the ducting system, the air passes over the heater and enters the cabin through the following:

- Defrost outlet on the glaresheild
- Pilot and co-pilot air outlets above the rudder pedals
- Floor outlets aft of the co-pilot and No. 4 passenger seats

Airflow from the outlets is controlled by the Automatic Climate Control System. A separate Defrost mode on the controller, operates the defrost vent.

A storm window that may be opened is on the pilot left side window. A fixed exhaust vent, aft of the windows on the left side of the fuselage, provides constant air circulation out of the cabin. Maximum ventilation may be achieved by fully opening the storm window.

AUTOMATIC CLIMATE CONTROL SYSTEM

DESCRIPTION AND OPERATION

The Automatic Climate Control System, incorporating an A/C Systems LLC Air Conditioning System, is designed to cool and heat the aircraft cabin to desired temperature settings during all phases of flight operations. The system may be used during any phase of the flight (except a right engine failure), offering a choice of fully automatic or mode override.

The system utilizes a digital climate controller (Figure 11A-2) which is located on the center pedestal (Figure 11A-3). The climate controller compares the outside air temperature, cabin temperature and selected cabin temperature to determine whether to operate the heating system or air-conditioning system.

To operate the environmental system, the pilot must select ON or AUTO mode. In AUTO mode blower speed is automatically controlled. With AUTO mode OFF, blower speed can be manually controlled (adjusting blower speed while in AUTO mode will turn AUTO mode OFF). Using the temperature controls, the pilot selects the desired cabin air temperature. The system will automatically turn on the heating and or air-conditioning system to reach and maintain the desired temperature. The system will automatically cycle the system ON and OFF as necessary.

Figure 11A-3. Climate Controller Panel Location

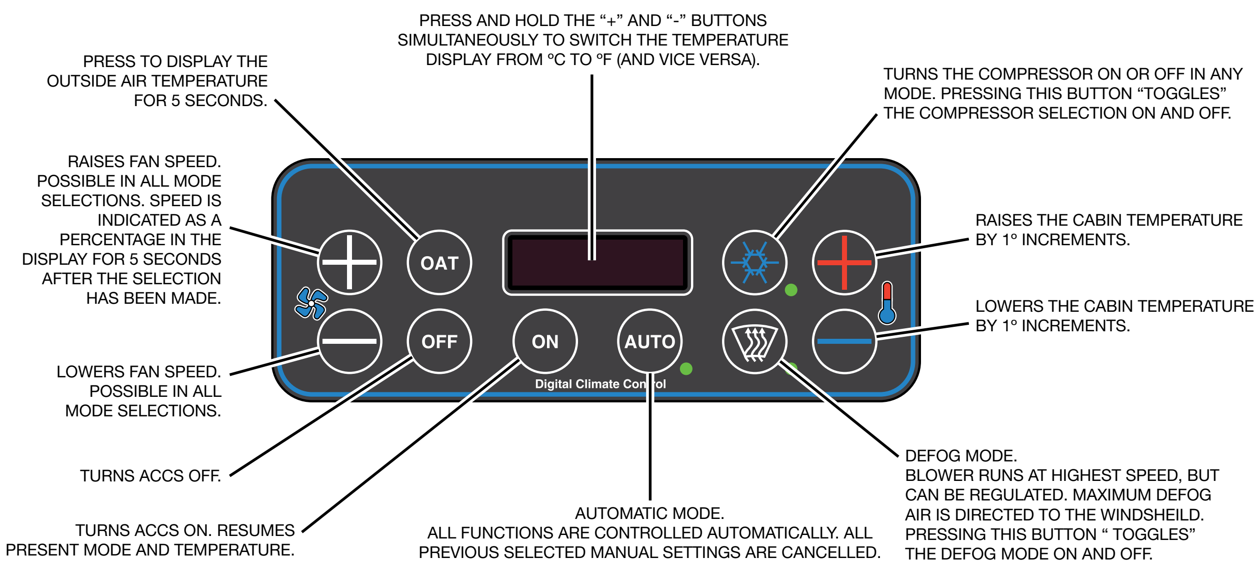


Figure 11A-2. Digital Climate Controller Panel

Air-conditioning is delivered through 7 overhead vents above the seats of the aircraft, and heated air is delivered through the floor vents of the aircraft. If windshield defrost is necessary, the defrost mode can be selected on the climate controller. The defrost mode just directs air to the defrost vent, this can be either cooled air and or heated air.

For more detailed information on normal operation, limitations, and emergency procedures, refer to the *Airplane Flight manual Supplement (AFMS)*

HEATING SYSTEM

DESCRIPTION

The Baron G58 uses a 50,000 BTU C&D Associates combustion heater in the nose wheel well as the source for cabin heating (Figure 11A-4). The heater system uses fuel from the left wing tanks for combustion.

Figure 11A-4. Combustion Heater

The heating system consists of:

- Burner can
- Electric fuel pump
- Ignition-vibrator-type ignition system
- Combustion air blower
- Ventilation blower
- Various controls and protection devices

Refer to Figure 11A-5 for an illustration of the Baron G58 heating system.

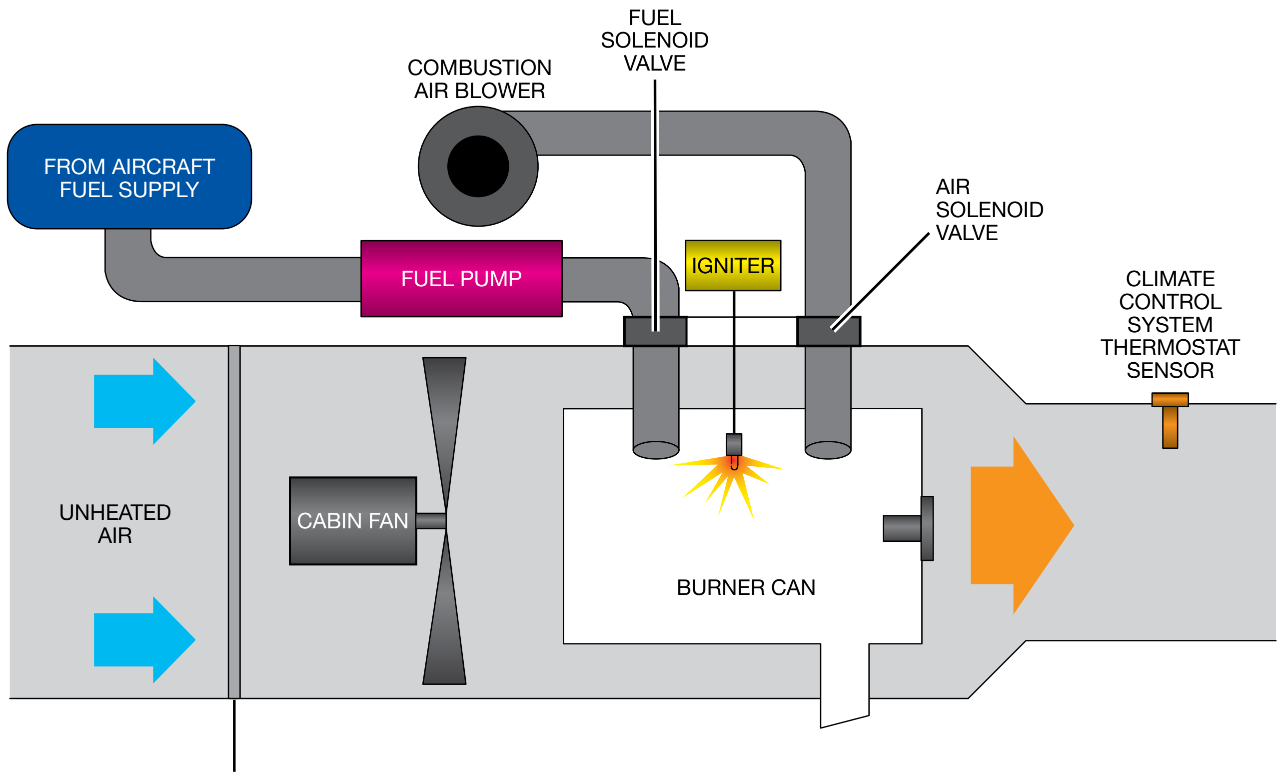


Figure 11A-5. Baron G58 Heater System

OPERATION

The heating system warm ambient air ducted through an iris valve in the nose. The iris valve regulates the amount of airflow to enter the heating chamber. The operation of the iris valve and heater blower (Master Heater Fan) (Figure 11A-6) is automatically controlled by the Automatic Climate Control system provided that the Heater Master Fan switch in the cockpit is turned ON. This switch should remain on at all times to allow the Automatic Climate Control System to regulate the heater blower. With the exception of an electrical system malfunction or emergency, it is important to leave the Heater Master Fan switch ON even after aircraft shutdown to allow the system to cool the burner can. If the heater was used and the aircraft shut down, the Automatic Climate Control System will continue to power the heater blower and keep the iris valve open for 2 minutes and then shut them down. The heater blower and iris valve are powered by the "HOT" battery bus. Note the heater blower does not

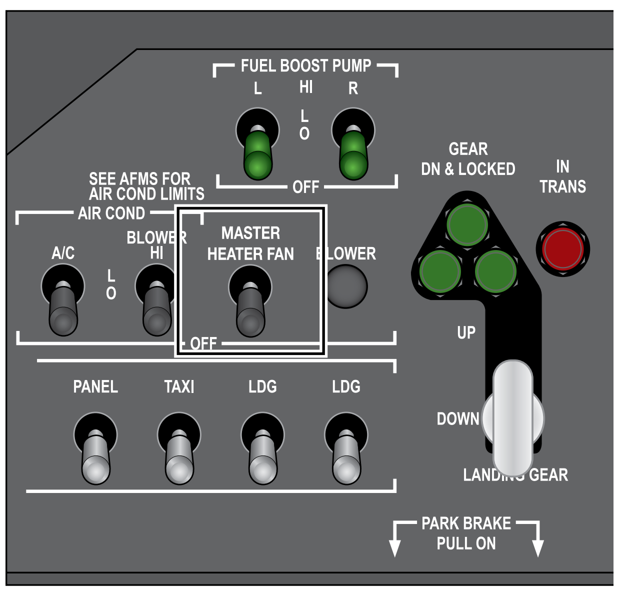


Figure 11A-6. Master Heater Fan Switch

operate with the landing gear retracted, instead, Ram air through the iris valve provides adequate airflow for heater operation and cool down.

Cabin Heat is selected by selecting “Auto” on the Climate Control Panel, then selecting a cabin temperature higher than the current cabin temperature. The system will automatically operate the heater and blower speed to bring the cabin to the desired temperature and will cycle on and off automatically to maintain the desired temperature.

A pressure switch monitors airflow into the burner can, energizing the igniter unit and fuel pump when sufficient airflow is established. When the cabin reaches the desired temperature the Climate Control System will shut down the heater. During heater operation, the system consumes 3lb of fuel (1/2 gallon) from the left inboard leading edge cell tank.

Heated air enters the cabin through the pilot, co-pilot, and rear passenger floor vents. The defroster vent is controlled by the Automatic Climate Control System by selecting the “Defrost Mode” on the Climate Control Panel.

Heater System Protection

The heater is protected by a manually resetable overtemperature switch on the burner can (Figure 11A-4) that shuts the heater system off if the heater burner can temperature reaches 300°F. The heater system should be inspected and any malfunction corrected before resetting the overtemperature switch.

If the ventilation or combustion air blowers fail, a pressure switch removes power from the ignition and fuel pumps to prevent damage to the burner can. Also, if the fuel flow becomes insufficient for heater operation, a pressure switch shuts the system down. An iris valve position switch prevents operation of the heater unless the iris valve is at least 50% open to prevent the heater from excessive operation temperatures.

The heating system has a 2000 TBO (time before overhaul) A Hobbs meter located in the nose baggage compartment keeps track of heater operation.

Heater Preflight and Shutdown

During the preflight inspection, check the over temperature circuit breaker to ensure that it has not tripped. Check the heater air inlets, drains, and exhaust vent for obstructions.

AIR-CONDITIONING SYSTEM

A 16,0000 BTU vapor cycle air-conditioning system is installed on the G58. R-134A refrigerant is used for the system. The air-conditioning system cools and dehumidifies cabin air to increase passenger comfort. The system consists of:

- Belt-driven compressor on the left engine
- Condenser and blower behind the aft bulkhead in the tail
- Evaporator and blower behind the aft bulkhead in the tail.
- Climate Controller on the center pedestal
- Protection devices

The evaporator-blower and condenser-blower assemblies are located in the aft tail cone aft of the rear bulkhead. Refer to fig Figure 11A-7 for an illustration of the system.

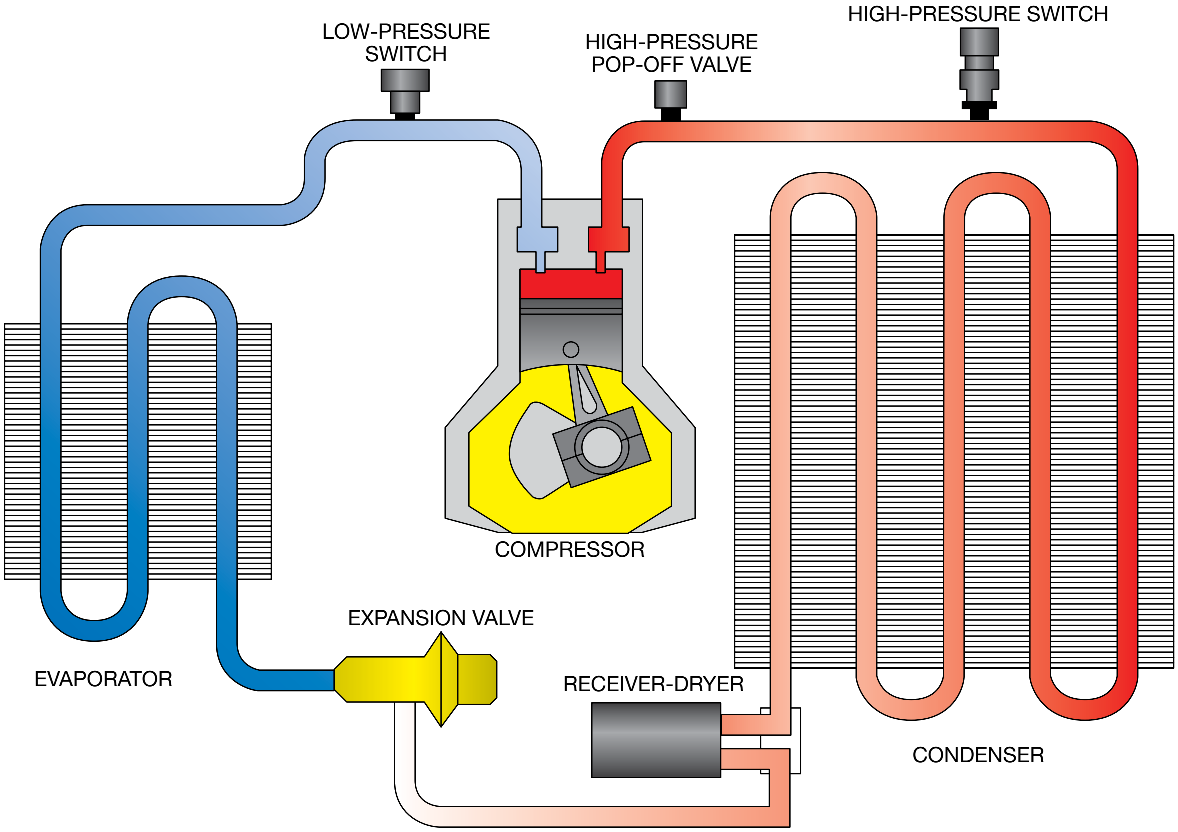


Figure 11A-7. Baron G58 Air-Conditioning System

OPERATION

The air-conditioning system is activated by the Automatic Climate Control System when the system is set to ON or AUTO, and the desired temperature selected is set below the current cabin temperature. The system will cycle ON and OFF automatically to maintain the desired temperature. When the system is turned ON, the compressor engages (Figure 11A-8) and pumps refrigerant to the condenser which is cooled by a condenser blower (Figure 11A-9) which removes heat caused by compression. The refrigerant then passes through the receiver- drier which removes moisture from the system to protect the refrigerant lines. Refrigerant from the Receiver-Drier then passes through the Expansion Valve. The expansion valve allows the refrigerant to expand rapidly causing it to cool as it passes through the evaporator (Figure 11A-10). The evaporator blower blows air over the cold evaporator cooling the air. The air is then directed over the 7 overhead air-conditioning vents in the cabin. (Figure 11A-11)

Protection

The air-conditioning and blower circuits are protected by circuit breakers on the left side panel. A fuse in the left engine nacelle protects the system from excessive or inadequate refrigerant pressures. A high-pressure switch blows the fuse to prevent damage to the system if system pressure becomes too great. If the high-pressure switch fails, a high-pressure pop-off valve opens and vents the system into the atmosphere to protect the compressor and refrigerant lines. A low-pressure switch blows the fuse to protect the compressor if refrigerant levels are inadequate for lubrication.

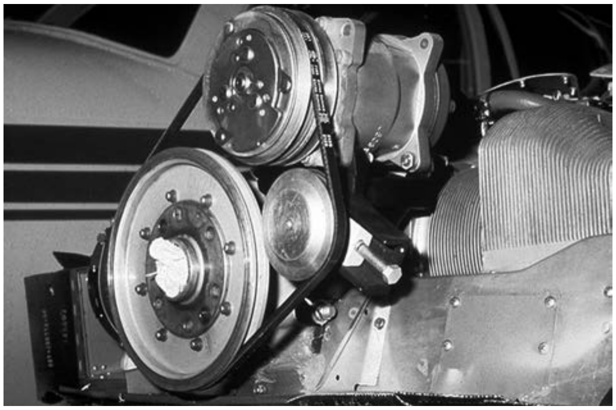


Figure 11A-8. Air-Conditioner Compressor

Figure 11A-9. Condenser Blower

LIMITATIONS

The air-conditioning system may be used in all phases of flight, including takeoff and landing. Due to engine drag caused buy the engine driven compressor, a slight performance loss will be noted. If maximum performance is required, either select OFF on the Climate Controller or turn the compressor OFF by depressing the “snow flake” symbol on the cabin controller. The LED next to the “snow flake” indicates compressor operation. Refer to the Airplane Flight Manual Supplement for performance considerations and operational limitations and emergency procedures. The air-conditioning system should not be operated below 50° F/ 10°C to prevent the evaporator from icing.

Figure 11A-10. Evaporator

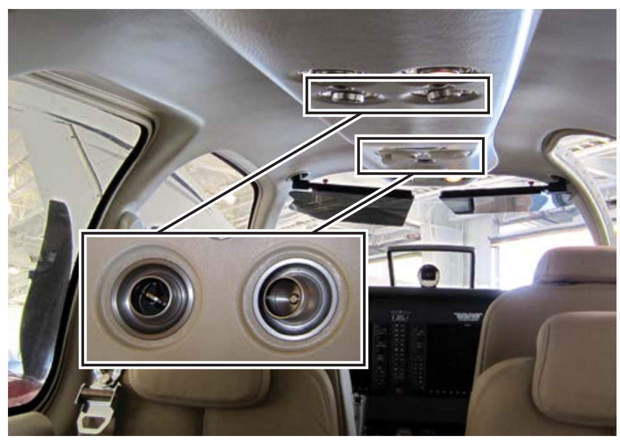


Figure 11A-11. Air-Conditioner Vents

The information normally contained in this chapter is not applicable to this particular aircraft.

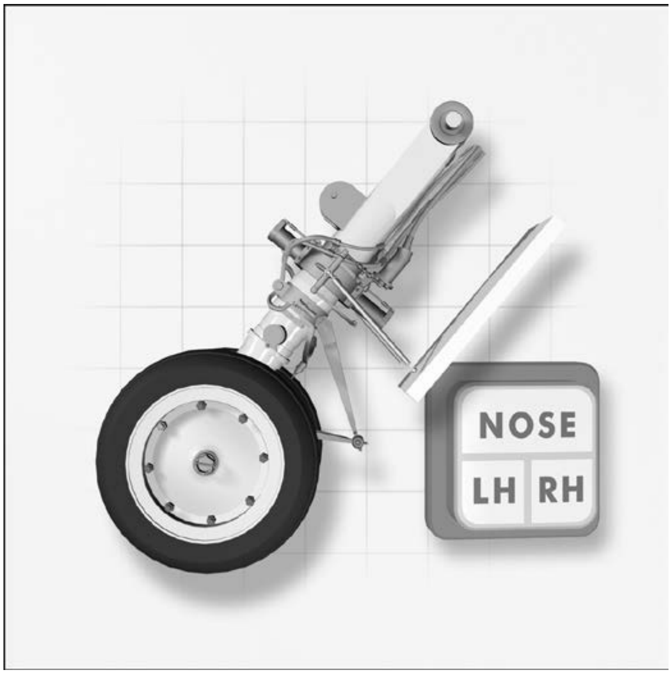
The information normally contained in this chapter is not applicable to this particular aircraft.

CHAPTER 14
LANDING GEAR AND BRAKES

CONTENTS

ILLUSTRATIONS

CHAPTER 14
LANDING GEAR AND BRAKES



INTRODUCTION

This chapter discusses the Baron G58 landing gear, nosewheel steering, and brake systems. An understanding of the landing gear system aids the pilot in safe and proper operation of the aircraft. An understanding of the brake system helps the pilot operate the brakes safely with a minimum of brake wear.

GENERAL

The Baron G58 landing gear system is an electromechanical system. The landing gear is fully enclosed by landing gear doors when retracted, and it is locked in the extended position by overcenter braces and mechanical downlocks.

LANDING GEAR

DESCRIPTION

Landing gear position is changed by an electric motor and a mechanical actuator assembly between the pilot and copilot seats, aft of the forward spar. As the actuator rotates, it operates steel push-pull rods to extend and retract the landing gear.

Limit switches next to the actuator terminate motor operation to stop the landing gear in the full-up or down position.

The landing gear is held in the retracted position by friction in the system and mechanical uplocks on the main gear. The gear is held in the extended position by overcenter braces and mechanical downlocks on the main gear.

Push-pull rods actuated by the nose gear strut mechanically operate nose gear doors on the Baron G58. Outboard gear doors on the main gear are attached to the main gear struts and open and close as the struts extend and retract. Push-pull rods connected to the landing gear actuator mechanism mechanically operate the inboard gear doors for the main gear.

The landing gear struts are air-oil shock-

absorber-type struts. Shock strut servicing procedures can be found in the Handling, Service, and Maintenance section of the *Pilot's Operating Handbook (POH).*

A single six-ply, tube-type tire is on the nose gear, and single 10-ply tube-type tires are on the main landing gear.

Tire specifications for the Baron G58 are:

- Main wheel tires—19.50 x 6.75 x 8, 10-ply tube-type tires
- Nosewheel tire—5.00 x 5, six-ply tube-type tire

Tire servicing procedures and inflation values can be found in the Handling, Service, and Maintenance section of the *POH*.

A pair of landing gear safety switches is on the main gear to prevent accidental retraction of the landing gear on the ground.

When the main struts are compressed, the control circuit is open and the gear cannot retract. Never rely on the safety switches to keep the gear extended during ground operations. Maneuvering over rough terrain may cause the strut to extend and close the circuit long enough to begin landing gear retraction.

Always keep the LANDING GEAR handle in the down position when on the ground.

Refer to Figure 14-1 for an illustration of the landing gear system.

CONTROLS AND INDICATIONS

Landing Gear Control Handle

Landing gear position is selected by a wheel-shaped control handle on the pilot subpanel (Figure 14-2). The handle has two positions: UP and DOWN.

The handle must be pulled out of a safety detent before it can be moved. The handle operates a control circuit that sends power to the gear motor for operation of the system.

Always keep the gear handle in the down position when on the ground. Do not change the position of the control switch while the gear is in transit, as it may cause serious damage to the mechanism.

Position Indicators

Landing gear position indicators are above the LANDING GEAR control handle (Figure 14-2). Three green GEAR DN & LOCKED lights (one for each gear) illuminate when the gear is fully extended.

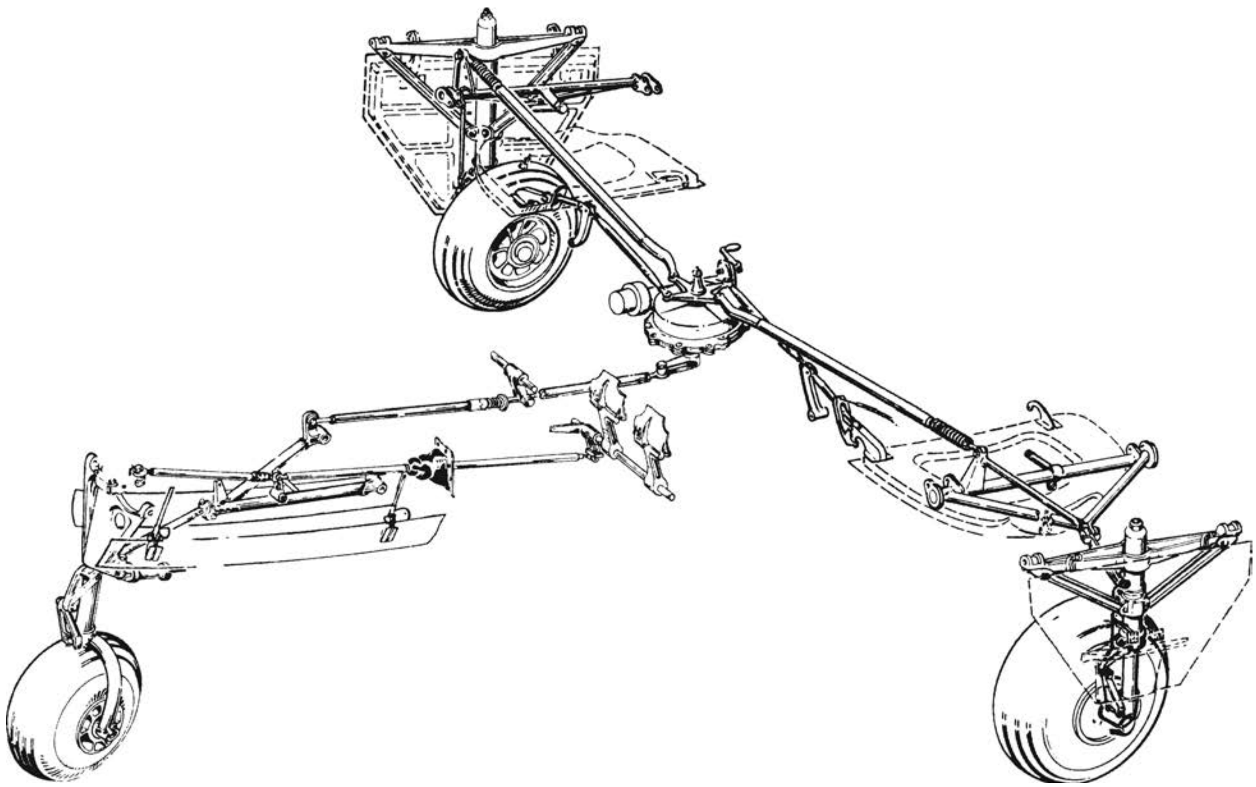


Figure 14-1. Landing Gear System

A single red IN TRANS light illuminates anytime one or all of the gear is in transit or in any intermediate position. All of the lights are extinguished when the gear is fully retracted (Figure 14-2).

The intensity of the landing gear indicators is controlled by a photoelectric cell just above the indicator lights.

Warning Horn and Annunciator

A landing gear horn sounds and a GEAR UP warning alert illuminates on the PFD if the landing gear is retracted under certain conditions of throttle and flap position.

The system alerts the pilot of an unsafe gear condition prior to landing. The landing gear warning system activates if the gear lever is selected up and the aircraft is on the ground or either throttle is reduced below approximately 13 in. Hg, with the landing gear safety switch closed.

Figure 14-2. Landing Gear Handle

In addition, one throttle must be greater than a position of approximately 17 in. Hg manifold pressure in order to retract the gear. The system also activates when full flaps are selected with the gear retracted.

During single-engine operation, advancing the throttle of the inoperative engine until the throttle position switch opens the circuit silences the landing gear warning horn.

OPERATION

Landing Gear System Preflight

The landing gear system should be checked closely as a part of the normal preflight inspection, as follows:

- Check struts for leaks and proper inflation.
- Check tires for damage and proper inflation.
- On the main gear, check the nuts and cotter pins on the scissor assemblies and axles.
- Ensure that the safety switches are attached and in good condition.
- Verify that the uplocks and downlocks (Figure 14-3) are attached and in good condition and that the cables and springs are attached. The uplock roller should be well lubricated and free to rotate.
- Verify that the nose gear tow pins are not bent or broken. A damaged or newly installed tow pin may indicate that tow steering limits have been exceeded (Figure 14-4).
- Check the shimmy damper for leaks or a bent rod.
- On the nose gear, verify that nuts and cotter pins are installed on the scissor assembly and axle.
- Make sure that the landing gear handle is down and the emergency handcrank is stowed with the handle accessible.

Refer to the *FlightSafety Training Checklist* for landing gear preflight procedures.

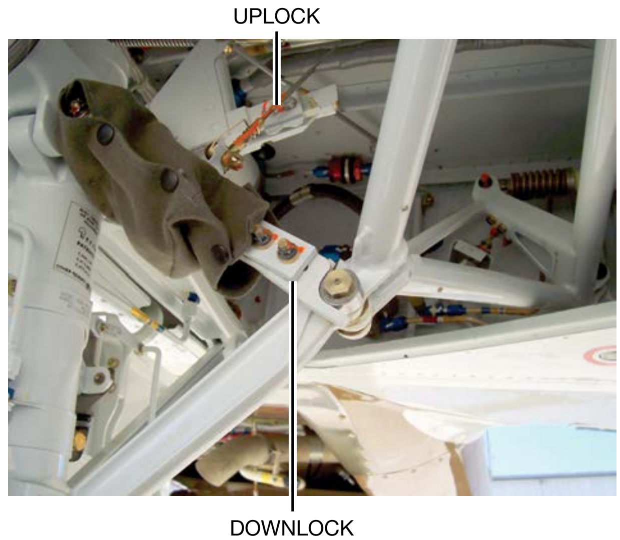


Figure 14-3. Landing Gear Uplock and Downlock

Figure 14-4. Nose Gear Tow Limits

LIMITATIONS

Maximum landing gear extended or operating speed (VLE, VLO) is 152 KIAS. To prevent damage to the gear doors, brake lines, and landing gear mechanism, do not extend, retract, or operate with the gear extended above this speed.

The manual extension system only lowers the landing gear. Do not attempt to retract the gear manually. For electrical retraction of the landing gear following a practice manual extension, refer to the *FlightSafety Training Checklist.*

Do not operate the landing gear electrically with the manual handcrank engaged or reverse the gear while it is in transit. Either action can cause serious damage to the landing gear actuator mechanism.

Landing Gear Manual Extension

The landing gear can be manually extended with the handcrank at the rear of the pilot seat (Figure 14-5) in the event of normal extension failure. Refer to the *FlightSafety Training Checklist* for landing gear manual extension procedures.

Figure 14-5. Landing Gear Manual Extension Handcrank

Consider the following steps while accomplishing an emergency landing gear extension:

- Set up the aircraft at a safe altitude and airspeed before attempting the manual gear extension.
- The autopilot may be engaged to assist in holding altitude and heading. If the autopilot is used, monitor airspeed closely throughout the manual extension procedure.
- Increase power as necessary to maintain a safe airspeed.
- Adjust the pilot seat as necessary to allow the pilot to reach the handcrank comfortably.
- Ensure that the LANDING GEAR handle is down and the landing GEAR MOTOR circuit breaker is pulled before engaging the manual handcrank.
- Engage the handcrank and turn it counterclockwise until it is forced against the mechanical stop (approximately 50 turns). Turn the handcrank as far as possible to ensure that the gear is completely down.
- Break the extension down into sets of 10–15 turns. A break between the sets allows the pilot to rest, monitor aircraft performance, and look for traffic.
- After the manual extension is accomplished, the position indicators and warning horn may verify that the landing gear is down.
- Do not move the landing gear controls or reset any circuit breakers until the aircraft is on the ground and the malfunction has been corrected.

NOSEWHEEL STEERING

DESCRIPTION AND OPERATION

The Baron G58 nosewheel steering mechanism is connected to the rudder pedals by a push-pull rod and bungee assembly.

A shimmy damper is on the nose gear strut to prevent nosewheel shimmy during ground operations.

A centering bearing and universal joint attached to the upper nose strut assembly automatically center the n osewheel and render nosewheel steering inoperative when the gear retracts.

Nosewheel steering is controlled through the rudder pedals at both the pilot and copilot flight stations. Minimum aircraft turning radius is achieved through the use of full rudder (nosewheel steering) input, partial braking action, and differential power.

WHEELS AND BRAKES

COMPONENTS

Wheel Assemblies

The Baron G58 aircraft is equipped with Goodrich 6.50 x 8 wheel assemblies on the main gear and a Goodrich 5.00 x 5 wheel assembly on the nose gear.

The wheels consist of inner and outer wheel halves fastened together with bolts, washers, and nuts.

The wheel assemblies are secured to the axles with bushings, washers, nuts, and cotter pins. Check the wheels during preflight for security and condition.

Brake Assemblies

The Baron G58 is equipped with a Cleveland brake system. The Cleveland brakes are a standard disc and caliper brake assembly (Figure 14-6).

Figure 14-6. Brake Assembly

Master Cylinders

A brake master cylinder is on the top of each pilot rudder pedal to provide braking action.

Brake Fluid Reservoir

The brake hydraulic fluid reservoir is on the far wall of the nose baggage compartment (Figure 14-7). The reservoir serves as a storage receptacle for the brake fluid and provides space for thermal expansion of the fluid. A dipstick attached to the reservoir cap checks fluid level.

Figure 14-7. Brake Fluid Reservoir

Brake Fluid

The brake system contains 1.5 pints of MIL-H-5606 red aircraft hydraulic fluid. If the reservoir is overfilled, fluid leaks into the nose baggage compartment through the reservoir pressure relief vent. Check the brake fluid level as a part of the preflight inspection.

Parking Brake

The parking brake assembly is a pair of check valves in the brake lines. When the PARK BRAKE knob is pulled, pressure is trapped downstream of the valves in the main brake caliper assemblies.

CONTROLS AND INDICATIONS

Rudder Toe Brakes

The wheel brakes are controlled by rudder pedal toe brakes at the pilot and copilot flight stations.

PARK BRAKE Knob

The PARK BRAKE knob on the pilot subpanel (just below the main landing gear control lever, left of the elevator trim tab wheel) controls the parking brake (Figure 14-8).

Figure 14-8. PARK BRAKE Knob

OPERATION

Main Brakes

When the top of the brake pedal is pushed, a piston inside the master cylinder forces hydraulic fluid through the brake lines to the brake caliper assembly on the main gear. The increase in hydraulic pressure forces the brake pads against the brake discs, creating friction that causes braking action (Figure 14-9).

The brakes require no adjustment, since the disc pistons move outward to compensate for pad and lining wear.

Check the brake pads for sufficient thickness during preflight. The pads should be at least 3/32 of an inch thick.

When starting to taxi, check the brakes individually and together to ensure stopping ability.

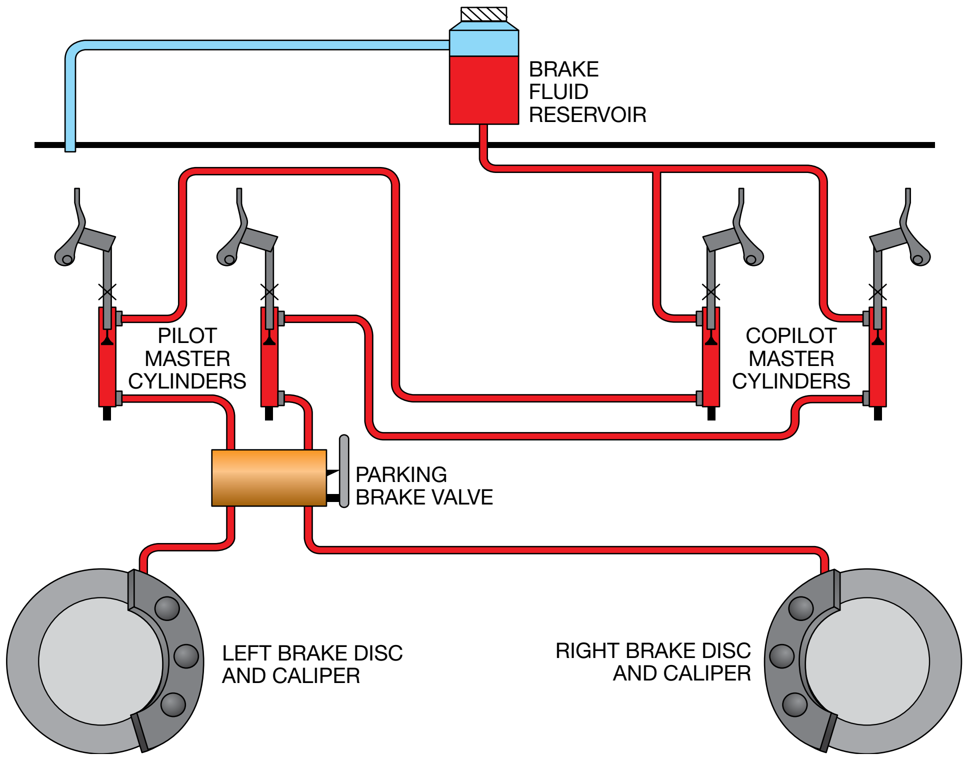


Figure 14-9. Baron G58 Brake System

Parking Brake

To set the parking brake, pull the PARK BRAKE knob out and apply pressure to the toe pedals until firm.

To release the parking brake, apply pressure to the toe pedals to equalize pressure in the lines and push the PARK BRAKE knob in.

When the parking brake is set, brake fluid is trapped downstream of the check valves, resulting in no room for thermal expansion in the lines.

LIMITATIONS

Tapping the brakes after lift-off may pinch off the filler valve, resulting in a flat tire.

Inspect the tires on preflight for proper inflation, cuts, cracks, or splits in the seams.

Changes in ambient temperature can cause the brakes to release or exert excessive pressure, resulting in damage to the lines or seals. Because of this, the parking brake should only be used for short periods of time.

The aircraft should be chocked and tied down before leaving the aircraft for an extended period of time.

QUESTIONS

LANDING GEAR

To answer the following questions, refer to the *FlightSafety Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. What type of gear system is on your aircraft?

2. What does the illumination of the red gear position light indicate?

3. How is the intensity of the landing gear position indicators controlled?

4. When does the landing gear warning horn sound?

5. What is the landing gear maximum extension speed?

6. How far should the manual handcrank be turned during a landing gear manual extension?

7. Where can information regarding the inflation values of the tires and shock struts be found?

8. When should the gear handle not be moved?

9. What safety precaution is recommended when extending the landing gear?

BRAKES

1. What may happen if both pilots apply brakes simultaneously?

2. What is the type and quantity of brake fluid used on the Baron G58?

3. Why should the parking brake not be set for extended periods of time?

4. When should a brake pad be replaced?

5. Should the brakes be tapped after lift-off? Explain.

CHAPTER 15
FLIGHT CONTROLS

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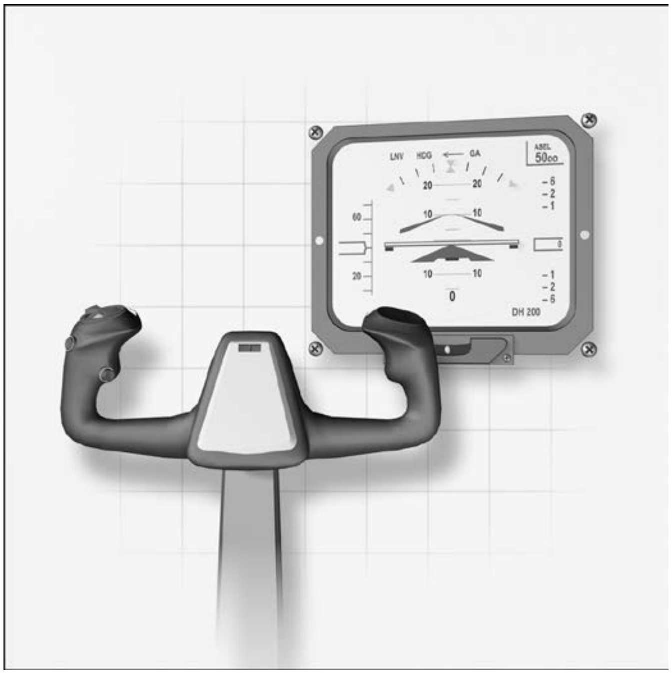
CHAPTER 15
FLIGHT CONTROLS



INTRODUCTION

This chapter describes the Baron G58 flight control, flap, and stall warning systems. Familiarization with the aircraft's flight control and stall warning system is essential to the safety of flight. An understanding of the flap system is necessary to provide optimum aircraft performance.

FLIGHT CONTROLS

DESCRIPTION

The flight controls on the Baron G58 are conventional cable-operated control surfaces. All primary control surfaces are manually actuated through push-pull rods, cables, and bell-cranks. Each system includes control surface balance weights, travel limit stops, and linkage adjustments for "rigging" the aircraft. Refer to Figure 15-1 for an illustration of flight control and trim tab locations.

COMPONENTS

Control Column

Baron G58 aircraft are equipped with interconnected control columns in front of the pilot and the copilot (Figure 15-2).

Rudder Pedals

The pilot and copilot rudder pedals are connected through a linkage below the floorboards. The two-position pedals are adjustable by pressing the spring-loaded lever on the side of the pedal (Figure 15-3). Verify the pedals are properly adjusted prior to engine start.

Trim System

Trim tabs are on the elevators, rudder, and left aileron. In addition to its trimming purpose, the aileron tab incorporates a servo action to assist the pilot with aileron inputs. Control wheels in the cockpit control the tabs through cables. Tab position indicators are on or near the trim control wheels. Manual ground-adjustable trim tabs are on the right aileron, rudder, and each elevator. The bendable tabs are set to rig the aircraft for hands-off flight in normal cruise conditions.

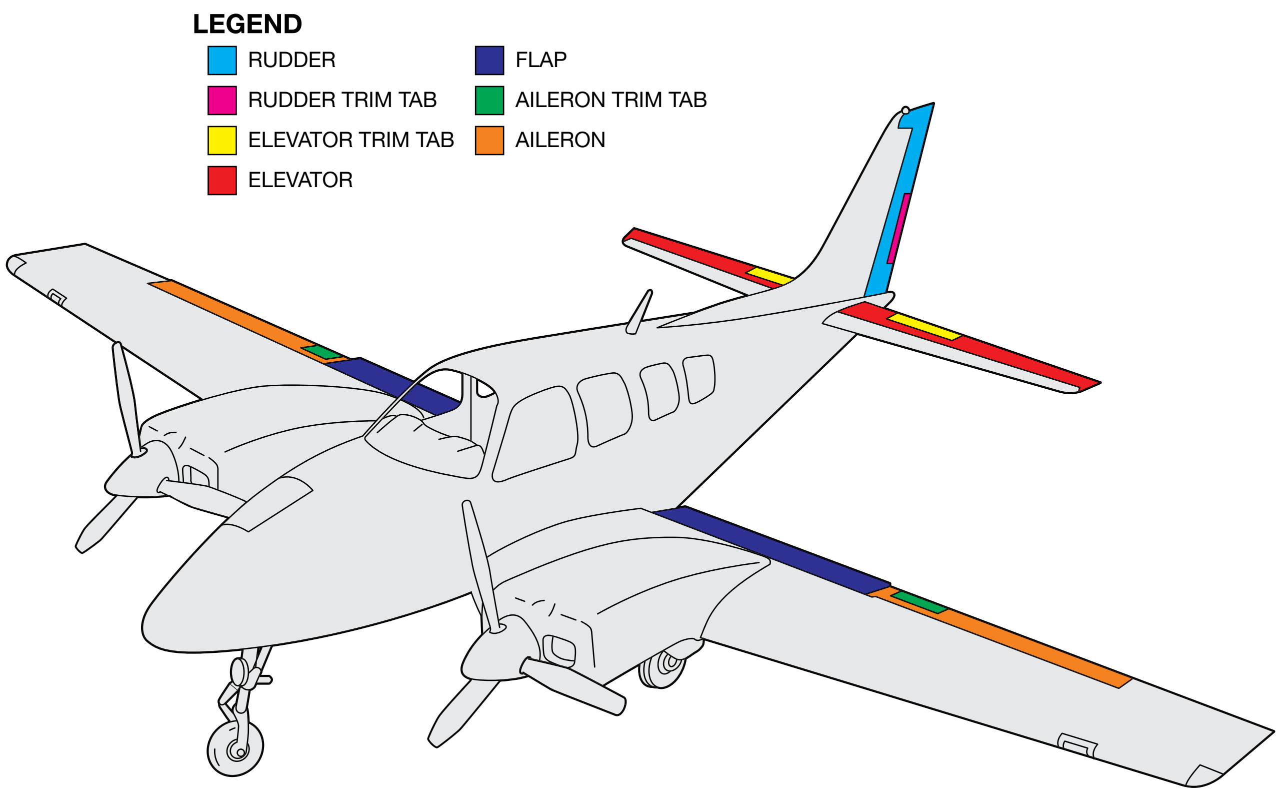


Figure 15-1. Flight Controls

Figure 15-2. Baron G58 Flight Controls

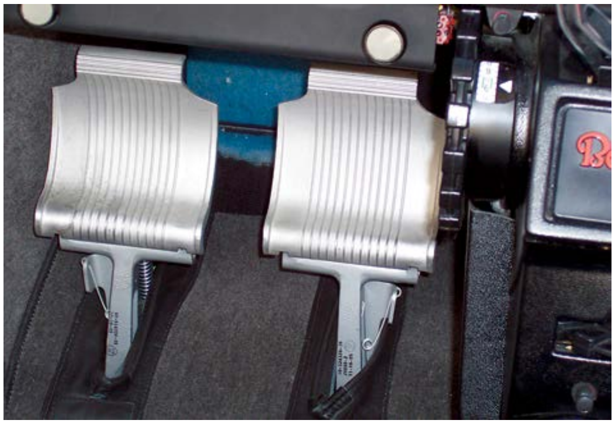


Figure 15-3. Rudder Pedals

The elevator trim tab can be actuated by an optional electric trim system. The electric elevator trim is controlled by a thumb switch mounted on the left side of the pilot control wheel (Figure 15-4). An emergency trim interrupt and autopilot disconnect switch is on the left side of the pilot control wheel. In the event of an unscheduled electric trim application, engage and hold the interrupt switch to temporarily break the electric trim circuit and stop movement of the elevator trim tab. Pull the AP SERVOS circuit breaker to deactivate the electric trim system. Refer to the Pilot's Operating Handbook (POH) for electric trim and autopilot preflight and operating procedures. Refer to the FlightSafety Training Checklist for trim runaway emergency procedures.

The trim tabs in the cockpit should be "zeroed out" prior to the preflight inspection. With the indicator at zero, the trim tab should line up relatively flush with its corresponding control surface. A slight difference in position is acceptable; however, any large difference should be inspected and adjusted by a mechanic.

Figure 15-4. Electric Trim Control

Control Locks

The control lock assembly prevents the flight controls from moving in gusty wind conditions. The control lock pin is inserted into the underside of the pilot control column to prevent movement of the ailerons and elevators (Figure 15-5).

Figure 15-5. Control Lock

Rudder pedals may be locked with a rudder lock pin attached to the main control lock assembly with a cable. Although the aircraft may be safely towed with only the control column lock installed, never tow the aircraft with the rudder lock installed. Because the rudder lock limits the movement of the nosewheel steering system, damage to the system can occur by towing the aircraft with the lock installed. Instructions for installing the control locks are printed on the control locks themselves. Verify that all control locks have been removed prior to starting the engines.

FLAP SYSTEM

DESCRIPTION

Baron G58 aircraft are equipped with Fowler-type flaps operated by an electric motor on the aft spar between the pilot and copilot seats. The motor drives a pair of flexible drive cables connected to jackscrew actuators at the flaps. A set of four limit switches in the left flap well (Figure 15-6), stop the flap motor when the flaps reach the selected position. Refer to the Figure 15-7 for an illustration of the flap system.

Figure 15-6. Flap Limit Switches

A three-position switch on the copilot subpanel controls the flaps. The flaps may be set at the full-up (0°), approach (15°), or full-down (30°) positions. The control switch must be moved out of a safety detent to move the flaps down. The switch does not need to be pulled out of the detent to be moved up. The flaps can be moved to any selectable position from any other position, and while in transit. There are no intermediate positions.

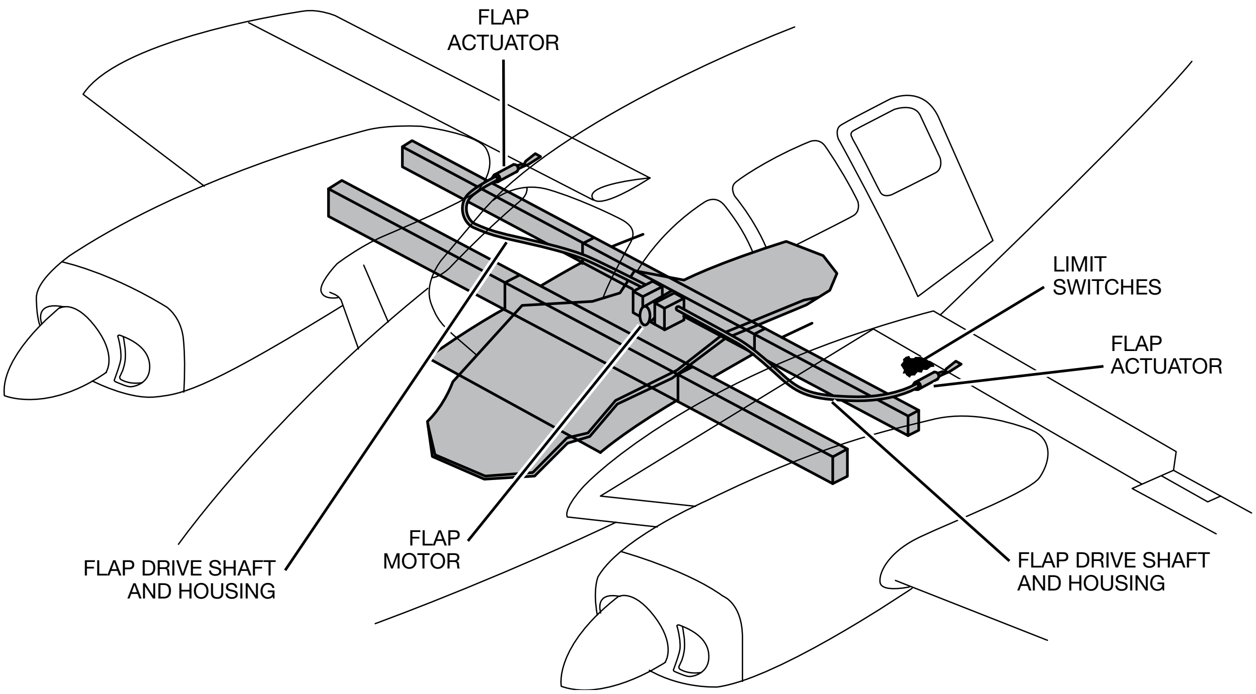


Figure 15-7. Flap System

Flap position is indicated by three lights adjacent to the flap control switch (Figure 15-8):

- Red light—Indicates the flaps are in transit
- Blue light—Illuminates when the flaps are in the approach position
- Amber light—Illuminates when the flaps are full down.

All of the lights extinguish when the flaps are fully retracted.

Figure 15-8. Flap Switch and Indicators

OPERATION

Preflight Inspection

Include a check of flap security and condition as part of the preflight inspection. Periodically, extend the flaps full down for a thorough inspection. Check the general condition of the jackscrew, hinges, and limit switches. Look along the leading edge of the flap for worn rivets, scratches, or scraped paint. The flaps should move up and down slightly, but not rattle. There should be no sideways movement in the flaps.

A doughnut-shaped rubber bumper is in the outboard section of each flap well to prevent the flaps from rattling and rubbing against the metal of the wing when the flaps are retracted. If the bumper is excessively worn or missing, the flaps makes contact with the wing in flight, eventually resulting in damage to the flaps.

Limit Switch Check

Operation of the flap limit switches may be checked during the Before Takeoff procedure. Select each flap position to verify the flaps stop properly in each direction. The flaps should stop evenly at each position without bouncing.

Takeoff Flap Settings

Although takeoff with the flaps is not prohibited, Beechcraft does not recommend the use of flaps for takeoff. Takeoff with the flaps extended may cause the aircraft to liftoff at speeds below the single-engine minimum control speed (VMCA). In no case should takeoff be attempted with full flaps extended.

Flap Extension Speeds

Maximum approach flap extension speed for the Baron G58 is 152 KIAS, indicated by a white triangle on the airspeed indicator. Maximum full-flap extension speed is 122 KIAS, indicated by the top of the white arc on the airspeed indicator.

Approach and Landing Flap Settings

Approach flaps are typically used to reduce airspeed and stabilize the aircraft when approaching the airport for landing. Approach flaps are also used to increase the descent rate and avoid large power reductions.

The normal landing procedure calls for full flap extension when landing on the runway is assured. Maximum braking can be achieved by leaving the flaps extended during landing rollout and gradually pulling the control wheel full aft while applying the brakes. Due to the high incidence of accidental gear retraction during the rollout, a safe procedure is to retract the flaps only after the aircraft is stopped and clear of the runway.

EMERGENCY/ABNORMAL

Flap Emergency Procedures

If the flaps do not extend, check the flap circuit breakers and reset if required. If it is not possible to extend the flaps, plan for a zero flap landing. Plan on additional landing distance due to the higher approach speed and loss of flap drag.

If the flexible drive cable or jackscrew actuator fails during flap travel, an asymmetrical flap extension results. The yaw and roll created by the split flap condition can be eliminated by reversing the flap direction with the flap control switch and pulling the flap motor circuit breaker when the flaps are symmetric. The aircraft is controllable in a full split flap condition by applying generous aileron pressure in the direction of the extended flap and opposite rudder pressure to maintain heading. If landing with a split flap condition, plan to land 5–10 KIAS faster than normal to increase aileron effectiveness during the flare.

STALL WARNING SYSTEM

DESCRIPTION AND OPERATION

The stall warning system consists of a stall warning horn, a lift transducer, and a heating element (Figure 15-9). The horn requires the electrical system to be active for operation.

When the angle of attack is great enough, aerodynamic pressure on the lift transducer vane pushes it against the face plate to complete the circuit to the stall warning horn. The lift transducer is effective in all flight attitudes and at all weights and airspeeds. The warning horn is intermittent at first, then becomes steady as the aircraft approaches a full stall.

The heating element protects the lift transducer and face plate from ice buildup. Stall warning heat is activated by a switch-type circuit breaker on the pilot subpanel. Any accumulation of ice on the wing may disrupt the airflow across the lift transducer and prevent the system from accurately indicating an imminent stall.

Figure 15-9. Stall Warning Vane

QUESTIONS

To answer the following questions, refer to the *FlightSafety Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. How can the rudder pedals be repositioned?

2. The aircraft should never be towed with which control lock installed? Why?

3. What stops the flaps between selectable positions?

4. What are the limiting airspeeds for the flaps?

5. How is the stall warning system powered on your aircraft?

6. When will the stall warning system be inaccurate?

7. List the steps to take in the event of an electric pitch trim runaway.

8. If the limit switches fail, what should be done to stop the flap motor?

9. What is the recommended takeoff flap setting? Why?

10. Describe the procedure to achieve maximum braking during landing.

11. What airspeed should be used for a "no-flap" landing?

12. Explain the procedure for a split flap condition.

CHAPTER 16
AVIONICS

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CHAPTER 16
AVIONICS

INTRODUCTION

This chapter describes the pitot and static systems and basic communication and navigation equipment on the Baron G58. Knowledge of the pitot-static system and its operation is vital to the safety of flight. The pilot should also be familiar with the communication and navigation equipment on the aircraft to ease pilot workload in flight.

PITOT SYSTEM

The GDC 74A air data computer and standby airspeed indicator receive ram-air pressure from the pitot tube on the left side of the nose radome (Figure 16-1). The pitot system self-drains through a drain hole in the bottom of the pitot mast. A heating element is in the pitot mast to prevent it from becoming obstructed by ice. The pitot heat system is activated by a switch-type

Figure 16-1. Pitot Tube

circuit breaker on the pilot subpanel. Refer to Figure 16-2 for an illustration of the pitot system.

If the pitot tube ram-air inlet becomes obstructed, indicated airspeed will read zero or lower than actual airspeed, depending on the severity of the blockage. If both the ram-air inlet and drain holes become obstructed, indicated airspeed remains at the same value, regardless of actual airspeed, as long as the aircraft maintains a constant altitude. If the aircraft climbs, indicated airspeed increases. If the aircraft descends, indicated airspeed decreases. Use known power settings and aircraft configurations to achieve a desired airspeed if the airspeed indicator is unreliable.

Ensure that the pitot tube is unobstructed during preflight and pitot heat is operational prior to flight in icing conditions. It is recommended pitot heat be used when flying in visible moisture.

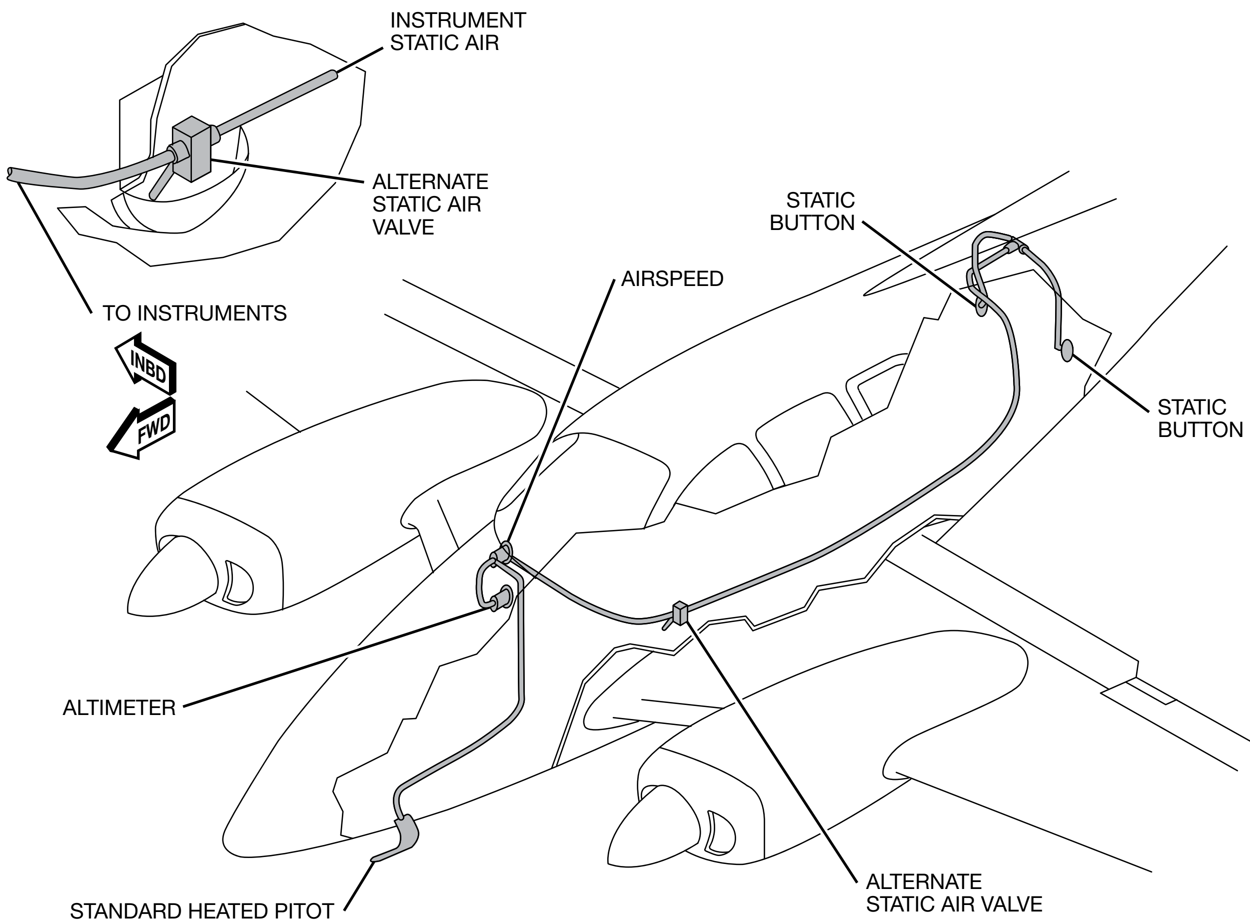


Figure 16-2. Pitot-Static System

STATIC SYSTEM

NORMAL SYSTEM OPERATION

Static air is routed to the GDC 74A air data computer to provide accurate information for computing airspeed, and is also the primary air reference for the altimeter and VSI Static air ports (Figure 16-3) are on each side of the aft fuselage aft of the rear cabin bulkhead. Static air lines are routed along the left side of the fuselage to the cockpit. Due to the location of the static ports, ice-protection equipment is not needed. An alternate static air system is provided in the event that the normal static lines become obstructed.

Figure 16-3. Static Port

The static lines are drained when the alternate static air selector is placed in the ON ALTERNATE position. The static system should be drained prior to flight. Ensure that the static ports are unobstructed during preflight.

ALTERNATE STATIC SYSTEM

If the static ports become obstructed in flight, the pilot is likely to notice sluggish or no movement of the altimeter and vertical speed indicator.

The alternate static system provides a source of static pressure to the instruments from inside the cabin. The alternate static air selector is on the pilot left sidewall, forward of the CB panel (Figure 16-4). If the static system becomes completely

Figure 16-4. Static Air Selector

blocked, the altimeter freezes and the vertical speed indicator indicates zero. The airspeed indicator indicates normally but will be slightly inaccurate. A partial blockage causes erroneous readings on both instruments. The lever should then be moved forward to the ON ALTERNATE position to select alternate static air.

Refer to the Airspeed Calibration and Altimeter Correction charts in the Performance section of the *Pilot's Operating Handbook (POH)* when operating on the alternate static air system. The *FlightSafety Training Checklist* contains procedures for activating the alternate static air system.

COMMUNICATION AND NAVIGATION

ANTENNAS

The equipment installed in the aircraft determines antenna type and location. Refer to Figure 16-5 for an illustration of typical antenna locations. The No. 1 communication antenna is on the top of the fuselage and the No. 2 communication antenna is on the bottom of the fuselage.

Distance measuring equipment (DME) and transponder antennas are typically on the bottom of the fuselage. The transponder antenna is under

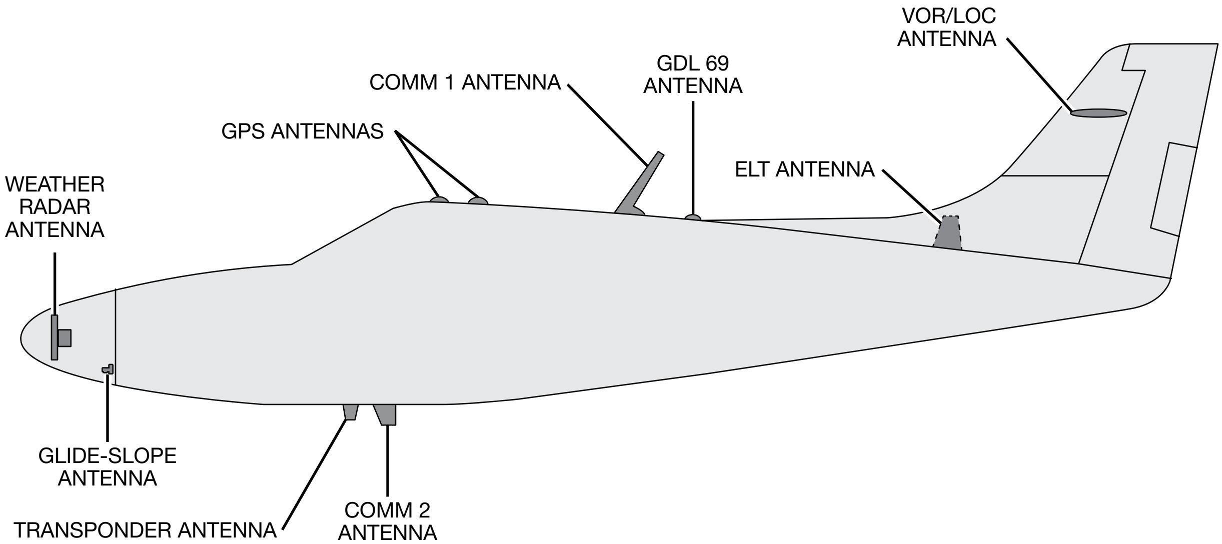


Figure 16-5. Antenna Locations

the copilot seat, and a DME antenna, if installed, is under the pilot seat. Glide-slope antennas are typically behind the nose radome.

The antenna for both GIA 63 integrated avionics units is on the vertical stabilizer. Half of the antenna is visible on each side of the vertical stabilizer. The GWX 68 weather radar antenna is behind the nose radome. The emergency locator transmitter (ELT) antenna is behind the fairing at the base of the vertical stabilizer. Antennas for options such as Stormscope and Skywatch Traffic Alerting System are on the belly and roof of the fuselage respectively.

EMERGENCY LOCATOR TRANSMITTER

The ELT is an automatic transmitting device that assists in the tracking and recovery of a downed aircraft. The ELT transmits on the international distress frequencies of 121.5 kHz, 243 MHz, or newer model 406 MHz upon sensing approximately 5 g of linear deceleration. The ELT is on a shelf in the aft fuselage and is accessed through an inspection panel on the left side of the aft fuselage.

An Artex remote switch is on the right side of the copilot panel (Figure 16-6). This switch has ON and ARM positions. The unit may be tested/reset by holding the switch in the ON position for 1 second, then returning it to the ARM position. An indicator light above the switch flashes when the ELT is activated. The ELT battery must be replaced when half of its useful life has expired (this date is stamped on the battery) or after one cumulative hour of use. ELT testing is permitted any time for a maximum of three sweeps.

Figure 16-6. ARTEX ELT Switch

STATIC DISCHARGING

A static electrical charge may build up on the surface of the aircraft in flight. This electrical charge, if retained, can cause interference in radio and avionics equipment operation. Static dissipation wicks are on the trailing edge of the flight surfaces to aid in the dissipation of static electricity.

There are 15 static wicks on the aircraft: three on each wing tip, three on each elevator, and three on the rudder. Static wick condition and security should be checked during the preflight inspection.

FLIGHT INSTRUMENTS AND AVIONICS

The avionics and flight instruments are completely integrated into the Garmin G1000 integrated avionics system (Figure 16-7). For further information on this system, refer to the documentation supplied with the aircraft on the Garmin G1000 System and the *POH*.

A magnetic compass is above the instrument panel. A lighted outside air temperature indicator is on the left side panel. See the Lighting section

Figure 16-7. Baron G58 Panel

of this manual for operation of the OAT gage and magnetic compass lights. A clock is in the center of the pilot control wheel.

AUTOPILOT

The Baron G58 is equipped with the Garmin GFC 700 digital automatic flight control system (AFCS). The autopilot system is fully integrated into the G1000 system. The autopilot controls are on the left side of the multifunction display (MFD) and all mode annunciations are displayed on the primary flight display (PFD) (Figure 16-8). Refer to the *AFCS Pilot's Guide* for the Bonanza B58/G58 and *POH* for operation and limitations.

AVIONICS POWER

The avionics bus receives electrical power from the RIGHT BUS through a 35-amp current limiter. The AVIONICS MASTER switch is used to control power to the G1000 Avionics Suite. The avionics master circuitry is a "fail-safe" system. The avionics can be powered even if the AVIONICS MASTER switch fails. This can be done by pulling the AVIONICS POWER circuit breaker on the left CB panel (Figure 16-7).

Electrical power to the avionics bus is controlled by an avionics master relay through the AVIONICS MASTER switch. The avionics master relay is a normally closed relay (closed when no electrical power is supplied) and is opened by electrical power from the RIGHT BATT. When the AVIONICS MASTER switch is OFF, and the RIGHT BATT switch is ON, electrical power is supplied to the relay to open the circuit to the avionics bus. When the AVIONICS MASTER switch is turned ON, electrical power is removed from the relay, allowing it to close, and power is then available to the AVIONICS BUS and all associated equipment. Refer to Figure 16-9 for an illustration of the avionics power system.

Due to the design of the system, the avionics can still be powered if the avionics power circuit breaker trips. When electrical power is removed from the avionics master relay by opening the avionics power circuit breaker, the relay closes and completes the circuit to the avionics bus. Refer to the *FlightSafety Training Checklist* for the avionics master switch failure procedure.

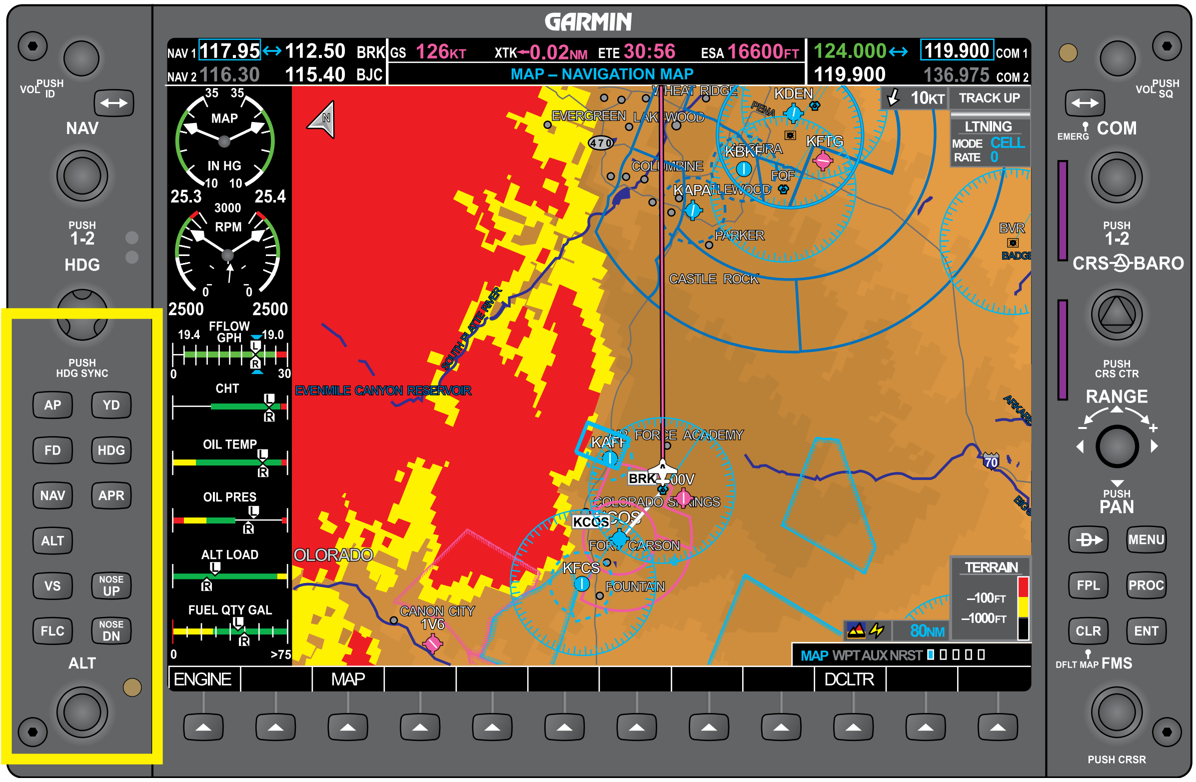


Figure 16-8. Autopilot Controls on MFD

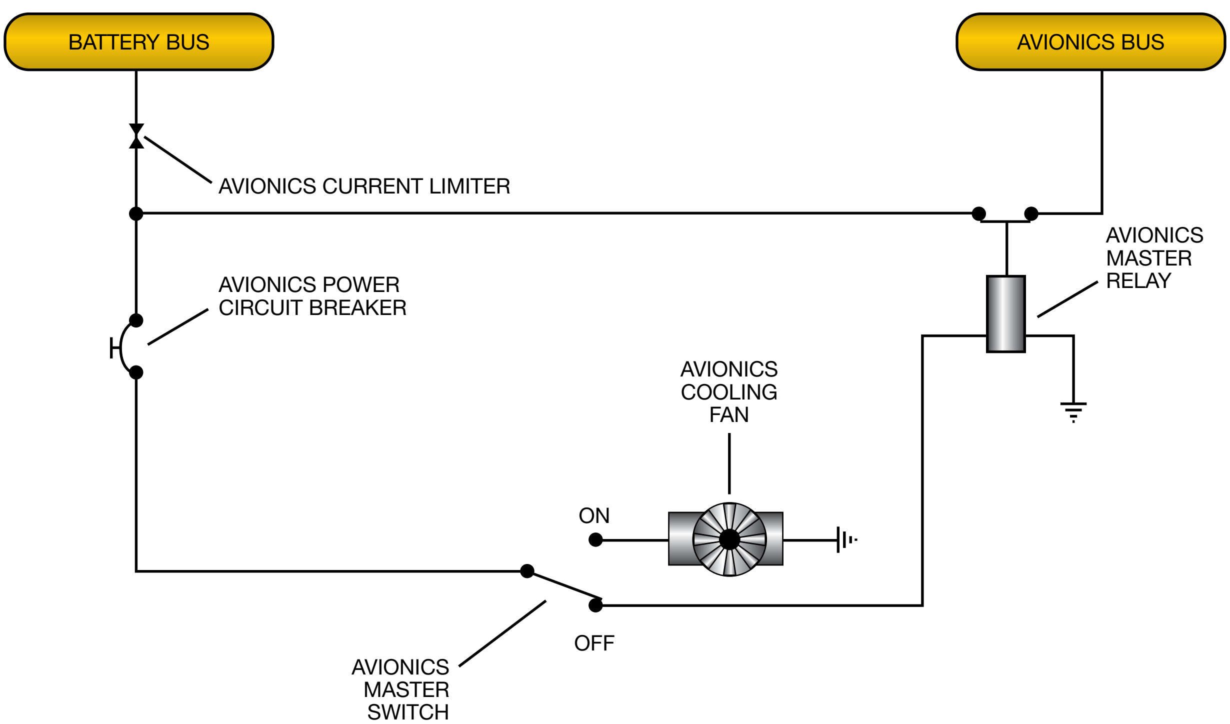


Figure 16-9. Avionics System

G1000 SYNTHETIC VISION

SYNTHETIC VISION OVERVIEW

- The Synthetic Vision System (SVS) depicts a forward-looking attitude display of the topography immediately in front of the aircraft.
- SVS information is shown on the Primary Flight Display (PFD), or on the Multifunction Display (MFD) in Reversionary Mode
- The depicted imagery is derived from the aircraft attitude, heading, GPS three-dimensional position, and a database of terrain, obstacles, and other relevant features.
- The terrain display is intended for situational awareness only. It may not provide the accuracy or fidelity on which to base decisions and plan maneuvers to avoid terrain or obstacles.
- Navigation must not be predicated solely upon the use of the Terrain–SVS or TAWS terrain or obstacle data displayed by the SVS.

The following SVS enhancements appear on the PFD:

- Synthetic Terrain
- Pathways
- Flight Path Marker
- Horizon Heading Marks
- Traffic Display
- Airport Signs
- Runway Display
- Terrain Alerting
- Obstacle Alerting

OPERATION

SVS can be turned on/off using the PFD softkey on the PFD (Figure 16-10).

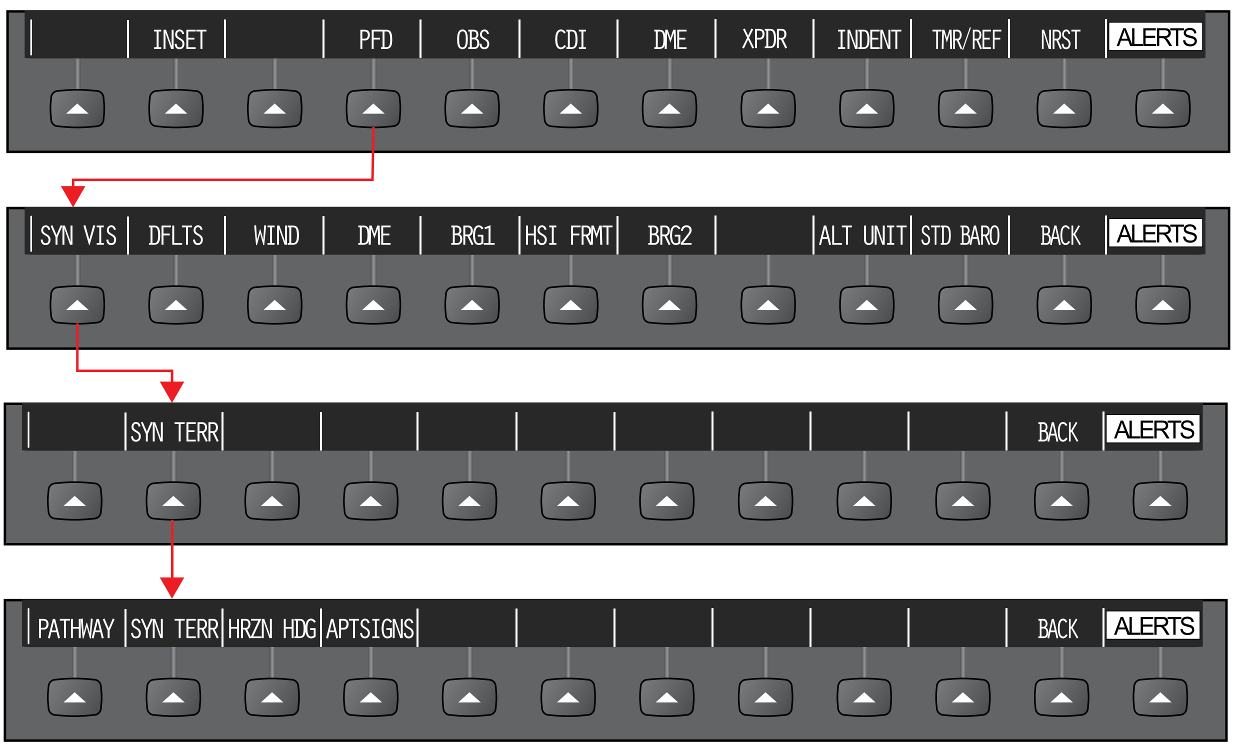


Figure 16-10. SVS Operation Using PFD Softkeys

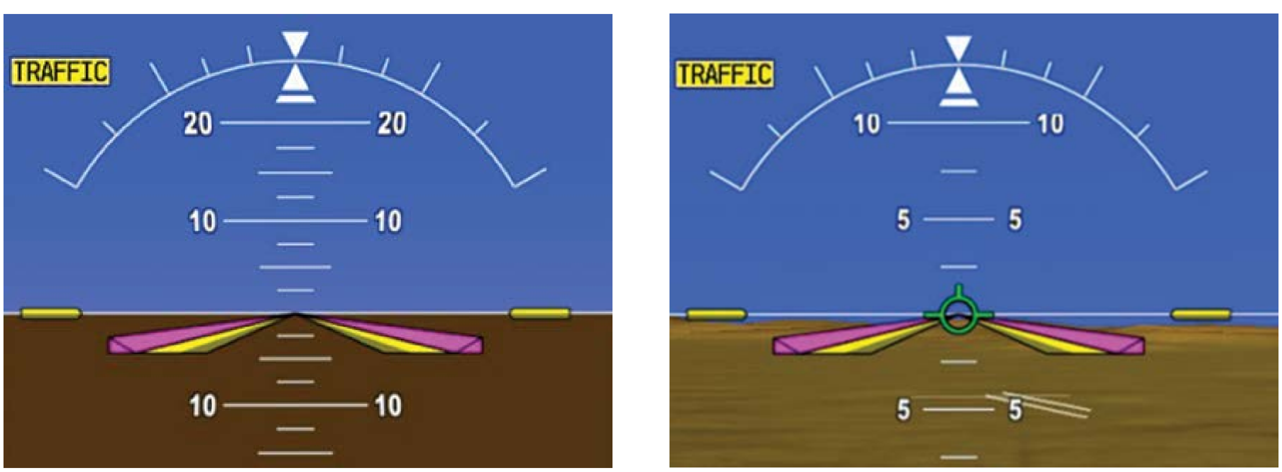
Selecting SYN TERR will activate (Figure 16-11):

- Synthetic Terrain
- Flight Path Marker
- Traffic Display
- Terrain and Obstacle Alerting

Other SVS options (Pathways, Horizon Headings and Airport Signs) have dedicated softkeys.

When SVS is enabled, the pitch scale increments are reduced from 20° up and 15° down, to 10° up and 7.5° down (Figure 16-12).

Figure 16-11. All SVS Options Turned On



SVS OFF **SVS ON**

Figure 16-12. SVS Enabled and Disabled

Zero Pitch Line

The Zero Pitch Line is drawn completely across the display and represents the aircraft attitude with respect to the horizon (Figure 16-13). It may not align with the terrain horizon, particularly when the terrain is mountainous or when the aircraft is flown at high altitudes.

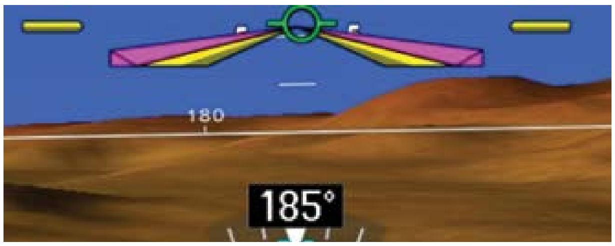


Figure 16-13. Zero Pitch Line

Horizon Heading

The Horizon Heading is synchronized with the HSI and shows approximately 60° of compass heading in 30° increments on the Zero Pitch Line.

Pathways

Pathways provide a three-dimensional perspective view of the selected route of flight shown as colored rectangular boxes representing the horizontal and vertical flight path of the active flight plan (Figure 16-14).

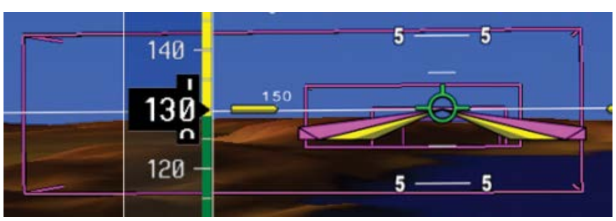


Figure 16-14. Pathways

- Pathway size:
  - Enroute:
    - Width: 700 feet
    - Height: 200 feet
  - Approach:
    - Width: 700 feet or one half full scale deviation on the HSI, whichever is less.
    - Height: 200 feet or one half full scale deviation on the VDI, whichever is less.
- The altitude at which the pathway boxes are displayed is determined by the higher of either the selected altitude or the VNAV altitude programmed for the active leg in the flight plan.
- The color of the rectangular boxes may be magenta, green, or white depending on the route of flight and navigation source selected.
- Pathways are shown descending only for a programmed descent (VNAV).
- Pathways provide supplemental glidepath information on an active ILS, LPV, LNAV/VNAV, and some LNAV approaches.

Flight Path Marker

The Flight Path Marker (FPM), also known as a Velocity Vector, is displayed at groundspeeds above 30 knots (Figure 16-15).

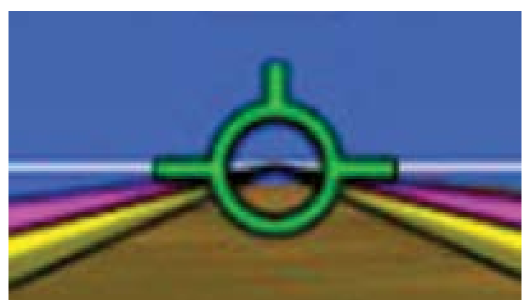


Figure 16-15. Flight Path Marker (FPM)

- Depicts the approximate projected path of the aircraft accounting for wind speed and direction relative to the three-dimensional terrain display.
- The FPM represents the direction of the flight path as it relates to the terrain and obstacles on the display, while the airplane symbol represents the aircraft heading.

- The FPM works in conjunction with the Pathways feature to assist the pilot in maintaining desired altitudes and direction when navigating a flight plan. When on course and altitude the FPM is aligned inside the pathway boxes.
- The FPM may also be used to identify a possible conflict with the aircraft flight path and distant terrain or obstacles. Displayed terrain or obstacles in the aircraft's flight path extending above the FPM could indicate a potential conflict, even before an alert is issued by TAWS. However, decisions regarding terrain and/or obstacle avoidance should not be made using only the FPM.

Traffic

Traffic symbols are displayed in their approximate locations as determined by the related traffic systems (Figure 16-16).

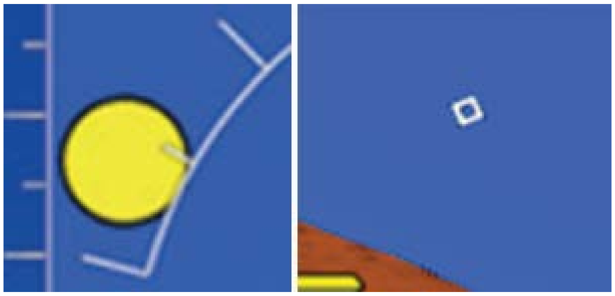


Figure 16-16. Traffic Symbols

- Traffic symbols are displayed in three dimensions, appearing larger as they are getting closer, and smaller when they are further away.
- Traffic symbols and coloring are consistent with that used for traffic displayed in the Inset map or MFD traffic page.

Airport Signs

Airport Signs provide a visual representation of airport location and identification on the synthetic terrain display (Figure 16-17).

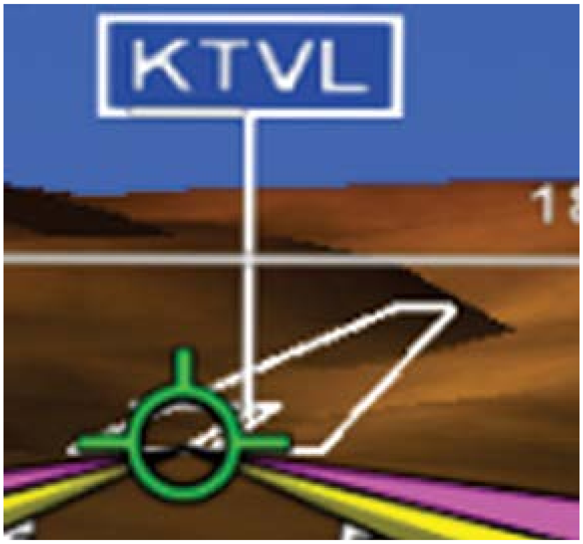


Figure 16-17. Airport Signs

- When activated, the signs appear on the display when the aircraft is approximately 15 nm from an airport and disappear at approximately 4.5 nm. Airport signs are shown without the identifier until the aircraft is approximately eight nautical miles from the airport.
- Runway thresholds are depicted at their respective elevations as defined in the database.
- As runways are displayed, those within 45° of the aircraft heading are displayed in white. Other runways will be gray in color.
- When an approach for a specific runway is active, that runway will appear brighter and be outlined with a white box
- As the aircraft gets closer to the runway, more detail such as runway numbers and centerlines will be displayed (Figure 16-18).

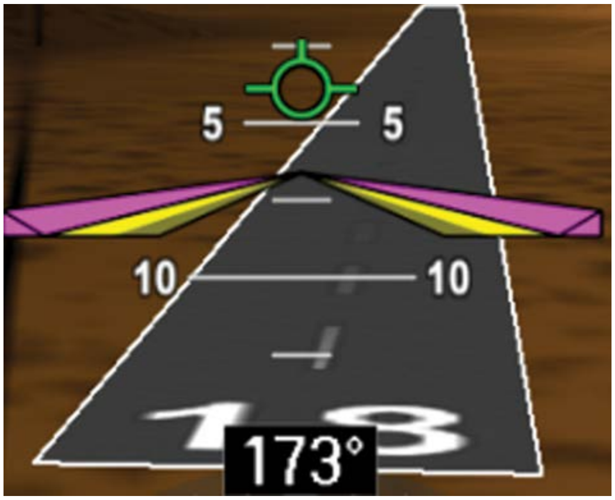


Figure 16-18. Runway Thresholds

Terrain and Obstacle Alerting

Terrain alerting on the synthetic terrain display is triggered by Forward-looking Terrain Avoidance (FLTA) alerts, and corresponds to the red and yellow X symbols on the Inset Map and MFD map displays (Figure 16-19).

- Obstacles are represented on the synthetic terrain display by standard two-dimensional tower symbols found on the Inset map and MFD maps and charts.
- Unlike the Inset map and MFD moving map display, obstacles on the synthetic terrain display do not change colors to warn of potential conflict with the aircraft's flight path until the obstacle is associated with an actual FLTA alert. Obstacles greater than 1000 feet below the aircraft altitude are not shown.

Field of View

The PFD field of view can be represented on the MFD Navigation Map Page (Figure 16-20). Two dashed lines forming a V-shape in front of the aircraft symbol on the map, represent the forward viewing area shown on the PFD.

The field of view is 30° to the left and 35° to the right.

To turn on Field of View:

1. Select MENU on the MFD
2. Select Map Setup
3. In the Map group, Field of View is the last selection

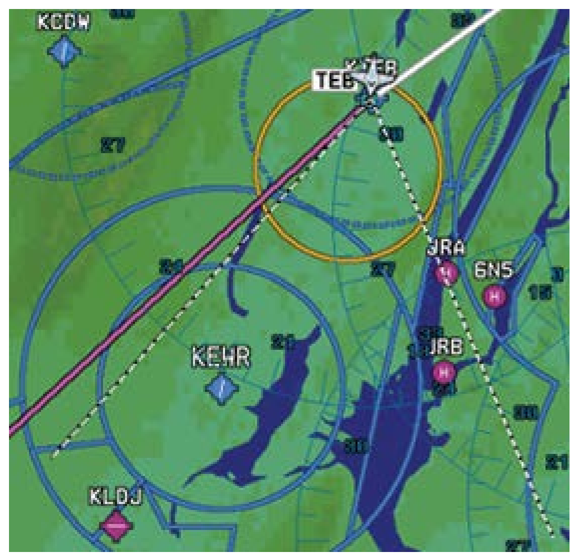


Figure 16-20. Field of View

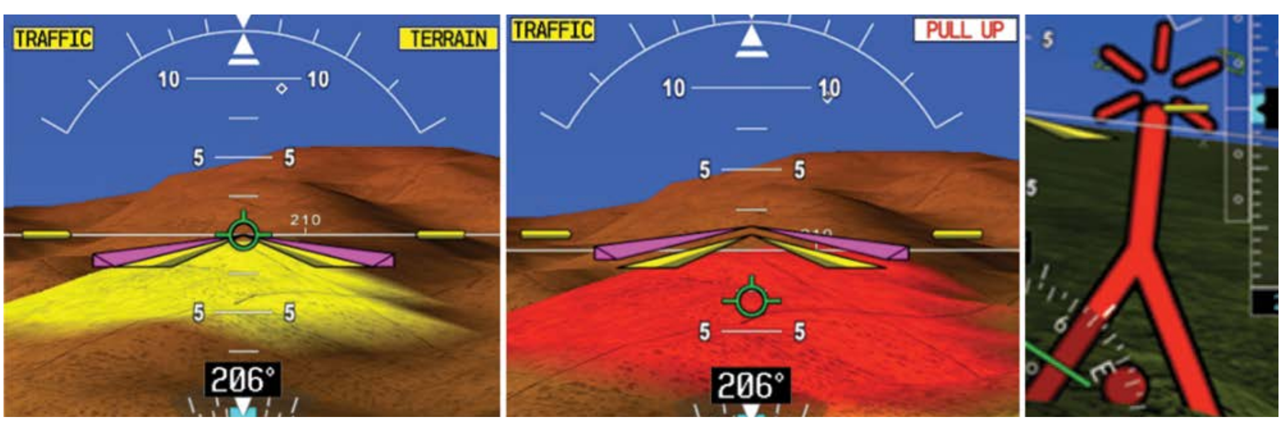


Figure 16-19. Terrain and Obstacle Display

QUESTIONS

To answer the following questions, refer to the *FlightSafety Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. Which instrument uses pitot reference?

2. What occurs if the pitot tube becomes obstructed?

3. Which instruments use static air reference?

4. If the static air ports are blocked, what indication should the pilot see?

5. How is the static system drained?

6. What must be done to stop an ELT transmission?

7. When and how can you test the ELT?

8. When must ELT batteries be replaced?

9. How many static wicks are installed on your aircraft?

10. How is the alternate static air system activated?

11. How can power be supplied to the avionics in the event that the avionics master switch fails?

12. How can a desired airspeed be established if the pitot tube is blocked?

13. Where can you find your autopilot operating procedures?

The information normally contained in this chapter is not applicable to this particular aircraft.

CHAPTER 18
PERFORMANCE WEIGHT

CONTENTS

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ILLUSTRATIONS

CHAPTER 18
PERFORMANCE, WEIGHT AND BALANCE

INTRODUCTION

It is the responsibility of the pilot to ensure that the aircraft is properly loaded and aircraft performance has been calculated prior to flight. The necessary performance and weight and balance data is provided by the manufacturer in the *Pilot's Operating Handbook (POH).*

This chapter is divided into two sections: Performance and Weight and Balance. The Performance section explains how to utilize the charts and tables contained in the Performance section of the *POH*. The Weight and Balance section guides the user through common terminology and the interpretation and use of the applicable forms, tables, and graphs. Takeoff and Landing Data Charts are provided at the end of the chapter. These charts provide useful performance and weight and balance calculations.

PERFORMANCE

GENERAL

Performance calculations are essential to the safety of flight. The Federal Aviation Administration (FAA) requires that the pilot know the runway lengths at airports of intended use and the takeoff and landing distance data for any flight. Additionally, FlightSafety recommends that the pilot of twin-engine aircraft determine accelerate-stop distance, single-engine rate of climb, and single-engine service ceiling.

Information determined by preflight performance planning should be used to formulate a plan of action for normal and emergency situations. Calculating aircraft performance determines whether the aircraft can be flown safely with the environmental, aircraft weight, and airport conditions that exist at the time. Performance data also provides a gage to measure actual versus expected performance. Achieving less-than-expected performance may be an indication of an aircraft problem.

TERMINOLOGY

Accelerate-Go Distance—The distance required to accelerate an aircraft to a specified speed and, assuming failure of an engine at the instant that speed is attained, to continue takeoff on the remaining engine and climb to a height of 50 feet.

Balked Landing—An aborted landing (i.e., all engines go-around in the landing configuration).

Balked Landing Transition Speed—The minimum speed at which a transition to a balked landing climb should be attempted from a 50- foot obstacle height.

Calibrated Airspeed (CAS)—Indicated airspeed of an aircraft corrected for position and instrument error. CAS is equal to true airspeed in standard atmosphere at sea level.

Climb Gradient—The demonstrated ratio of the change in height during a portion of a climb to the horizontal distance traversed in the same time interval.

Demonstrated Crosswind Velocity—The crosswind component for which adequate control of the aircraft during takeoff and landing was actually demonstrated during certification tests. This value is not an aerodynamic limit for the aircraft.

Indicated Airspeed (IAS)—The speed of an aircraft as shown on the airspeed indicator when corrected for instrument error. IAS values published in the POH assume zero instrument error.

Indicated Pressure Altitude—The number actually read from an altimeter when the barometric subscale has been set to 29.92 inches of mercury (1,013.2 millibars).

I*ndicated outside air temperature (IOAT)*—The temperature indicated on the pilot outside air temperature indicator. The indication is not adjusted for instrument error or temperature compressibility effects.

International standard atmosphere (ISA)—Atmosphere in which:

1. The air is a dry perfect gas
2. The temperature at sea level is 15°C
3. The pressure at sea level is 29.92 inches Hg (1,013.2 millibars)
4. The temperature gradient from sea level to the altitude at which a temperature of –56.6°C exists is –0.00198°C per foot and zero above that altitude

KCAS—Calibrated airspeed expressed in knots.

KIAS—Indicated airspeed expressed in knots.

KTAS—True airspeed expressed in knots.

M—Mach number is the ratio of true airspeed to the speed of sound.

Maximum Effective Braking—The maximum amount of braking pressure that can be applied to the toe brakes without locking the wheels.

Outside air temperature (OAT)—The free air static temperature, obtained either from in-flight temperature indications adjusted for instrument error and compressibility effects or ground meteorological sources.

Pressure Altitude—Altitude measured from sea-level pressure (29.92 inches Hg) by a pressure or barometric altimeter. It is the indicated pressure altitude corrected for position and instrument error. In the *POH*, altimeter instrument errors are assumed to be zero.

Station Pressure—Actual atmospheric pressure at field elevation.

True airspeed (TAS)—The airspeed of an aircraft relative to undisturbed air, which is the CAS corrected for altitude, temperature, and compressibility.

Temperature Compressibility Effects—An error in the indication of temperature caused by airflow over the temperature probe. The error varies, depending on altitude and airspeed.

VA—The maximum speed at which application of full available aerodynamic control will not over-stress the aircraft.

PERFORMANCE CHARTS

The POH includes many performance charts and tables for all phases of flight. The charts are arranged more or less chronologically from preflight planning through landing. Most Beechcraft charts are based on specific associated conditions and airspeeds. The pilot should become aware of the conditions when calculating performance figures. Any deviation from the associated conditions or airspeeds will result in differences between computed and actual performance. In many cases, it is desirable to add a “fudge factor” to performance calculations to compensate for time-worn engines, worn brakes, and differences in pilot technique.

Many performance charts are divided into sections by reference lines to determine the effects of weight, wind, and obstructions. Guidelines are then used to calculate the change from the reference condition. The reference lines indicate where to begin following the guidelines. Always project to the reference line first; then follow the guidelines to the actual condition. From the condition, proceed horizontally out of the section to the next reference line and repeat the process until the end of the chart.

Refer to the Performance section of the *POH* for instructions and charts for calculating performance data.

WEIGHT AND BALANCE

GENERAL

Weight and balance are critical to the safe operation of any aircraft. If gross weight limitations are exceeded, takeoff and flight performance, stability, and structural integrity of an aircraft are unpredictable. An aircraft loaded forward of the allowable limits may lack elevator authority to pitch up and may not even become airborne. An aircraft loaded aft of limits is unstable, tending to become uncontrollable as it nears stall speeds.

The Baron G58 was designed, tested, and certified within a certain loading and weight distribution envelope. Refer to Figure 18-1 for Baron Weight and Balance, and Takeoff and Landing Data Forms. At the time of initial aircraft delivery, the necessary weight and balance data is provided by Beechcraft. Subsequent changes may have been made. It is the responsibility of the owner and/or operator to ensure that the current weight and balance data is available in the aircraft. The pilot is responsible for determining if the aircraft falls within the loading envelope prior to flight.

WEIGHT & BALANCE LOADING FORM

ITEM	WEIGHT	MOMENT/100
1. BASIC EMPTY CONDITION		
2. Front Seat Occupants		
3. 3rd and 4th Seat Occupants		
4. 5th and 6th Seat Occupants		
5. Nose Baggage		
6. Aft Baggage		
7. SUB TOTAL ZERO FUEL CONDITION		
8. Fuel Loading		
9. Sub Total Ramp Condition		
10. Less Fuel for Start, Taxi and Runup	(24)	(20)
11. SUB TOTAL TAKEOFF CONDITION		
12. Less Fuel to Destination		
13. Landing Condition		

TAKEOFF AND LANDING DATA

TAKEOFF

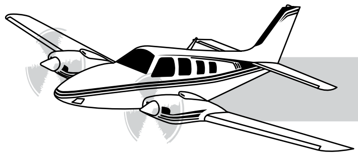
CONDITIONS		SPEEDS		PERFORMANCE	
Pressure Altitude		Liftoff		Ground Roll	
Altimeter		50 Obstacle		50 Obstacle	
Temperature		Vx		Max. Climb	
Cross Wind		Vy			
Headwind		Cruise Climb			
Weight					

LANDING

CONDITIONS		SPEEDS		PERFORMANCE	
Pressure Altitude		Approach		Ground Roll	
Altimeter		Balked Landing		50 Obstacle	
Temperature					
Cross Wind					
Headwind					
Weight					

ATIS	CLEARANCE

Figure 18-1. Weight and Balance, and Takeoff and Landing Data Forms



Refer to Figure 18-2 for seating, baggage, and equipment arrangements.

DEFINITIONS

The following terms apply to aircraft weight and balance calculations:

Basic Empty Weight—The weight of the aircraft without passengers, cargo, or fuel. This weight is found in the Weight and Balance section of the POH and must be updated and signed by a mechanic whenever equipment is added, removed, or relocated in the aircraft. The basic empty weight includes full oil, hydraulic fluid, and unusable fuel.

Zero Fuel Weight—The weight of the aircraft, loaded with passengers and cargo for the flight, without fuel aboard.

Ramp Weight—The weight of the aircraft, fully loaded, at engine start. Maximum certified ramp weight is an aircraft limitation. This weight allows for taxiing and engine runup, reducing the fuel weight sufficiently to be at maximum takeoff weight at takeoff.

Beechcraft publishes average figures for fuel burn for start, taxi, and runup at 24 pounds.

Takeoff Weight—The weight at takeoff. Maximum takeoff weight is the maximum weight at which flight is allowed. This weight is found in the Limitations section of the POH.

Landing Weight—The weight at landing.

Center of Gravity (CG)—The balance point of the aircraft as loaded at any given time. Weight in the aircraft must be distributed so that the center of gravity falls within acceptable limits for the aircraft to be safely flown.

Datum Line—The point along the longitudinal axis from which the weight and balance measurements are taken. Center-of-gravity position is expressed in inches aft of datum.

Arm—The distance aft of the datum of any particular weight in the aircraft, used to calculate weight and balance.

Moment—The force exerted about the center of gravity of any load in the aircraft. Moment is calculated by multiplying the weight by the arm. Refer to Figure 18-3 for moment limits versus weight.

The essence of weight and balance calculations is to ensure that the aircraft is not loaded above the maximum weight for flight and that the weight is distributed so the center of gravity stays within prescribed limits for all flight operations.

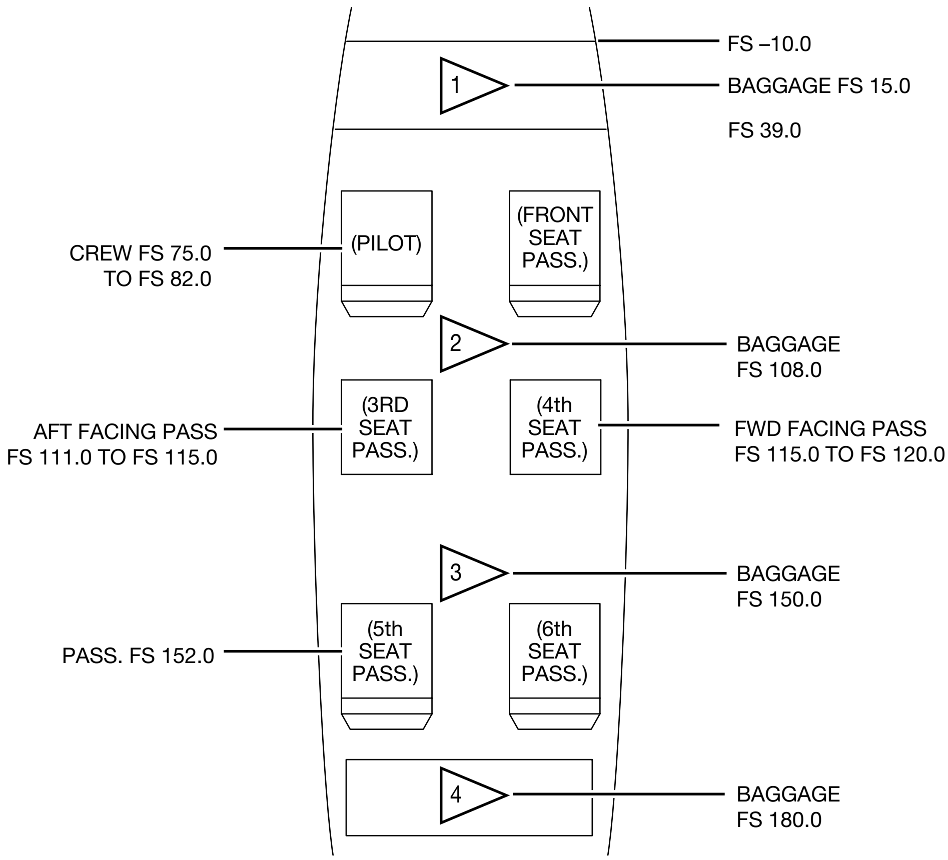
SPECIAL CONSIDERATIONS

The Baron G58 may not be able to be loaded with six adults, baggage, and full fuel without being significantly overweight. Careful calculations are required to determine the number of passengers, baggage load, and fuel that may be loaded in the aircraft. Always determine takeoff and landing conditions prior to flight to avoid exceeding weight and balance limitations.

WEIGHT AND BALANCE CALCULATIONS

Refer to the Weight and Balance section of the *POH* for the applicable charts and computing procedure. The basic empty weight and moment of the aircraft are shown on the current Basic Empty Weight and Balance form. Passenger and baggage loads are shown on the Useful Load Weight and Moment tables. The minimum and maximum moments are shown on the Moment Limits vs. Weight graph or numerical table. All moments are divided by 100 to simplify calculations.

PAYLOAD LOCATIONS



NOTES:

1 ▷ Maximum baggage weight is 300 pounds.

2 ▷ Maximum baggage weight is 200 pounds between front and rear spars with aft-facing or removed 3rd and 4th seats. This location is not approved for baggage when the 3rd and 4th seats are facing forward.

3 ▷ Maximum Baggage Weight is 400 pounds aft of the rear spar, with 5th and 6th seats removed, or 200 pounds with only the 5th or 6th seat removed.

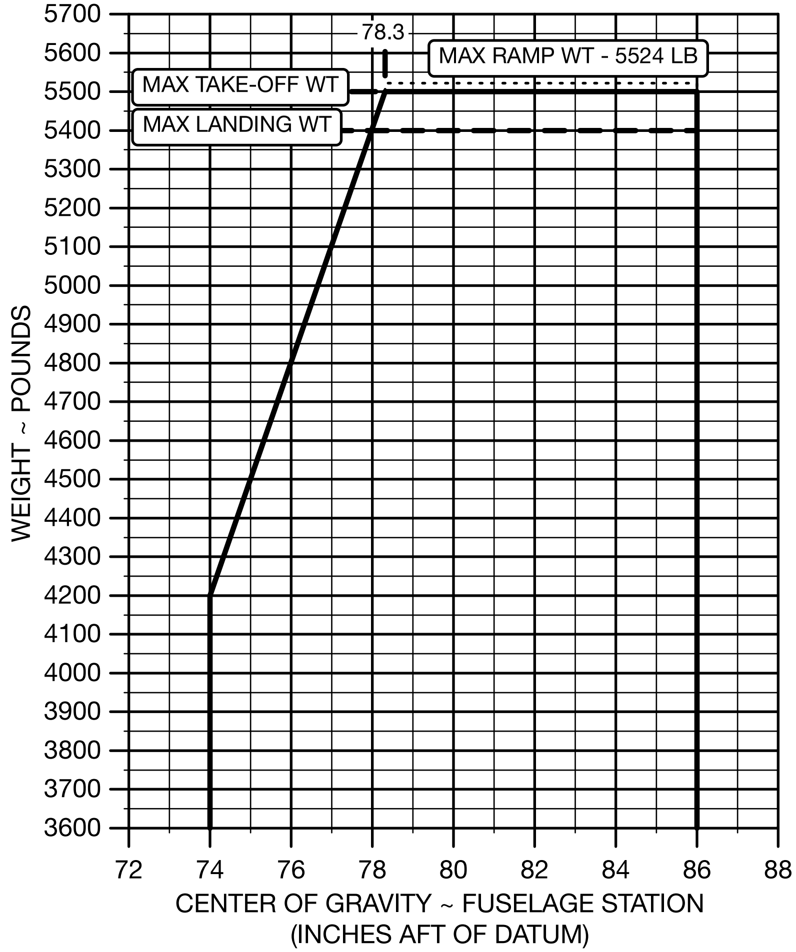
4 ▷ Maximum baggage weight is 120 pounds.

NOTES:

1. The floor structure load limit is 50 pounds per square foot between the front and rear spars and 100 pounds per square foot aft of the rear spar.
2. Any combination of the 3rd, 4th, 5th, and 6th seats may be removed by the owner/operator or pilot-in-command, with the appropriate Log Book approved entry and Weight and Balance Record change. Refer to the equipment list for seat weights and arms.
3. All maximum baggage weights include baggage, cargo, and installed equipment, if applicable. All baggage and cargo must be secured with an approved retention system.

Figure 18-2. Seating, Baggage, and Equipment Arrangements

WEIGHT AND BALANCE DIAGRAM



MOMENT LIMITS vs. WEIGHT TABLE

WEIGHT (lb)	MOMENT/100 (lb-in.)	
	FWD LIMIT	AFT LIMIT
3800	2812	3268
3850	2849	3311
3900	2886	3354
3950	2923	3397
4000	2960	3440
4050	2997	3483
4100	3034	3526
4150	3071	3569
4200	3108	3612
4250	3152	3655
4300	3196	3698
4350	3241	3741
4400	3285	3784
4450	3330	3827
4500	3375	3870
4550	3420	3913
4600	3465	3956
4650	3510	3999
4700	3556	4042
4750	3601	4085
4800	3647	4128
4850	3693	4171
4900	3740	4214
4950	3786	4257
5000	3832	4300
5050	3879	4343
5100	3926	4386
5150	3973	4429
5200	4020	4472
5250	4067	4515
5300	4115	4558
5350	4163	4601
5400	4210	4644
5450	4258	4687
5500	4307	4730

Figure 18-3. Moment Limits vs. Weight

QUESTIONS

To answer the following questions, refer to the *FlightSafety Pilot Training Manual*, *Pilot Training Checklist*, and ground school notes:

1. Which performance calculations is a pilot required to figure prior to flight?

2. What is the maximum takeoff and landing weight for your aircraft?

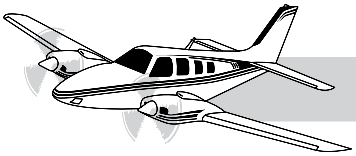
3. What is the danger of an aircraft being loaded over maximum gross weight?

4. What is the danger of an aircraft being loaded forward of the center-of-gravity limit?

5. What use should be made of performance calculations?

6. When figuring Beechcraft performance charts, what consideration must be kept in mind?

7. What is your aircraft's basic empty weight?



APPENDIX A
FLIGHT PROFILES

CONTENTS

Page

ILLUSTRATIONS

APPENDIX A
FLIGHT PROFILES

NORMAL TAKEOFF AND DEPARTURE

A. Before takeoff checklist items complete. The following items should be considered:

1. Current weather/terrain conditions
2. Departure procedure
3. Takeoff alternate, if necessary
4. Engine failure or other event prior to liftoff
5. Engine failure or other event after liftoff, with gear up or down

B. When aligned with runway:

1. Apply brakes
2. Advance power to 2,000 rpm
3. Check engine instruments for normal indications
4. Lean mixtures for takeoff, if necessary
5. Release brakes and smoothly advance throttles to full

NOTE

When field length or obstacle clearance is a consideration, setting maximum power prior to brake release is the recommended procedure. Takeoff distance will be greater for a rolling takeoff.

C. When liftoff speed is attained, rotate approximately 7° to 10° nose up (use of the flight director go-around mode may be helpful during rotation and climbout).

D. Once the pitch is established and a positive rate of climb is verified, retract the landing gear.

E. Climbing through approximately 500 feet AGL:

1. Set cruise climb power
2. Lean mixtures for climb, if necessary
3. Complete the Cruise Climb Checklist

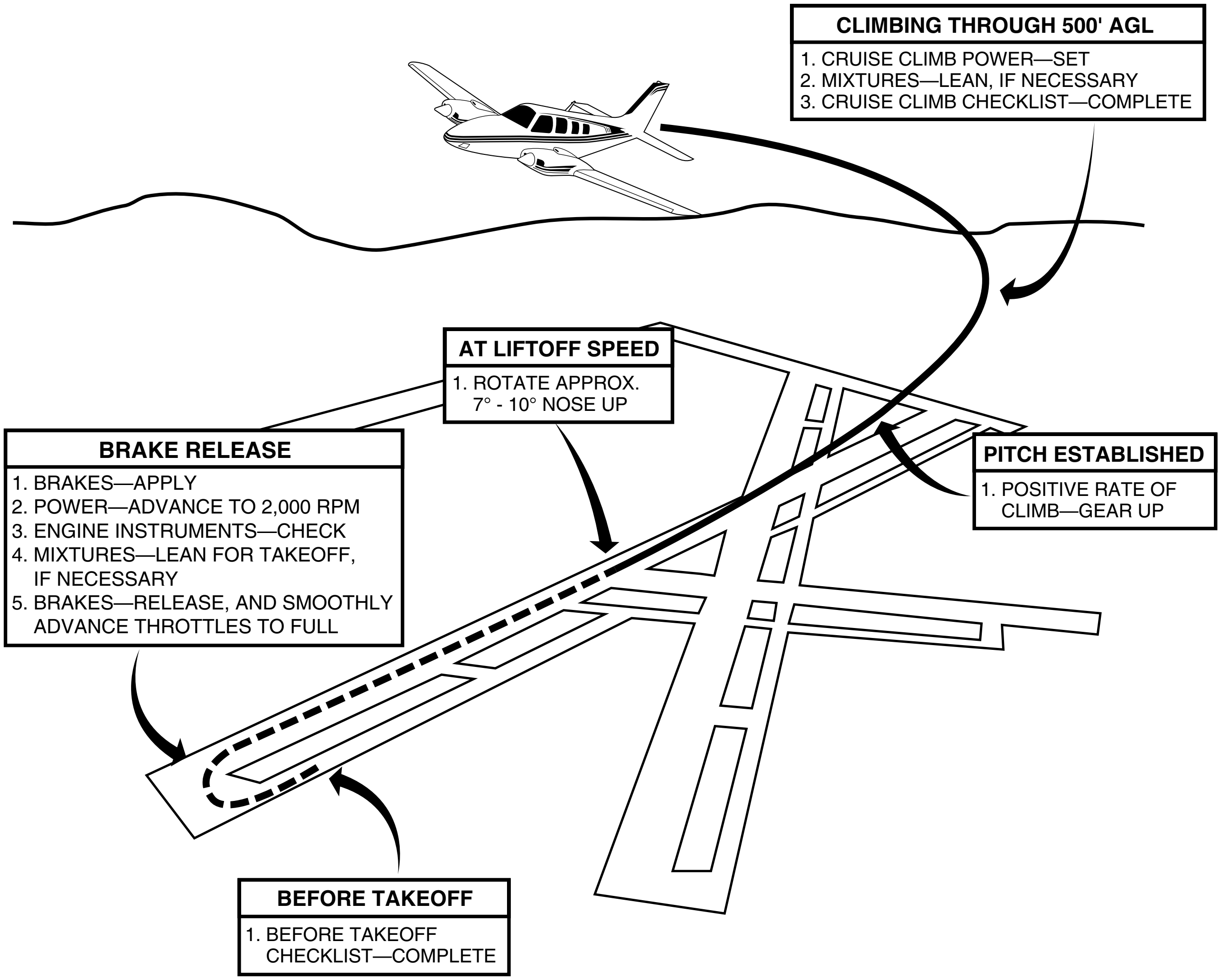


Figure APP A-1. Normal Takeoff and Departure

VISUAL APPROACH AND LANDING

A. Descent Checklist complete

B. Prior to entering traffic pattern:
   1. Slow to 150 KIAS or less
   2. Set approach power
   3. Establish approach configuration
   4. Maintain traffic pattern altitude
   5. Approach Checklist complete

C. On Downwind:
   1. Establish speed at 120 KIAS
   2. Lower landing gear abeam landing point
   3. Reduce power for descent
   4. Slow to 110 KIAS

D. On Base:
   1. Establish speed at 110 KIAS
   2. Verify final approach path clear

E. If a go-around (balked landing) becomes necessary:
   1. Increase power to maximum
   2. Establish pitch for balked landing climb
   3. Establish a positive rate of climb
   4. Retract landing gear
   5. Retract flaps
   6. Open cowl flaps
   7. Establish climb speed

F. When on final and landing assured:
   1. Reduce power for landing
   2. Extend full flaps
   3. Increase mixtures to full rich
   4. Advance propeller controls to full forward
   5. Confirm landing gear down

6. Establish landing approach speed
7. Disengage yaw damper

G. Cross threshold at landing speed, plus gust correction, if necessary

H. After touchdown:

1. Apply brakes as necessary
2. Ground lean mixtures, if necessary

I. After clearing runway, complete After Landing Checklist

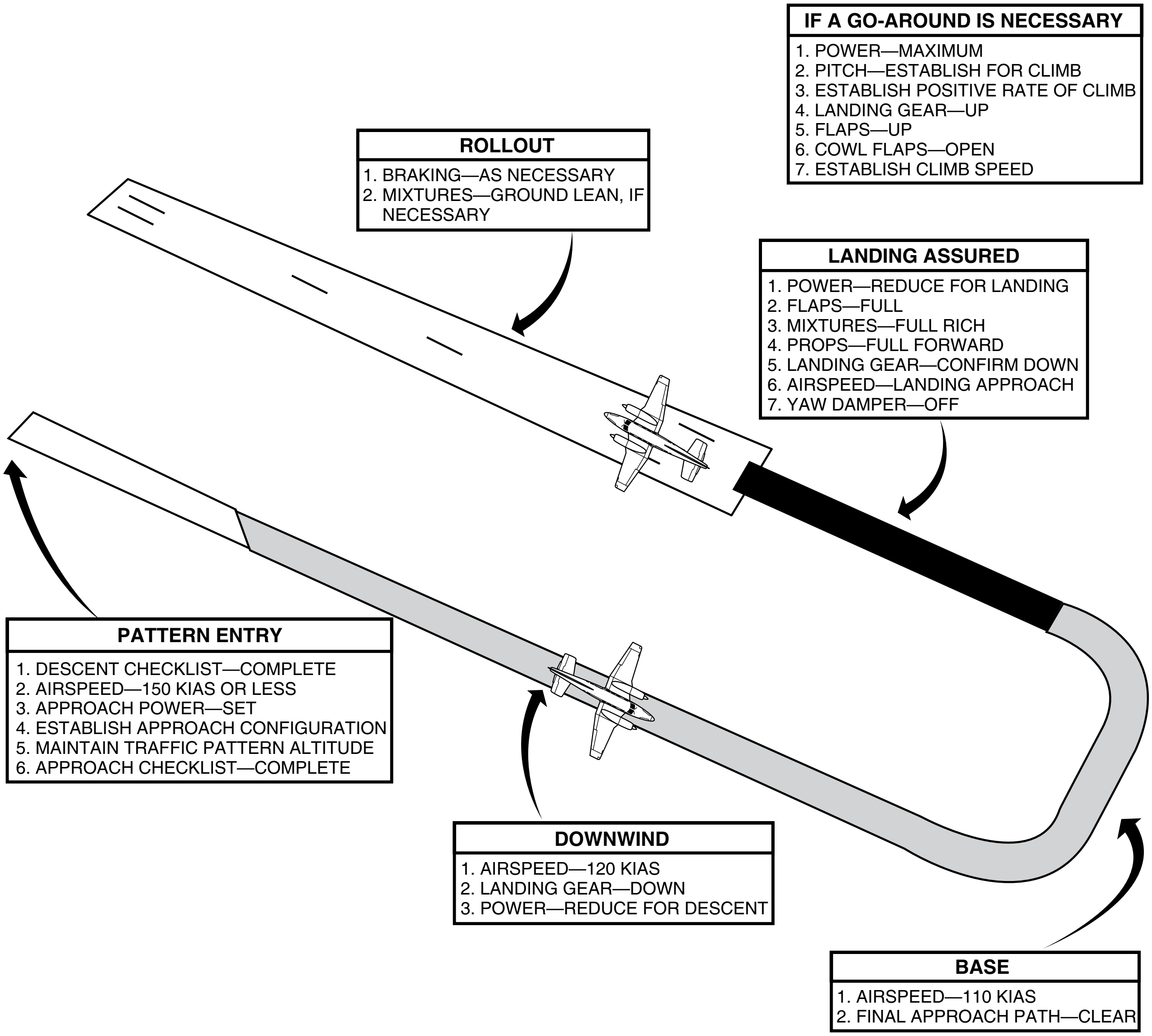


Figure APP A-2. Visual Approach and Landing

CLOSED TRAFFIC

A. Before takeoff checklist items complete. The following items should be considered:

1. Current weather/terrain conditions
2. Departure procedure
3. Takeoff alternate, if necessary
3. Engine failure or other event prior to liftoff
4. Lean mixtures for takeoff, if necessary
5. Engine failure or other event after liftoff, with gear up or down

B. When aligned with runway:

1. Apply brakes
2. Advance power to 2,000 rpm
3. Check engine instruments for normal indications
4. Release brakes and smoothly advance throttles to full

NOTE

When field length or obstacle clearance is a consideration, setting maximum power prior to brake release is the recommended procedure. Takeoff distance will be greater for a rolling takeoff.

C. When liftoff speed is attained, rotate approximately 7° to 10° nose up (use of the flight director go-around mode may be helpful during rotation and climbout).

D. Once the pitch is established and a positive rate of climb is verified, retract the landing gear.

E. Climbing through approximately 500 feet AGL:

1. Set cruise climb power
2. Lean mixtures for climb, if necessary
3. Extend approach flaps 200 feet below pattern altitude

F. Level off at pattern altitude in approach configuration

G. On downwind:

1. Establish speed at 120 KIAS
2. Lower landing gear abeam landing point
3. Reduce power for descent
4. Slow to 110 KIAS

H. On base:

1. Establish speed at 110 KIAS
2. Verify final approach path clear

I. If a go-around (balked landing) becomes necessary:

1. Increase power to maximum
2. Establish pitch for balked landing climb
3. Establish a positive rate of climb
4. Retract landing gear
5. Retract flaps
6. Open cowl flaps
7. Establish climb speed

J. When on final and landing assured:

1. Reduce power for landing
2. Extend full flaps
3. Increase mixtures to full rich
4. Advance propeller controls to full forward
5. Confirm landing gear down
6. Establish landing approach speed
7. Disengage yaw damper

K. Cross threshold at landing speed, plus gust correction if necessary

L. After touchdown

1. Apply brakes as necessary

3. Ground lean mixtures, if necessary

M. After clearing runway, complete After Landing Checklist

HIGH-SPEED ILS APPROACH

A. Descent Checklist complete and approach reviewed

B. Transition at high speed:

  1. Set high-speed transition configuration
  2. Confirm avionics set for approach
  3. 150 KIAS maximum

C. Prior to or during the procedure turn or prior to final vector, complete the Approach Checklist

D. At glideslope intercept:

  1. Extend landing gear
  2. Reduce power to normal approach power
  3. Extend approach flaps
  4. Decelerate to 120 KIAS

E. At final approach, fix inbound complete six "Ts"

F. At DH, if landing cannot be completed, execute a missed approach:

  1. Increase power to cruise climb or maximum
  2. Establish pitch for climb
  3. Establish positive rate of climb
  4. Retract landing gear
  5. Retract flaps
  6. Open cowl flaps
  7. Establish climb speed

G. At DH, if landing assured:

  1. Reduce power for landing
  2. Extend full flaps
  3. Increase mixtures to full rich
  4. Advance propeller controls to full forward
  5. Confirm landing gear down
  6. Establish landing approach speed
  7. Disengage yaw damper

H. Cross threshold at landing speed, plus gust correction, if necessary

I. After touchdown:

   1. Apply brakes as necessary

   2. Ground lean mixtures, if necessary

J. After clearing runway, complete After Landing Checklist

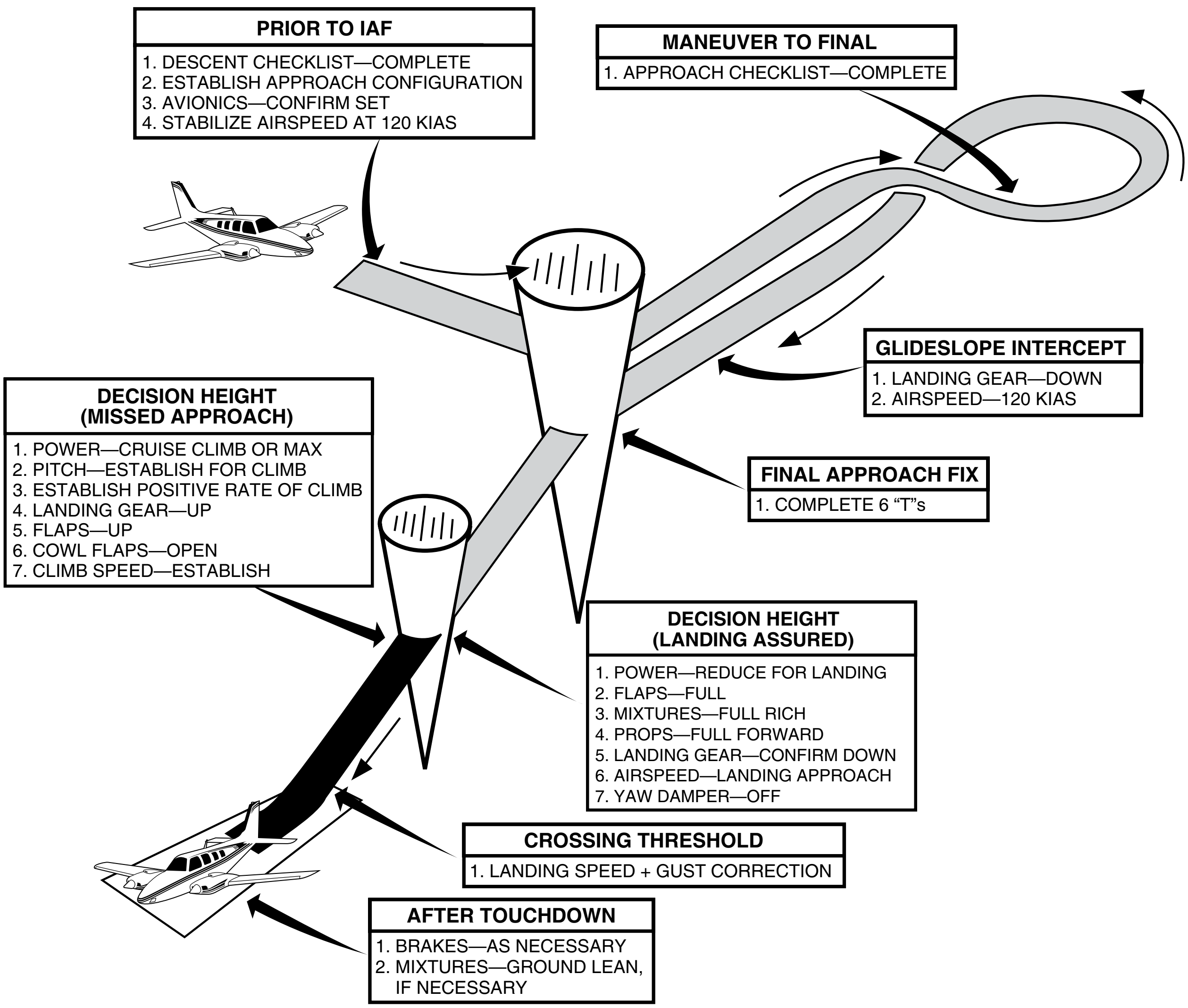


Figure APP A-3. High-Speed ILS Approach

STABILIZED ILS APPROACH

A. Descent Checklist complete and approach reviewed

B. Transition for stabilized approach:
   1. Establish approach configuration
   2. Confirm avionics set for approach
   3. Stabilize airspeed at 120 KIAS

C. Prior to or during the procedure turn or prior to final vector, complete the Approach Checklist

D. At glideslope intercept:
   1. Extend landing gear
   2. Airspeed 120 KIAS

E. At final approach fix inbound complete six "Ts"

F. At DH, if landing cannot be completed, execute a missed approach:
   1. Increase power to cruise climb or maximum
   2. Establish pitch for climb
   3. Establish positive rate of climb
   4. Retract landing gear
   5. Retract flaps
   6. Open cowl flaps

G. At DH, if landing assured:
   1. Reduce power for landing
   2. Extend full flaps
   3. Increase mixtures to full rich
   4. Advance propeller controls to full forward
   5. Confirm landing gear down
   6. Establish landing approach speed
   7. Disengage yaw damper

H. Cross threshold at landing speed, plus gust correction, if necessary

I. After touchdown:
   1. Apply brakes as necessary
   2. Ground lean mixtures, if necessary

J. After clearing runway, complete After Landing Checklist

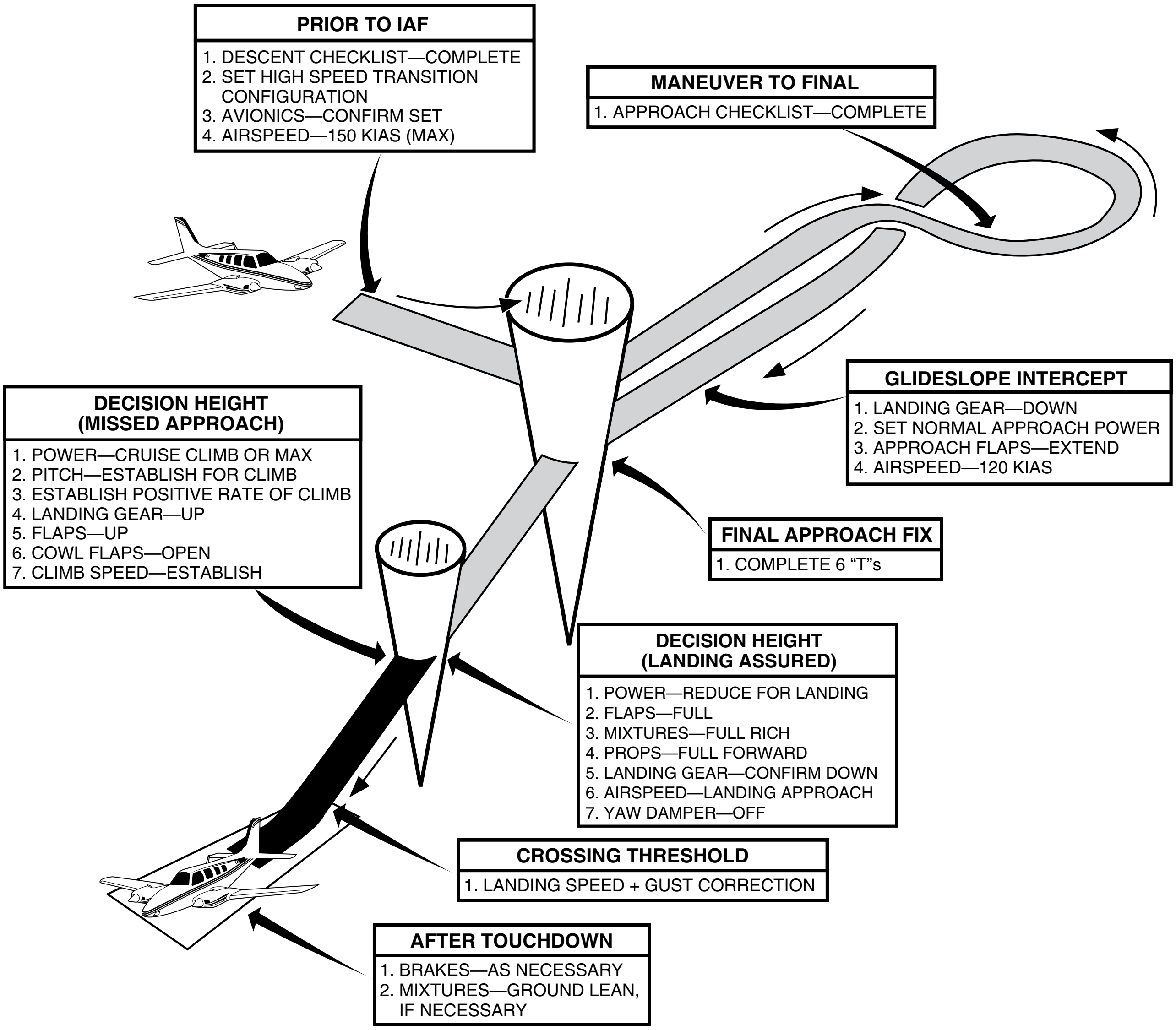


Figure APP A-4. Stabilized ILS Approach

APPENDIX A

TYPICAL NONPRECISION APPROACH

A. Descent Checklist complete and approach reviewed

B. Transition for stabilized approach:
   1. Establish approach configuration
   2. Confirm avionics set for approach
   3. Stabilize airspeed at 120 KIAS

C. Prior to or during the procedure turn or prior to final vector, complete the Approach Checklist

D. At final approach fix inbound:
   1. Extend landing gear
   2. Reduce power for descent
   3. Complete six "Ts"

E. Upon reaching MDA:
   1. Add power to level off
   2. Airspeed 120 KIAS

F. At the missed approach point, if landing cannot be completed, execute a missed approach:
   1. Increase power to cruise climb or maximum
   2. Establish pitch for climb
   3. Establish positive rate of climb
   4. Retract landing gear
   5. Retract flaps
   6. Open cowl flaps
   7. Establish climb speed

G. With the runway in sight and in a position to land:
   1. Reduce power for landing
   2. Extend full flaps
   3. Increase mixtures to full rich
   4. Advance propeller controls to full forward
   5. Confirm landing gear down
   6. Establish landing approach speed
   7. Disengage yaw damper

H. Cross threshold at landing speed, plus gust correction, if necessary

I. After touchdown:

1. Apply brakes as necessary
2. Ground lean mixtures, if necessary

J. After clearing runway, complete After Landing Checklist

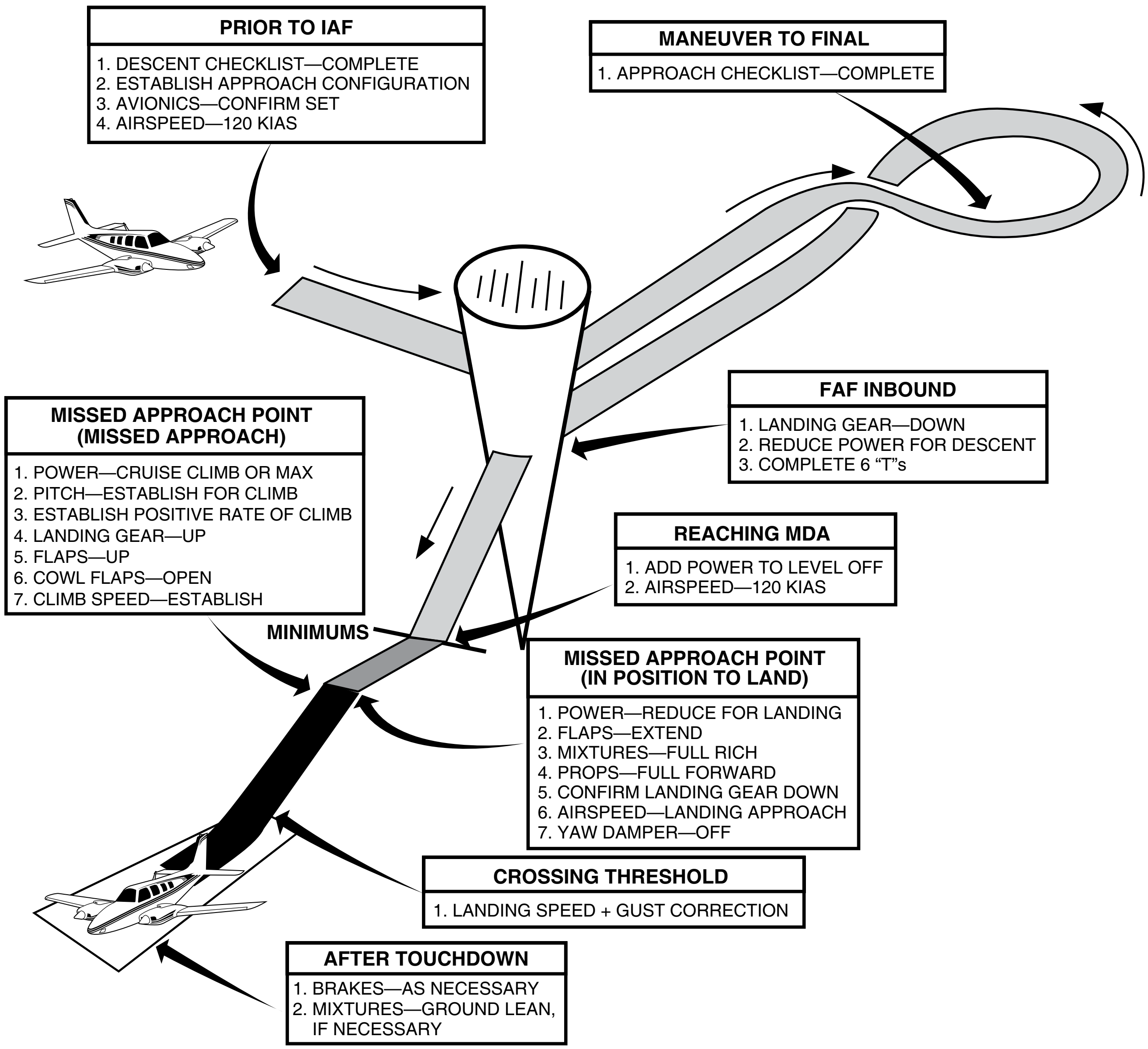


Figure APP A-5. Typical Nonprecision Approach

CIRCLING APPROACH

A. Descent Checklist complete and approach reviewed

B. Transition for stabilized approach:
   1. Establish approach configuration
   2. Confirm avionics set for approach
   3. Stabilize airspeed at 120 KIAS

C. Prior to or during the procedure turn or prior to final vector, complete the Approach Checklist

D. At final approach fix inbound:
   1. Extend landing gear
   2. Reduce power for descent
   3. Complete six "Ts"

E. Upon reaching MDA:
   1. Add power to level off
   2. Airspeed 120 KIAS

F. At the missed approach point, if landing cannot be completed, execute a missed approach:
   1. Increase power to cruise climb or maximum
   2. Establish pitch for climb
   3. Establish positive rate of climb
   4. Retract landing gear
   5. Retract flaps
   6. Open cowl flaps
   7. Establish climb speed

G. When the runway is in sight, begin circling maneuver:
   1. Maintain MDA until in a position to make a normal landing
   2. Airspeed 120 KIAS
   3. Enter normal traffic pattern or as required

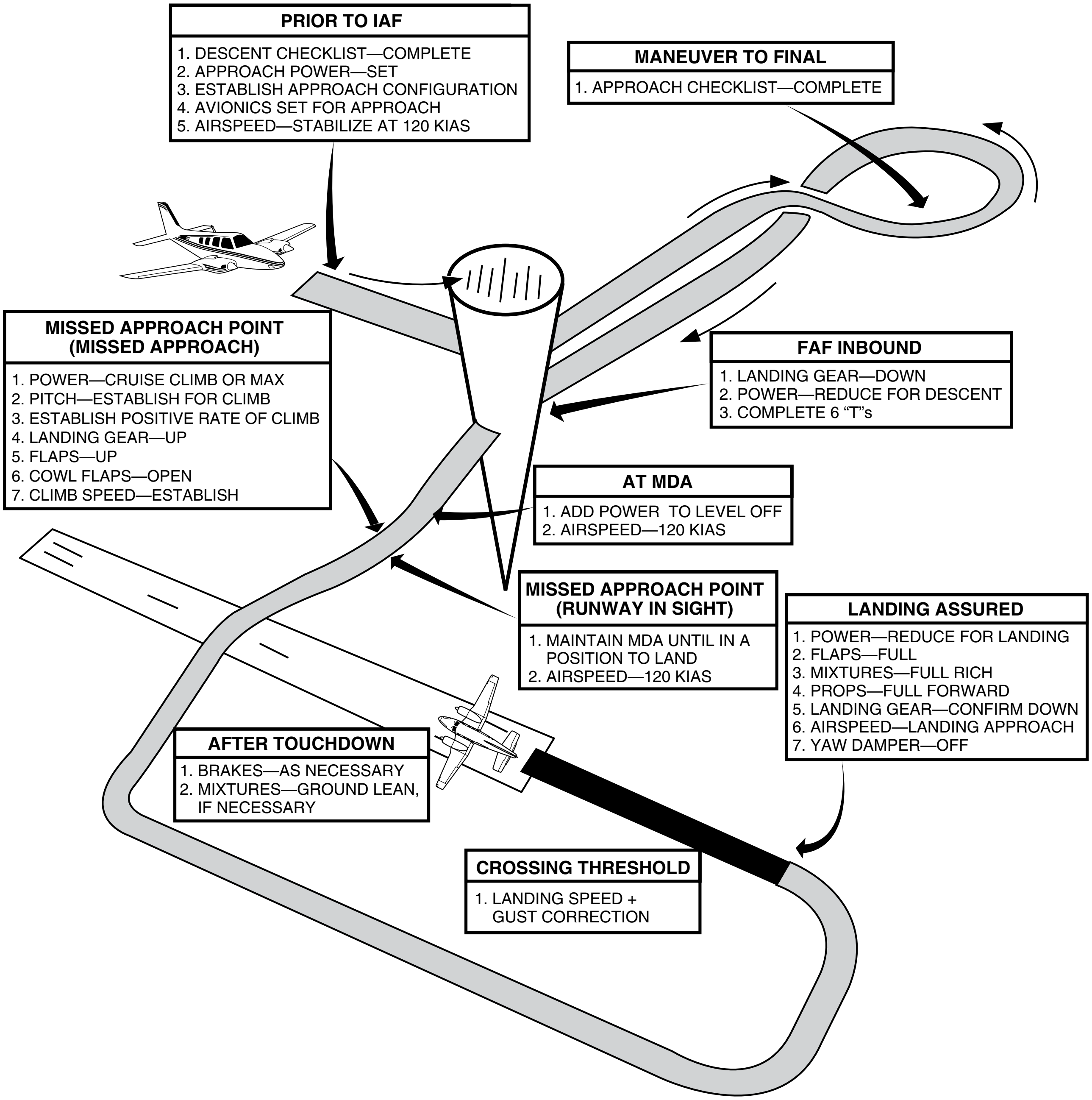


Figure APP A-6. Circling Approach

APPENDIX A

H. With the runway in sight and in a position to land:

1. Reduce power for landing
2. Extend full flaps
3. Increase mixtures to full rich
4. Advance propeller controls to full forward
5. Confirm landing gear down
6. Establish landing approach speed
7. Disengage yaw damper

I. Cross threshold at landing speed, plus gust correction, if necessary

J. After touchdown:

1. Apply brakes as necessary
2. Ground lean mixtures, if necessary

K. After clearing runway, complete After Landing Checklist

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ABORTED TAKEOFF

A. Before takeoff checklist items complete. The following items should be considered:
   1. Current weather/terrain conditions
   2. Departure procedure
   3. Takeoff alternate, if necessary
   4. Engine failure or other event prior to liftoff
   5. Engine failure or other event after liftoff, with gear up or down

B. When aligned with runway:
   1. Apply brakes
   2. Advance power to 2,000 rpm
   3. Check engine instruments for normal indications
   4. Lean mixtures for takeoff, if necessary
   5. Release brakes and smoothly advance throttles to full

NOTE

When field length or obstacle clearance is a consideration, setting maximum power prior to brake release is the recommended procedure. Takeoff distance will be greater for a rolling takeoff.

C. Engine failure/malfunction occurs prior to or during rotation:
   1. Retard throttles to idle
   2. Apply maximum braking

D. If aircraft cannot be stopped on remaining runway:
   1. Retard mixtures to idle cutoff
   2. Turn magneto/start switches to off
   3. Turn battery and alternator switches off
   4. Maneuver as necessary to avoid obstacles
   5. Turn off fuel selector valves, if able

E. Evacuate aircraft as soon as possible

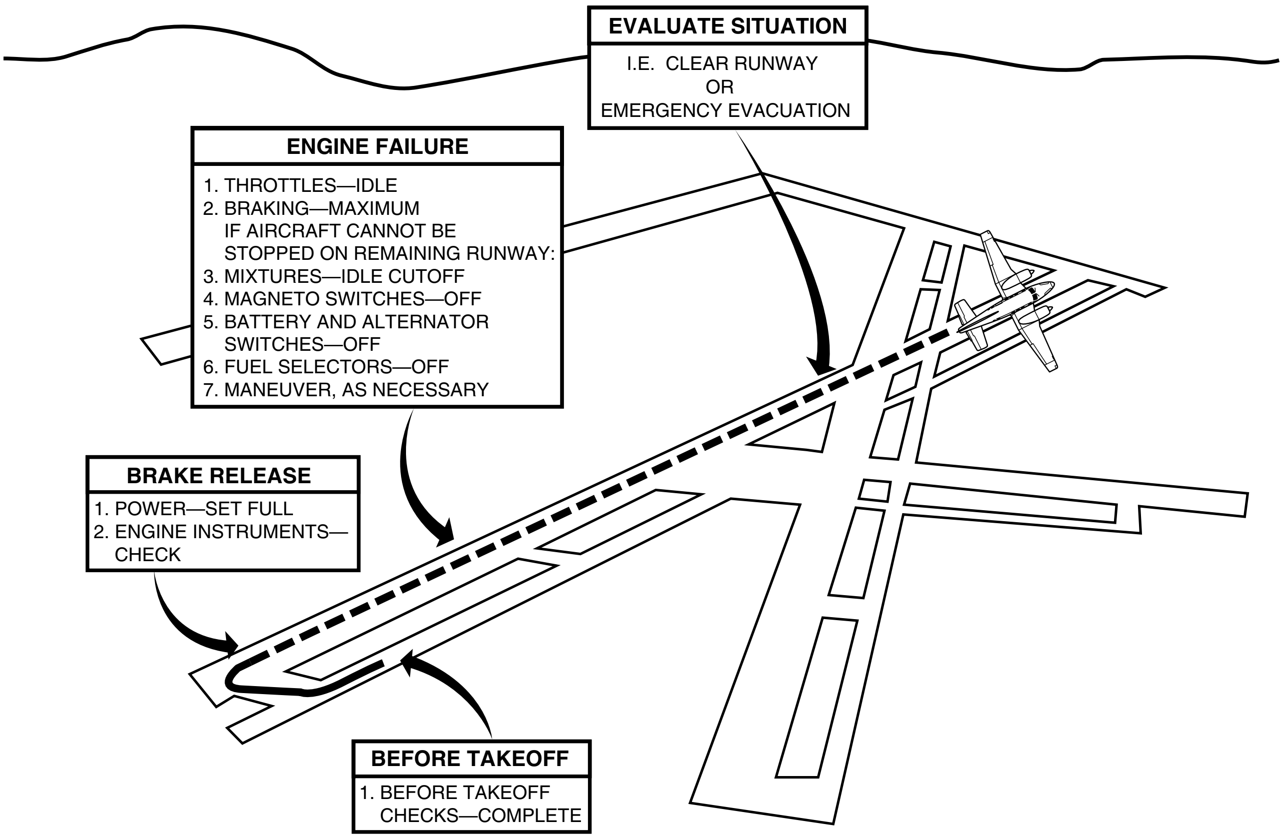

Figure APP A-7. Aborted Takeoff

ENGINE FAILURE AFTER LIFT-OFF (GEAR DOWN)

A. Before takeoff checklist items complete. The following items should be considered:

1. Current weather/terrain conditions
2. Departure procedure
3. Takeoff alternate, if necessary
4. Engine failure or other event prior to liftoff
5. Engine failure or other event after liftoff, with gear up or down

B. When aligned with runway:

1. Apply brakes
2. Advance power to 2,000 rpm
3. Check engine instruments for normal indications
4. Lean mixtures for takeoff if necessary
5. Release brakes and smoothly advance throttles to full

NOTE

When field length or obstacle clearance is a consideration, setting maximum power prior to brake release is the recommended procedure. Takeoff distance will be greater for a rolling takeoff.

C. When liftoff speed is attained, rotate approximately 7° to 10° nose up (use of the flight director go-around mode may be helpful during rotation and climbout).

D. Engine failure occurs after liftoff:

1. Reduce pitch to maintain airspeed
2. Confirm landing gear extended
3. Extend full flaps if time permits

E. After touchdown:

1. Retard throttles to idle
2. Apply maximum braking

F. If aircraft cannot be stopped on remaining runway:

1. Retard mixtures to idle cutoff
2. Turn magneto/start switches to off
3. Turn battery and alternator switches off
4. Maneuver as necessary to avoid obstacles
5. Turn off fuel selector valves if able

G. Evacuate aircraft as soon as possible

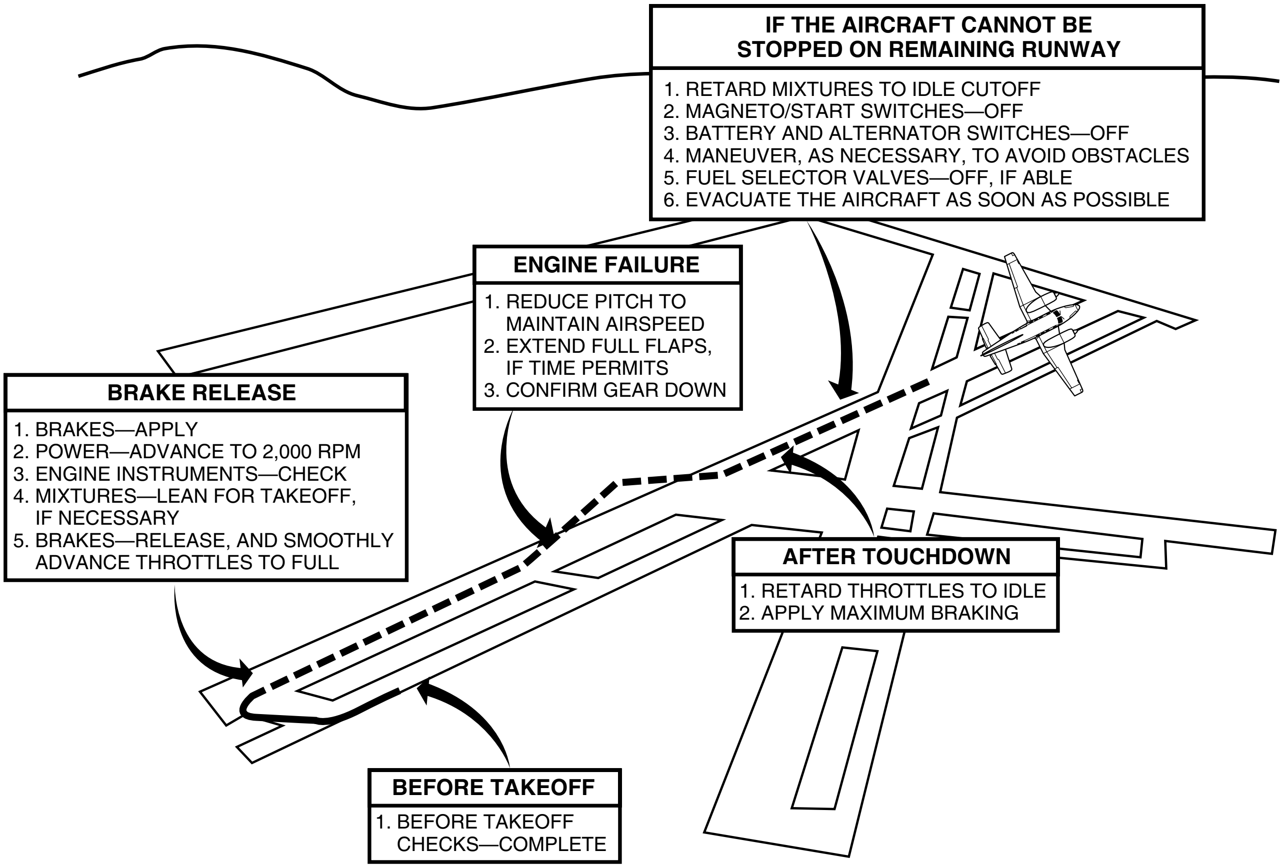

Figure APP A-8. Engine Failure After Lift-Off (Gear Down)

ENGINE FAILURE AFTER LIFT-OFF (GEAR UP)

A. Before takeoff checklist items complete. The following items should be considered:
   1. Current weather/terrain conditions
   2. Departure procedure
   3. Takeoff alternate, if necessary
   4. Engine failure or other event prior to lift-off
   5. Engine failure or other event after lift-off, with gear up or down

B. When aligned with runway:
   1. Apply brakes
   2. Advance power to 2,000 rpm
   3. Check engine instruments for normal indications
   4. Lean mixtures for takeoff, if necessary
   5. Release brakes and smoothly advance throttles to full

NOTE

When field length or obstacle clearance is a consideration, setting maximum power prior to brake release is the recommended procedure. Takeoff distance will be greater for a rolling takeoff.

C. When lift-off speed is attained, rotate approximately 7° to 10° nose up (use of the flight director go-around mode may be helpful during rotation and climbout).

D. Once the pitch is established and a positive rate of climb is verified, retract the landing gear.

E. Engine failure occurs during or after landing gear retraction
   1. Maintain control of aircraft
   2. Increase mixtures, propeller controls and throttles full forward
   3. Verify landing gear and flaps up
   4. Identify: dead foot, dead engine
   5. Verify by retarding throttle of suspected engine
   6. Feather propeller on inoperative engine
   7. Trim for single-engine flight
   8. Adjust cowl flaps as required
   9. Verify air conditioning off

F. Climb at V_{YSE} or V_{XSE} as necessary

G. Return to departure airport for landing or continue to takeoff alternate, if applicable.

H. When time and altitude permit, complete Engine Failure After Lift-Off Gear Up checklist.

I. Proceed with appropriate single-engine approach and landing procedure.

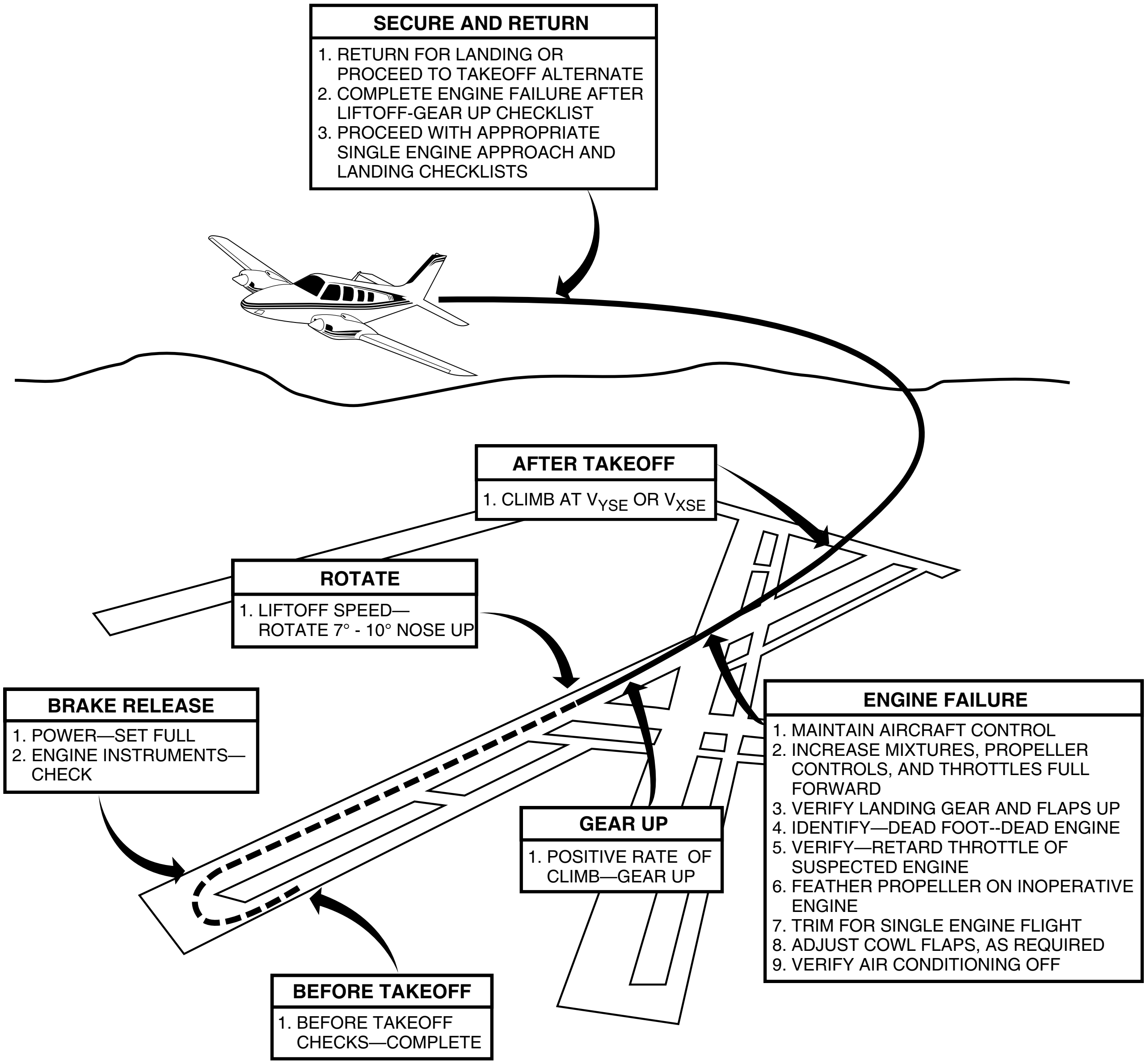

Figure APP A-9. Engine Failure After Lift-Off (Gear Up)

SINGLE-ENGINE VISUAL APPROACH AND LANDING

A. Descent checklist complete

B. Prior to entering traffic pattern:
   1. Slow to 150 KIAS or less
   2. Set approach power
   3. Establish clean or approach configuration as necessary
   4. Maintain traffic pattern altitude
   5. Approach checklist complete

C. On downwind:
   1. Establish speed at 107-120 KIAS
   2. Lower landing gear abeam landing point
   3. Reduce power for descent

D. On base:
   1. Establish speed at 107-120 KIAS
   2. Verify final approach path clear

E. If a single-engine go-around becomes necessary:

NOTE

Do not attempt with full flaps.

   1. Increase power to maximum
   2. Establish pitch for V_{YSE} or V_{XSE}
   3. Retract landing gear
   4. Retract flaps if lowered for approach
   5. Open cowl flaps as required
   6. Establish climb at V_{YSE} or V_{XSE}

F. When on final and landing is assured:
   1. Reduce power for landing
   2. Extend flaps at pilot's discretion
   3. Increase mixture on operating engine to full rich
   4. Increase propeller control on operating engine full forward
   5. Confirm landing gear down

6. Establish landing approach speed

7. Retrim as necessary

G. Cross threshold at landing speed, plus gust correction is necessary

H. After touchdown, during rollout:

1. Apply braking as necessary

2. Ground lean mixtures, if necessary

I. After clearing runway, complete after landing checklist.

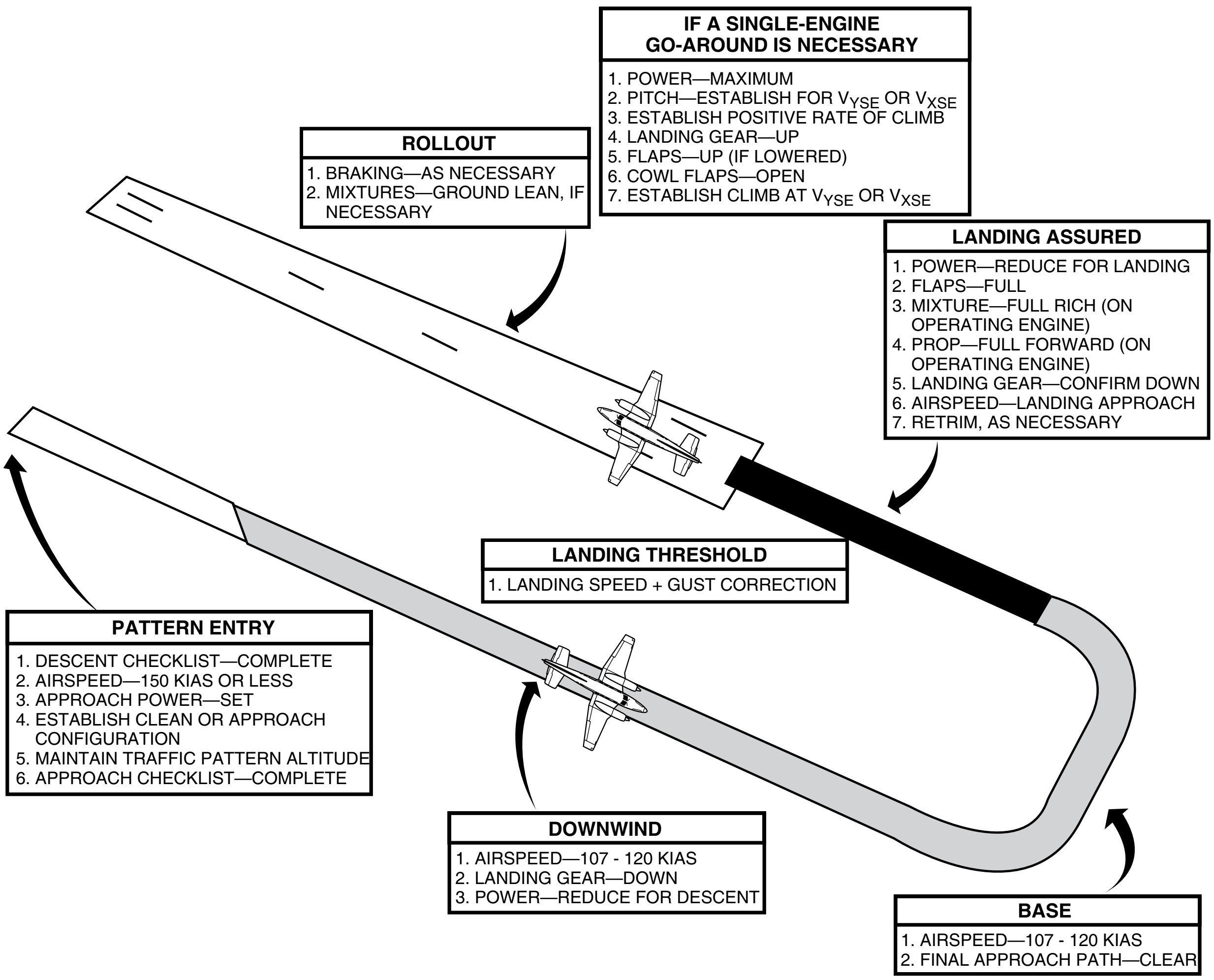

Figure APP A-10. Single-Engine Visual Approach and Landing

SINGLE-ENGINE ILS APPROACH

NOTE

Keep the procedure as normal as possible. With the exception of power settings, single-engine ILS procedures are essentially the same as normal ILS approach procedures.

A. Descent checklist complete and approach reviewed

B. Transition for approach:

1. Set approach power
2. Establish clean or approach configuration as necessary
3. Confirm avionics set for approach
4. Stabilize airspeed at 120 KIAS or as necessary, 100 KIAS minimum

C. Prior to or during the procedure turn or prior to final vector, complete the approach checklist.

D. At glideslope intercept:

1. Extend landing gear
2. Airspeed 120 KIAS or as necessary

E. At final approach fix inbound, complete six “Ts”

F. At DH, if landing cannot be completed, execute a missed approach:

NOTE

Do not attempt with full flaps.

1. Increase power to maximum
2. Establish pitch for V_{YSE} or V_{XSE}
3. Retract landing gear
4. Retract flaps if lowered for approach
5. Open cowl flaps
6. Establish climb at V_{YSE} or V_{XSE}

G. At DH, if a landing is assured:

1. Reduce power for landing
2. Extend flaps at pilot’s discretion
3. Increase mixture on operating engine to full rich
4. Increase propeller control on operating engine full forward
5. Confirm landing gear down

6. Establish landing approach speed
7. Retrim as necessary

H. Cross threshold at landing speed, plus gust correction is necessary

I. After touchdown, during rollout:
1. Apply braking as necessary
2. Ground lean mixture if necessary

J. After clearing runway, complete after landing checklist.

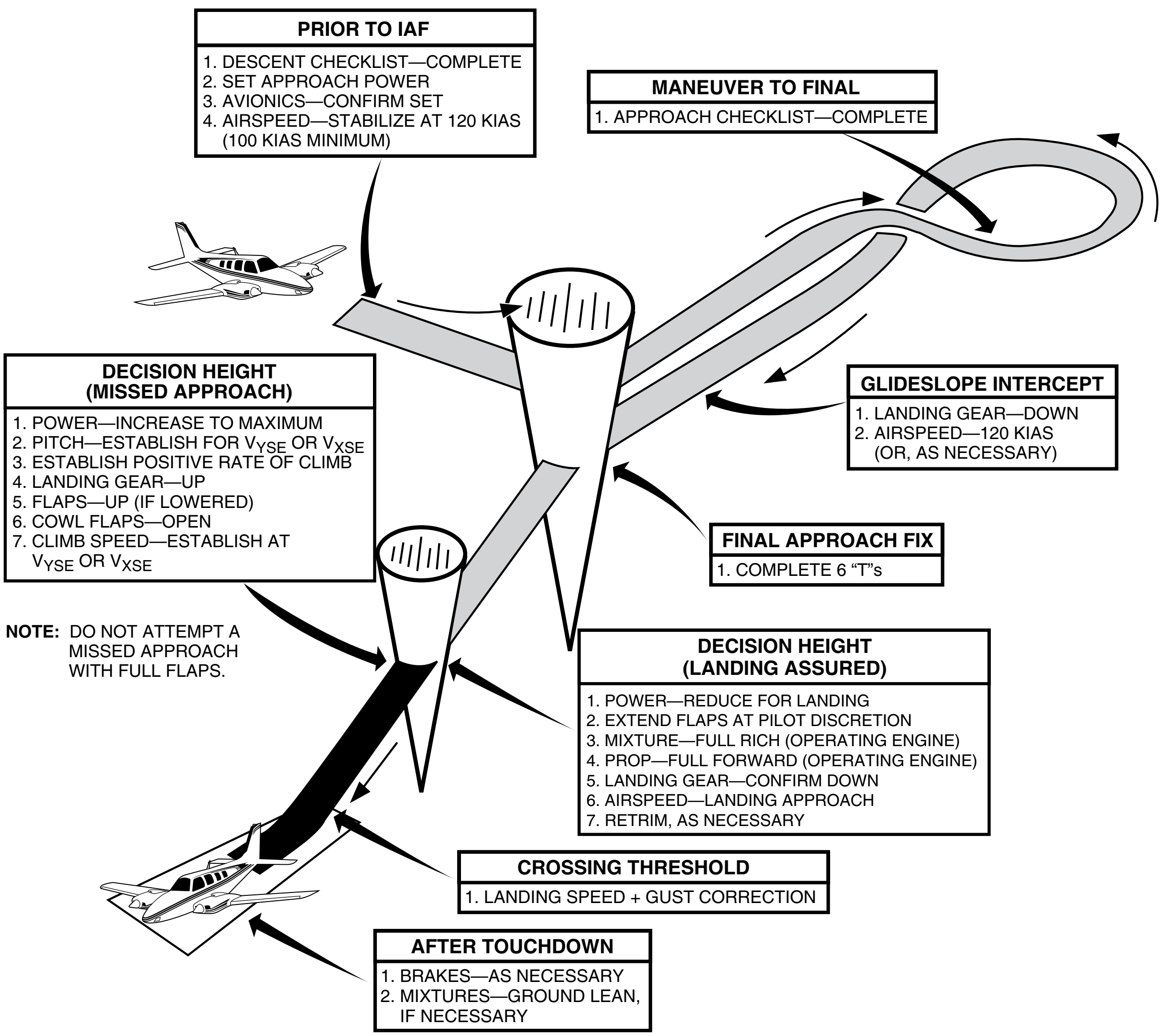

Figure APP A-11. Single-Engine ILS Approach

APPENDIX A

SINGLE-ENGINE NONPRECISION APPROACH

NOTE

It is recommended a straight-in approach with vertical guidance be used in single-engine procedures. Nonprecision circling approaches are not recommended. Keep the procedure as normal as possible. With the exception of power settings and configuration management, single-engine approach procedures are essentially the same as normal approach procedures. Under many circumstances, the aircraft will not be capable of maintaining level flight at MDA with the landing gear extended.

A. Descent checklist complete and approach reviewed

B Transition for approach:

1. Set approach power
2. Establish clean or approach configuration as necessary
3. Confirm avionics set for approach
4. Stabilize airspeed at 120 KIAS or as necessary, 100 KIAS minimum

C. Prior to or during the procedure turn or prior to final vector, complete the approach checklist.

D. At final approach fix inbound:

1. Extend landing gear at pilot's discretion
2. Reduce power for descent
3. Complete six "Ts"

E. Upon reaching MDA:

1. Add power to level off
2. Retract landing gear if necessary
3. Airspeed 120 KIAS or as necessary

F. At the missed approach point, if a landing cannot be completed, execute a missed approach:

NOTE

Do not attempt with full flaps.

1. Increase power to maintain
2. Establish pitch for V_{YSE} or V_{XSE}
3. Retract landing gear
4. Retract flaps if lowered for approach
5. Open cowl flaps
6. Establish climb at V_{YSE} or V_{XSE}

G. With the runway in sight and in a position to land:

1. Re-extend landing gear, if necessary, and confirm down
2. Reduce power for landing

3. Extend flaps at pilot's discretion
4. Increase mixture on operating engine to full rich
5. Increase propeller control on operating engine to full forward
6. Establish landing approach speed
7. Retrim as necessary

H. Cross threshold at landing speed, plus gust correction, if necessary.

I. After touchdown, during rollout:
1. Apply braking as necessary
2. Ground lean mixture, if necessary

J. After clearing runway, complete after landing checklist.

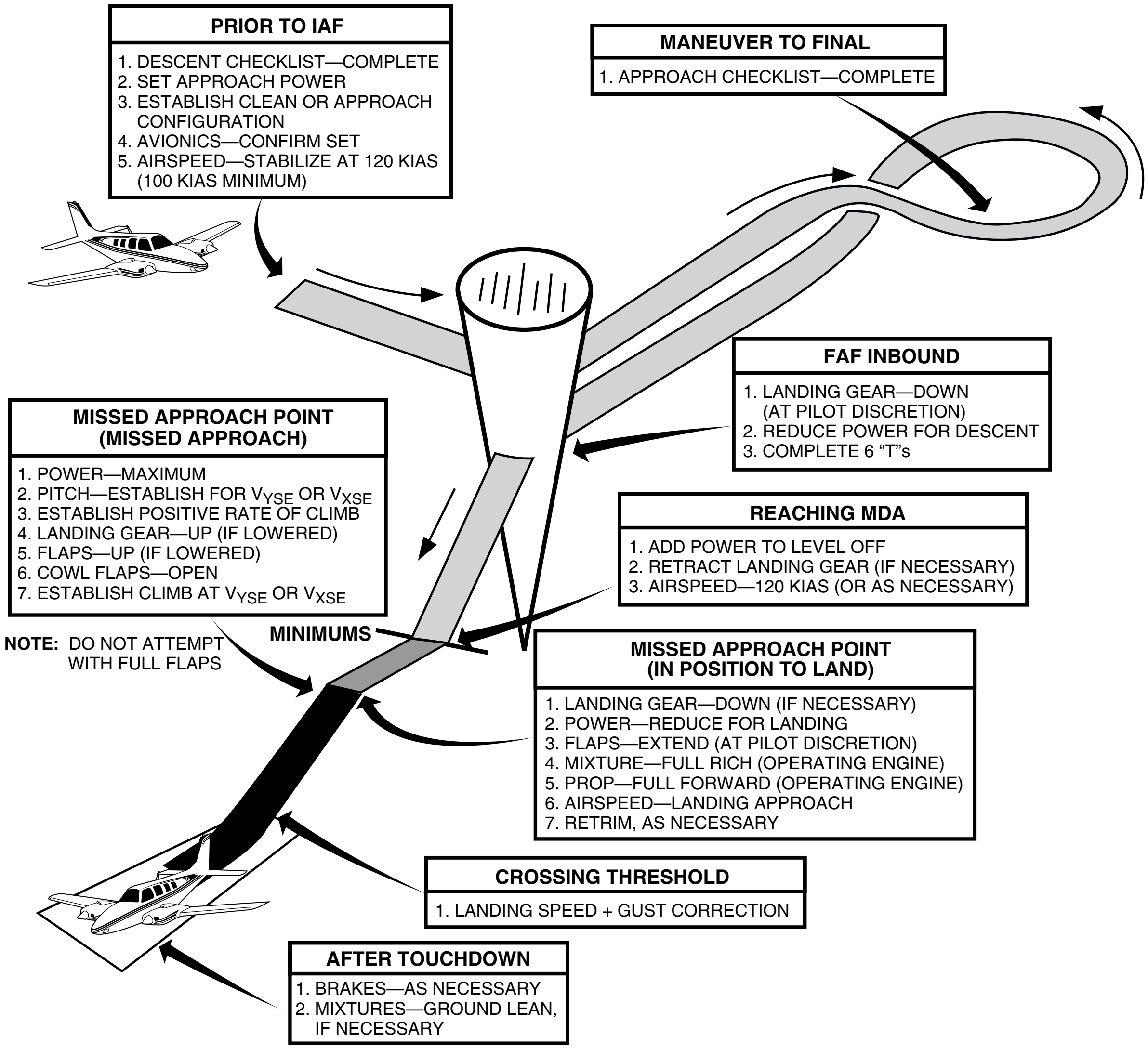

Figure APP A-12. Single-Engine Nonprecision Approach

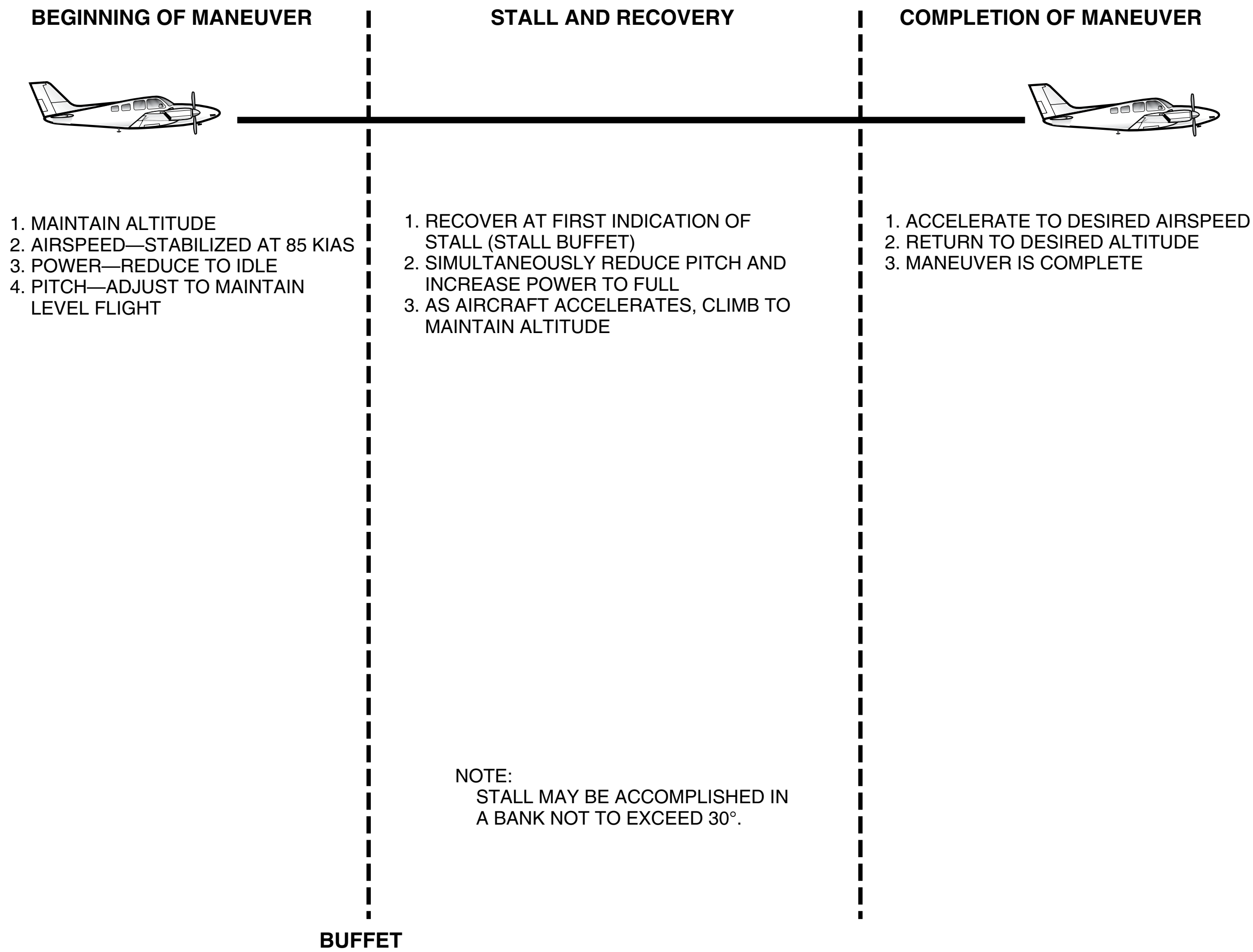

Figure APP A-13. Clean Stall

APPENDIX A

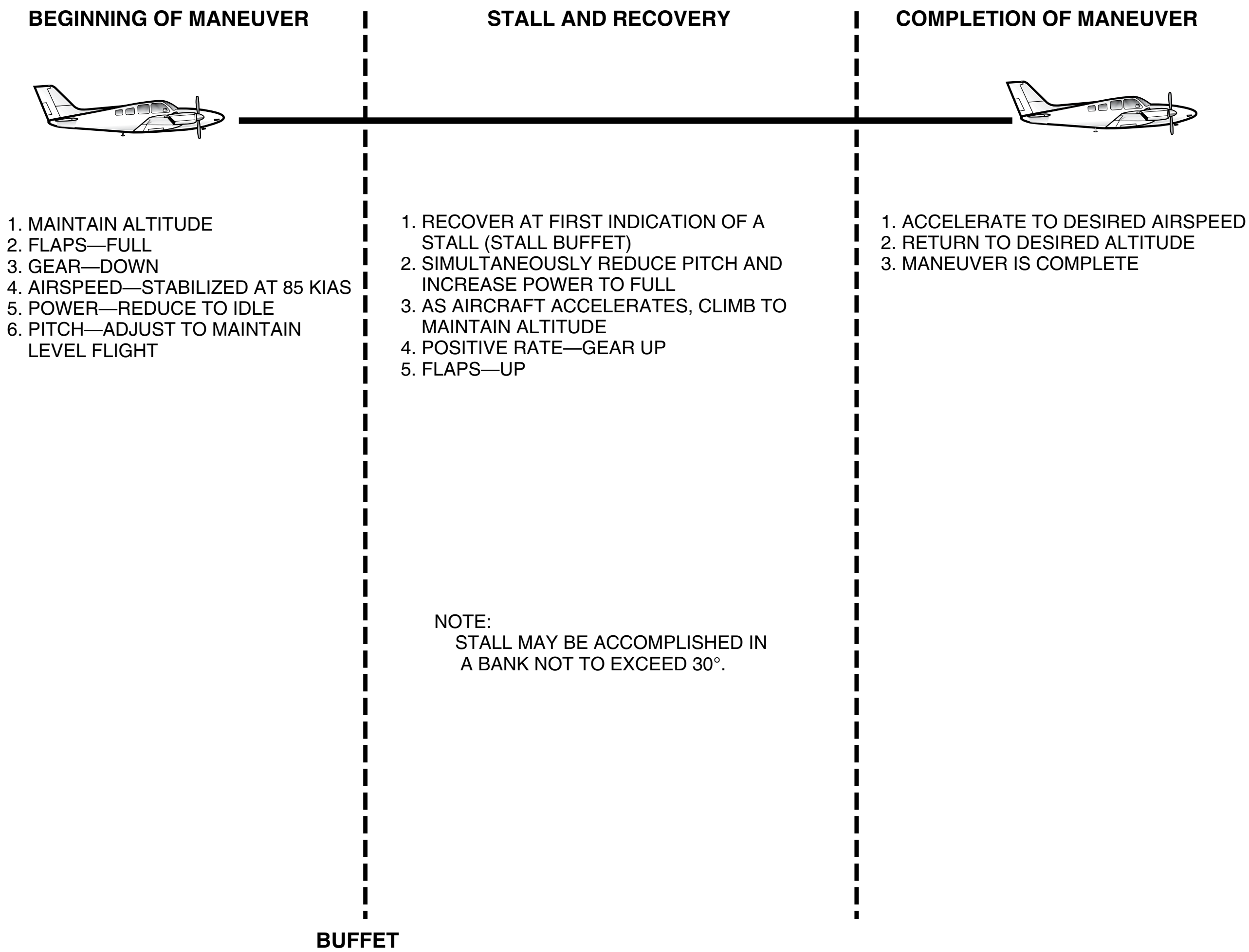

Figure APP A-14. Approach to Landing Stall

APPENDIX A

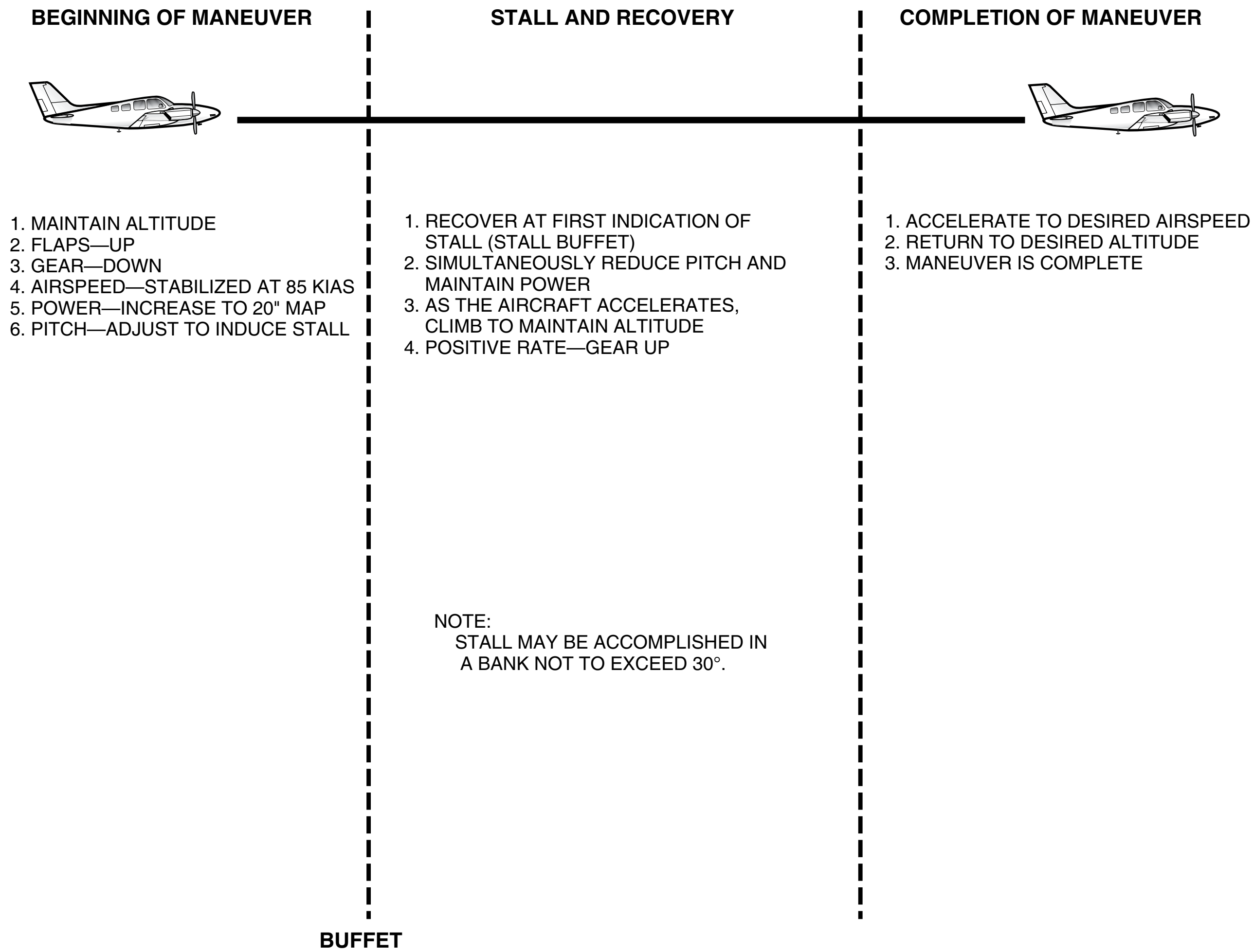

Figure APP A-15. Departure Stall

APPENDIX B
TERMS AND ABBREVIATIONS

AFCS	Automatic flight control system
AFM	*Airplane Flight Manual*
AHRS	Altitude and heading reference system
BMEP	Brake mean effective pressure
CAS	Calibrated airspeed
CB	Circuit breaker
CG	Center of gravity
CHT	Cylinder head temperature
DME	Distance measuring equipment
EGT	Exhaust gas temperature
EIS	Engine indication system
ELT	Emergency locator transmitter
FAA	Federal aviation administration
GEA	Engine/airframe unit
IAS	International standard atmosphere
IFR	Instrument flight rules
IOAT	Indication outside air temperature
KCAS	Calibrated airspeed
KIAS	Indicated airspeed
KTAS	True airspeed
L BAT	Left battery
LED	Light-emitting diode
M	Mach number
MFD	Multifunction display
OAT	Outside air temperature
PFD	Primary flight display
POH	*Pilot's Operating Handbook*
R BAT	Right battery
TAS	True airspeed
TBO	Time between overhauls
TDC	Top dead center
VFR	Visual flight rules
VSI	Vertical speed indicator
V_A	Design maneuvering speed
V_{FE}	Maximum flap extended speed
V_{LE}	Maximum landing gear extended speed
V_{LO}	Maximum landing gear operating speed
V_{MCA}	Minimum control speed