OWNER'S MANUAL

MODEL AA-1B
TRAINER & Tr-2

OWNER'S MANUAL

MODEL AA-1B
TRAINER & Tr2

Owner _____

Registration No. _____

PERFORMANCE-SPECIFICATIONS
MODEL AA-1B

	Trainer	TR-2 *
GROSS WEIGHT	1560 lbs.	1560 lbs.
SPEED: Top Speed at Sea Level	138 m.p.h.	144 m.p.h.
Cruise, 75 Percent Power	124 m.p.h. at 3000 ft.	133 m.p.h. at 8000 ft.
Cruise, 65 Percent Power at 8000 ft.	116 m.p.h.	120 m.p.h.
RANGE: Cruise, 75 Percent Power	435 mi.	463 mi.
22 Gallons, No. Reserve	3.52 hrs. at 3000 ft.	3.48 hrs. at 8000 ft.
Cruise, 65 Percent Power at 8000 ft.	475 mi.	489 mi.
22 Gallons, No Reserve	4.10 hrs.	4.07 hrs.
Optimum Range at 10,000 ft.	490 mi.	508 mi.
22 Gallons, No Reserve	4.50 hrs.	4.52 hrs.
RATE OF CLIMB AT SEA LEVEL	705 f.p.m.	660 f.p.m.
SERVICE CEILING	12,750 ft.	11,550 ft.
TAKE OFF: Ground Roll	810 ft.	890 ft.
Total Distance Over 50 ft. Obstacle	1550 ft.	1590 ft.
LANDING: Ground Roll	410 ft.	410 ft.
Total Distance Over 50 ft. Obstacle	1100 ft.	1100 ft.
WING LOADING	15.5 lb. / sq. ft.	15.5 lb. / sq. ft.
POWER LOADING	14.4 lb. / hp.	14.4 lb. / hp.
BAGGAGE	100 lbs.	100 lbs.
FUEL CAPACITY: TOTAL	24 gal.	24 gal.
OIL CAPACITY: TOTAL	6 qts.	6 qts.
PROPELLER: McCAULEY Fixed Pitch (Diameter Pitch)	71 / 53	71 / 57
ENGINE: LYCOMING 108 h.p. at 2600 r.p.m.	O-235-C2C	O-235-C2C

* Equipped with cruise propeller

Note: 1. Range and endurance figures do not include take off and climb allowance.

2. All performance obtained with wheel fairings installed.

Welcome Aboard!

You are about to meet a fast, tough aircraft designed by pilot-engineers for pilots . . . the kind of pilots who enjoy flying more than they enjoy spending. The AA-1B is the most responsive, high performing light aircraft on the scene today; yet it offers the lowest hourly cost in flight, and the least expense to maintain in top condition. The materials, techniques and design innovations which made this double-breakthrough possible also made it much stronger and more handsome than any light aircraft near its class.

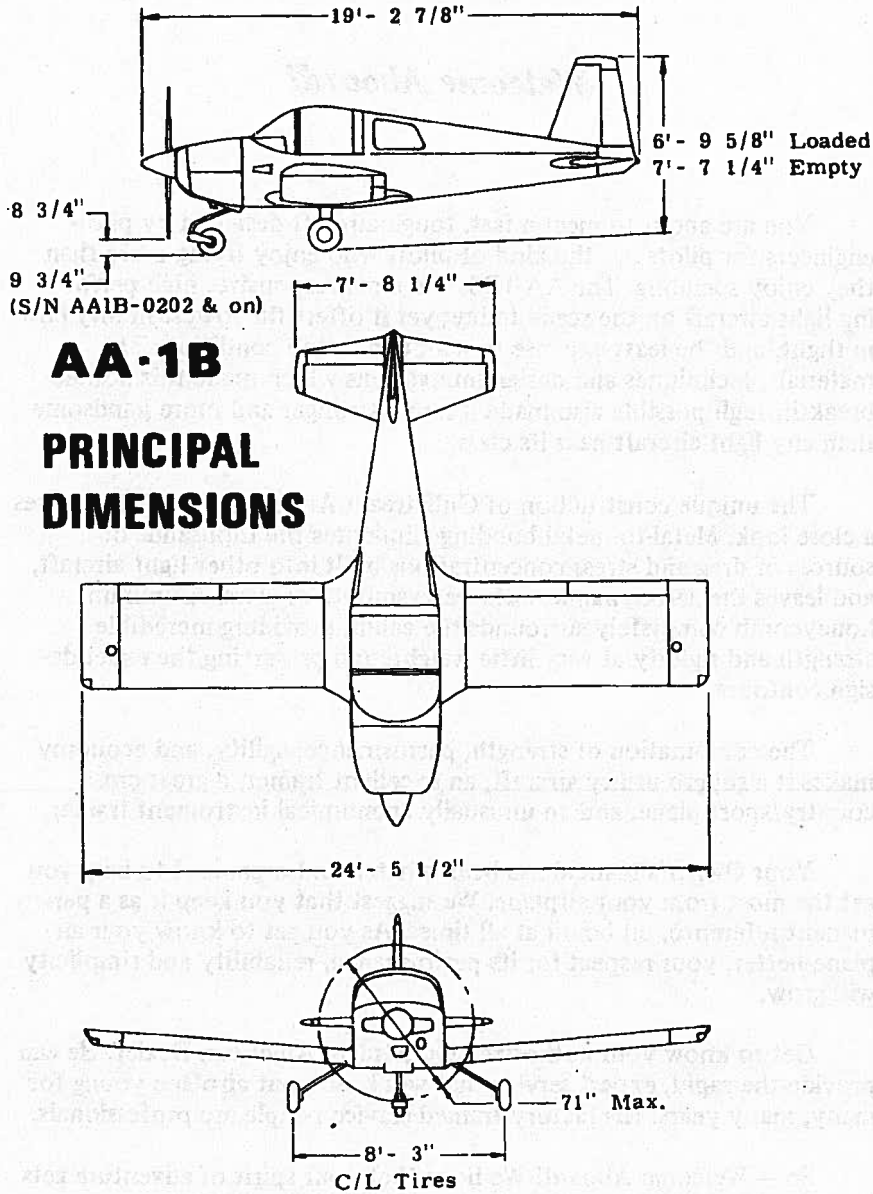
The unique construction of Gulfstream American Aircraft deserves a close look. Metal-to-metal bonding eliminates the thousands of sources of drag and stress concentrations built into other light aircraft, and leaves the aerodynamic surfaces as smooth as glass. Aluminum honeycomb completely surrounds the cabin, providing incredible strength and rigidity at very little weight, and preserving the exact design contours.

The combination of strength, performance, agility, and economy makes it a superb utility aircraft, an excellent trainer, a great cross-country/sport plane, and an unusually economical instrument trainer.

Your Owner's Manual has been written and organized to help you get the most from your airplane. We suggest that you keep it as a permanent reference, on board at all times. As you get to know your airplane better, your respect for its performance, reliability and simplicity will grow.

Get to know your authorized Gulfstream American Dealer. He can provide the rapid, expert service that will keep your airplane young for many, many years. His factory-trained service people are professionals.

So – Welcome Aboard! We hope that your spirit of adventure gets the same boost that ours did when we first flew the AA-1B.



AA·1B

PRINCIPAL DIMENSIONS

TABLE OF CONTENTS

NOTE

The operating limitations of this airplane include SPINS PROHIBITED. A spin is not possible without a prolonged stall condition. All types of stalls (except whip, which are prohibited) can be performed in this airplane without spinning by simply recovering from the stall when it occurs (moving the control wheel forward sufficiently to reduce angle of attack for normal forward flight).

There is evidence that permitting a spin to go beyond one turn without initiating proper recovery procedures can allow a spin mode to develop from which recovery is not possible.

SECTION I

DESCRIPTION OF SYSTEMS & STRUCTURES

The AA-1B is a two-place, all-metal, low-wing monoplane with unique "Face-Saver" tricycle landing gear. It gets more performance from its 108 horsepower Lycoming four-cylinder, horizontally opposed engine than any current production aircraft in the record books . . . and does it with a fixed-pitch metal propeller.

Airframe components such as wings, fuselage and tail assemblies employ high-strength adhesive bonding of aluminum sheet metal to ribs or bulkheads. The same bonding technique employed in aluminum honeycomb sandwich panels, provides a fuselage cabin area tougher, stronger and more rigid than any light aircraft near its class.

CABIN DESCRIPTION

1. INSTRUMENT PANEL

The instrument panel employs a unique "eyebrow" design to shield the windshield from panel reflections during night flights. This eyebrow also houses the panel lights which are turned on and their intensity controlled by a switch-rheostat located just above the throttle. The fuel quantity sight gauges are individually lighted by lamps which are also controlled by the instrument light switch-rheostat. Other panel switches are of the rocker type, combining the convenience of pushbutton operation with the positive action of the toggle.

2. CABIN DOME LIGHT

A cabin dome light for illuminating the baggage compartment and to aid in map reading is located over the baggage compartment and controlled by a switch mounted adjacent to the light. It is energized from the battery regardless of the master switch position.

3. CONSOLE

The center console serves as a seat divider; provides out-of-the-way storage for the microphone; and houses the flap switch and flap position indicator, the trim wheel and trim position indicator, ash tray and fuel selector valve.

4. SEATS AND BELTS

The contoured seats are individually adjustable in a forward/up, rearward/down travel. The seat bottoms should be flipped up during entry and exit to expose a non-slip step on the main spar.

Each seat back folds foreward for easy access to the baggage compartment.

NOTE

Shoulder belts are provided for your safety. Be sure to use them.

The shoulder belt fastens to the end of the outboard lap belt, allowing both belts to be fastened or removed in one operation. Lap and shoulder belts may be neatly stowed by hanging them on the side panel supports provided.

Lap belts should be adjusted to lie low on the hips, without any slack. Shoulder belts should lie over the outer shoulder and across the chest, with just enough slack to reach all controls comfortably.

5. **BAGGAGE COMPARTMENT**

The baggage compartment is accessible during flight to either the pilot or passenger. It is certified for 100 pounds capacity or 90 pounds with the child's seat installed. (Refer to the weight and balance Section IV for proper loading.)

HEATING AND VENTILATION

Cabin heat and defroster air are supplied by a heat exchanger on the engine exhaust system. This system heats a continuous flow of fresh air, and provides heating and defrosting by diverting the desired portion of that continuous supply into the cabin and by-passing the balance directly overboard.

Fresh air ventilation is provided by adjustable vents located just below the instrument panel, with the air supply being ducted in from inlets in the fuselage. Maximum ventilation may be obtained by sliding the canopy open half-way at speeds up to 130 MPH. A thumbscrew is provided to hold the canopy in intermediate open positions. Always leave the thumbscrew disengaged except when flying with the canopy partially open.

To obtain warm defrost air, pull out the cabin heat control (on the center of the instrument panel) and slide open the defroster vent near the lower edge of the windshield. The fresh air vents also provide good defrost action when partially opened and the louvers directed toward the side canopy.

When cool and high-humidity conditions exist, do not use partial defrost as windshield may fog rapidly on take-off. Always check defroster position before flight.

NOTE

The heater system and fresh air system can be turned on simultaneously during cold weather operations to provide a comfortable cabin atmosphere.

FLIGHT CONTROLS

The control surfaces are operated by a combination of torque tubes and conventional cable systems. The right elevator includes an adjustable trim tab controlled by a trim wheel on the center console. Ground-adjustable tabs on the rudder and ailerons provide a simple means for adjusting directional and lateral trim.

Electrically operated flaps offer a full range of settings by means of a spring-loaded, two-position switch. This flap actuator switch is held down until the flap position indicator shows the desired flap angle; when released, it returns to neutral, and flap travel stops. (Caution: Abruptly releasing the switch may cause it to snap *through* the neutral detent, into the retract position.) To retract flaps, push the switch forward and release it: the flaps retract fully with no further attention, and the flap drive motor shuts off automatically (very handy on a full-flap go-around). Flap position is clearly indicated on the center console.

ENGINE CONTROLS

The push-pull type throttle, located in the lower center instrument panel, is equipped with a friction lock to prevent creeping (but which can be overridden manually). The mixture control and carburetor heat control, to the right and left of the throttle, respectively, are also of the push-pull design.

FUEL SYSTEM

The Trainer's fuel system (Figure 1) is one of the simplest, and therefore one of the most reliable, in aviation. The tubular main wing spar also serves as a two-cell fuel tank, with each cell holding 11 gallons (useable) or 12 gallons (total). The 22 useable gallons are managed by a fuel selector valve on the center console, clearly marked OFF-LEFT-RIGHT. Fuel quantity is reliably indicated in vertical sight gauges on the left and right cabin walls. Each wing tank has its own quick drain located on the bottom inboard trailing edge of each wing.

NOTE

Check fuel sight gauges while in level, balanced flight to avoid mis-reading fuel quantity indications.

An auxiliary electric fuel pump supplements the engine-driven pump. Fuel pressure is indicated on a gauge in the engine instrument cluster, located to the right of the radio section of the instrument panel. The electric pump should be turned on if the engine-driven pump fails as noted by a loss of fuel pressure. The electric fuel pump can also be used to provide fuel pressure redundancy during low altitude operation, such as during take-off and landing.

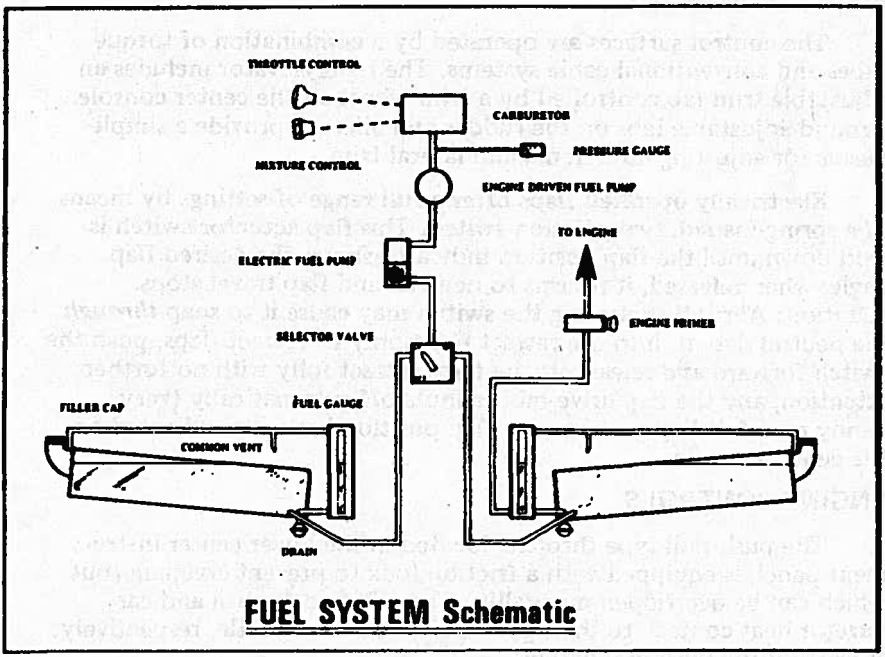


Figure 1

ELECTRICAL SYSTEM

The electrical system (Figure 2) uses a 14-volt, 60-amp alternator with internal power diodes which delivers DC power direct to the main bus through a 60-amp circuit breaker. An external voltage regulator controls the alternator output voltage and automatically adjusts the battery charging rate to maintain proper charge. The electrical system ammeter is located in the engine instrument cluster and indicates current charge (+) and discharge (—) of the battery.

The master switch is a split rocker type which serves two functions. One side (master) energizes the battery circuit for engine starting and operating electrical systems with the engine OFF. The other side (alt) energizes the alternator field circuit which produces the electrical field in the alternator. With the electrical field energized, the alternator supplies all of the required current for the system loads through the bus bar.

In the event of alternator failure, as indicated by a battery discharge (—) indication on the ammeter, the alternator side of the master

DALLAS METROPLEX AVIATION, INC.
14902 FOREST LODGE
HOUSTON, TEXAS 77070

EXTENDED RANGE FUEL SYSTEM
AA1 SERIES AIRCRAFT

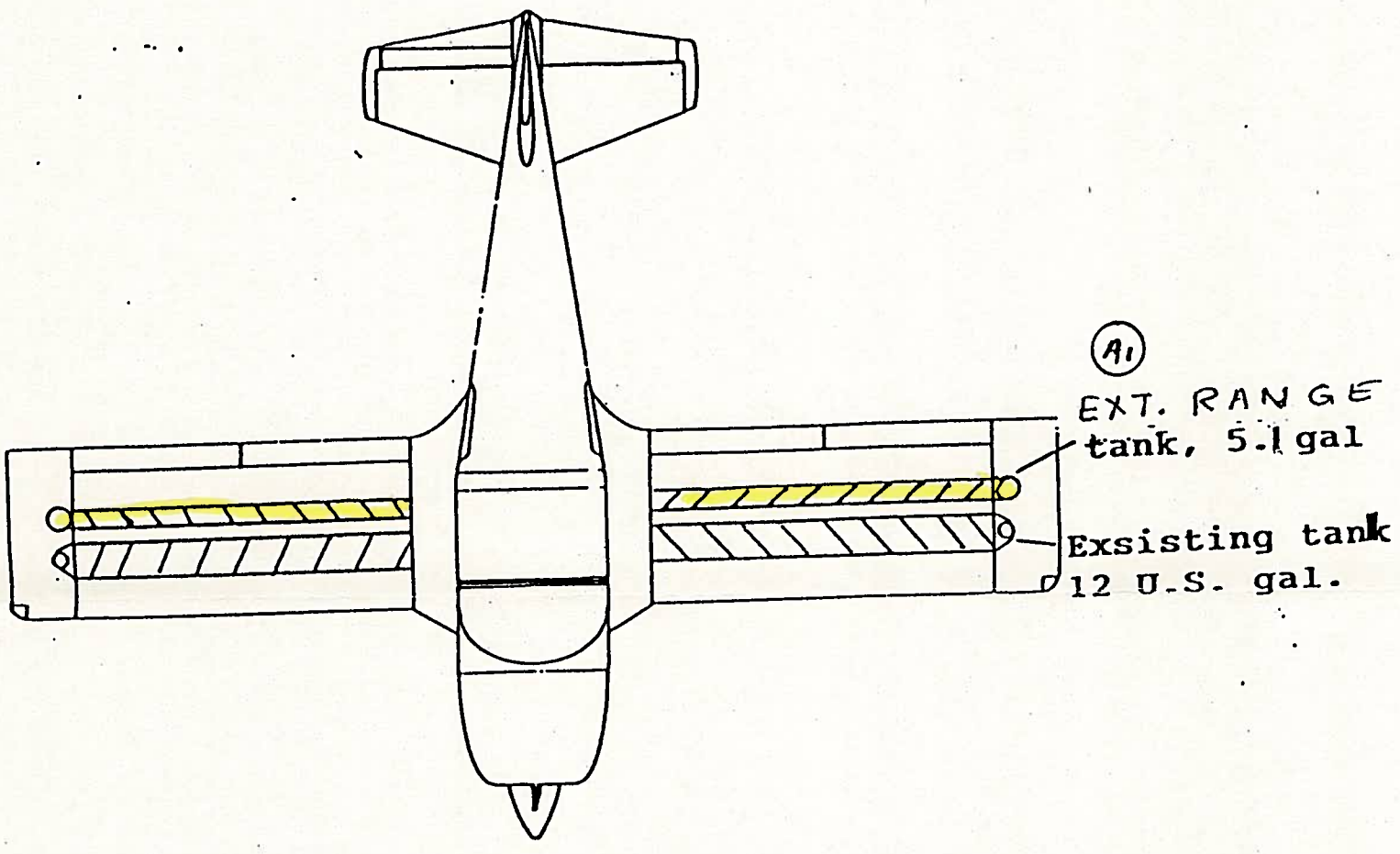
INTRODUCTION

This modification is to increase the fuel capacity of the American General AA1 series aircraft. The alteration to the airframe consists of installing a 4" diameter aluminum fuel tank just aft of the 6" fuel tank/spar in each wing. The fuel volume capability is increased by approximately 5 U.S. gallons per wing for a total of 10 U.S. gallons of additional usable fuel.

The new fuel tank is plumbed in parallel with the existing tank and in effect the two tanks in each wing are used and gauged as one tank.

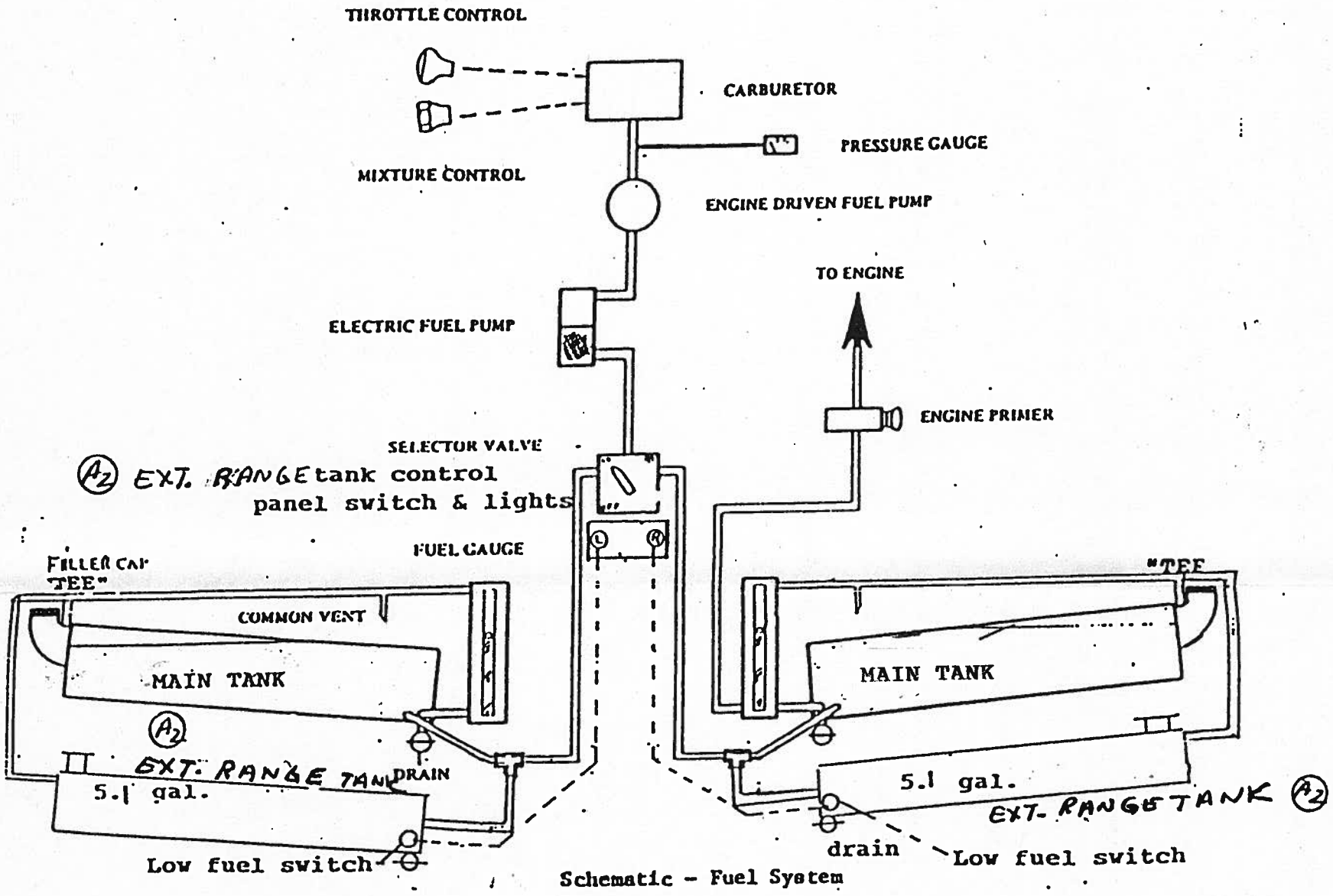
Unlike auxiliary fuel tanks that can be selected separately this system is an extended range fuel system due to the fact that they are tied together at all times and share a common vent.

EXTENDED RANGE FUEL TANK
INSTALLATION
AA1 SERIES AIRCRAFT



DALLAS METROPLEX AVIATION, INC. 14902 FOREST LODGE HOUSTON, TEXAS 77070			EXTENDED RANGE FUEL TANKS INSTALLATION
VISION	DATE	APPROVED BY	TOLERANCE UNLESS OTHERWISE NOTED:
IR	7-29-96	BWC	.x .1 .xx .03 .xxx .020
A	7-9-97	EFP	DWG. NO.: AUXIOO SHEET 1 OF 13

EXTENDED RANGE FUEL TANK INSTALLATION AA1 SERIES AIRCRAFT



Schematic - Fuel System

DALLAS METROPLEX AVIATION, INC. 14902 FOREST LODGE HOUSTON, TEXAS 77070			EXTENDED RANGE FUEL TANKS INSTALLATION	
VISION	DATE	APPROVED BY	TOLERANCE UNLESS OTHERWISE NOTED:	DWG. NO.:
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A	7-9-97	EFP		SHEET 2 OF 13

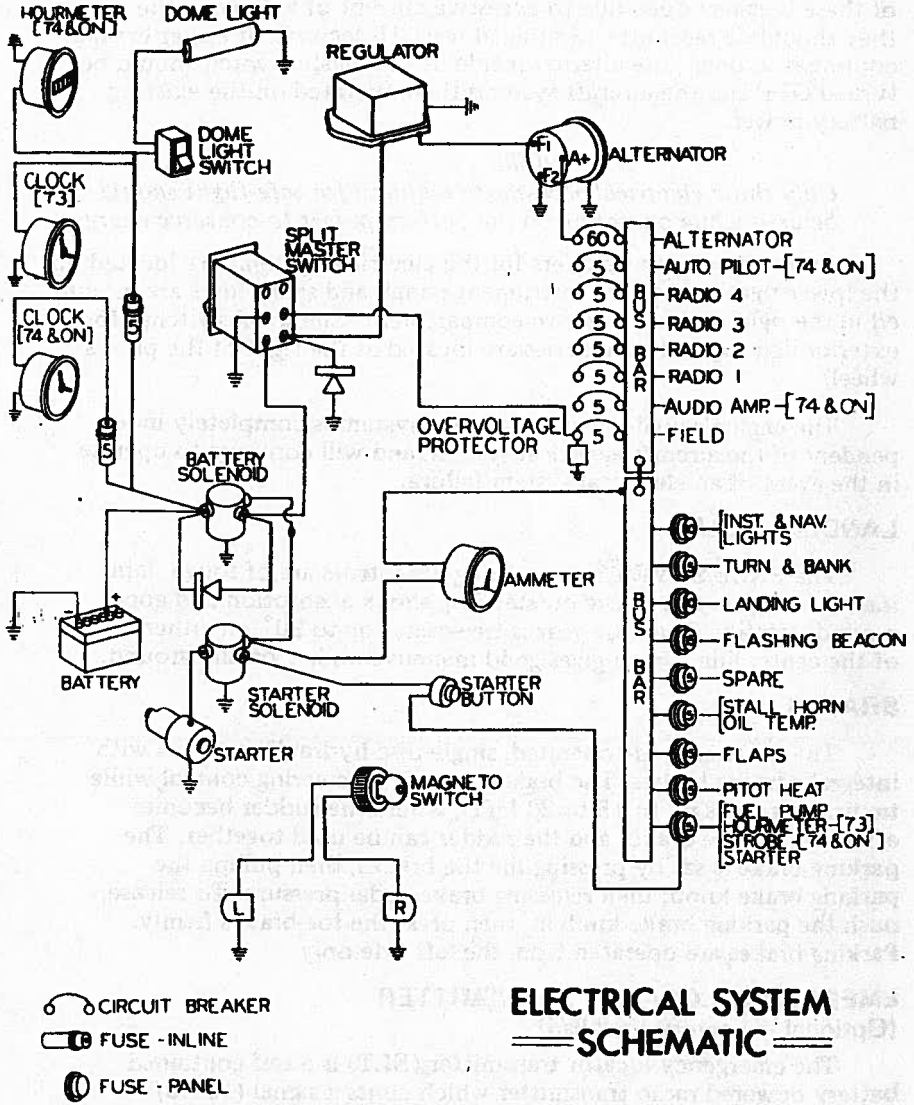

HOURMETER [74 & ON]
DOME LIGHT
REGULATOR
DOME LIGHT SWITCH
ALTERNATOR
F1
A+
F2
CLOCK [73]
SPLIT MASTER SWITCH
CLOCK [74 & ON]
60
5
BUS BAR
ALTERNATOR
AUTO PILOT - [74 & ON]
RADIO 4
RADIO 3
RADIO 2
RADIO 1
AUDIO AMP. - [74 & ON]
FIELD
OVERVOLTAGE PROTECTOR
BATTERY SOLENOID
AMMETER
INST. & NAV. LIGHTS
TURN & BANK
LANDING LIGHT
FLASHING BEACON
SPARE
STALL HORN
OIL TEMP.
FLAPS
PITOT HEAT
FUEL PUMP
HOURMETER - [73]
STROBE - [74 & ON]
STARTER
BATTERY
STARTER SOLENOID
STARTER BUTTON
STARTER
MAGNETO SWITCH
L
R
CIRCUIT BREAKER
FUSE - INLINE
FUSE - PANEL
ELECTRICAL SYSTEM
SCHEMATIC

Figure 2

switch can be turned OFF and the aircraft systems then operated on the existing battery power.

The alternator circuits are protected by a 60-amp alternator circuit breaker and a 5-amp alternator field circuit breaker. Should either of these breakers open due to excessive current or voltage in the system, they should be reset after waiting at least 15 seconds. If either breaker continues to open, the alternator side of the master switch should be turned OFF and the aircraft systems then operated on the existing battery power.

NOTE

Only those electrical accessories required for safe-flight should be used while operating on the battery power to conserve energy.

Fuses and circuit breakers for the electrical systems are located on the lower right side of the instrument panel, and spare fuses are mounted in the right side of the glove compartment. Electrical switches for exterior lighting and accessories are located at the right of the pilot's wheel.

The engine's dual-magneto ignition system is completely independent of the aircraft electrical system, and will continue to operate in the event of an electrical system failure.

LANDING GEAR

The FACE SAVER® main landing gear struts are of tough, laminated fiberglass to achieve outstanding shock absorption and good ground stability. The nose gear is free-castering to 90° on either side of the center line, which gives good maneuverability on the ground.

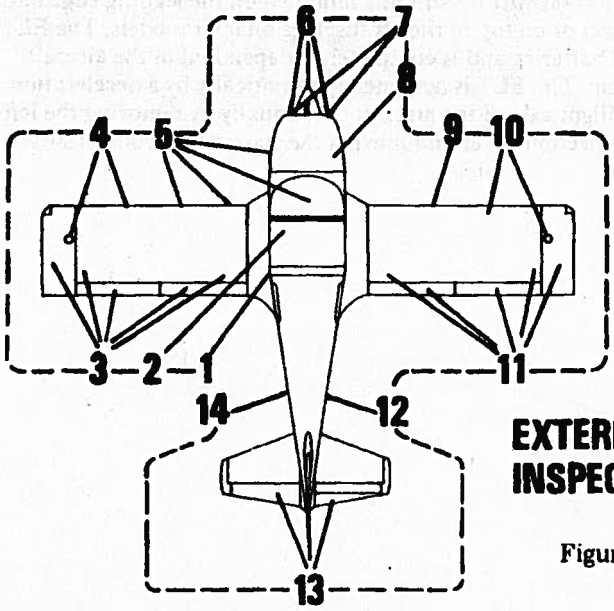
BRAKES

The brakes are toe-operated, single-disc hydraulic systems with integral parking brakes. The brakes provide all steering control while taxiing at speeds up to 15 to 20 MPH, where the rudder becomes effective and the brakes and the rudder can be used together. The parking brake is set by pressing the toe brakes; then pulling the parking brake knob; then releasing brake pedal pressure. To release, push the parking brake knob in, then press the toe-brakes firmly. Parking brakes are operated from the left side only.

EMERGENCY LOCATOR TRANSMITTER (Optional – Factory Installed)

The emergency locator transmitter (ELT) is a self contained battery powered radio transmitter which emits a signal (121.5/243.0 MHZ) to assist in locating a downed aircraft. The ELT consists of a transmitter located in the aft fuselage section under the vertical

stabilizer and a transmitting antenna mounted on the leading edge of the vertical stabilizer or on top of the aft fuselage on later models. The ELT has self-contained batteries and is completely independent of the aircraft electrical system. The ELT is activated automatically by a deceleration of 5 G's along the flight axis of the aircraft or manually by removing the left side empennage inspection cover and moving the transmitter control switch to the "on" position.



EXTERIOR INSPECTION

Figure 3

PREFLIGHT

The airplane should be given a thorough visual inspection prior to each flight. This procedure is recommended as shown on Figure 3.

1. Unlock and open canopy.
2. CHECK: Ignition switch OFF, Master switch OFF, mixture control in FULL AFT, IDLE CUT-OFF position. Remove control lock.
3. Drain fuel sample from left wing.
   Check for flap security.
   Check ailerons for freedom of movement.
   Check wing surface and tip for damage.
   Remove left wing tie down.
4. Visually check fuel level and check cap for tight seal.
   Inspect pitot opening for foreign material.
5. Inspect fuel tank vent for foreign material.
   Inspect landing gear and tire for general condition (wear, cuts, abrasions, leaking brakes and proper inflation).
   Check security of shock mounted wheel fairing (if installed).
   Check windshield and canopy for general condition.
   Check fresh air vents for blockage.

CHECK LIST AND OPERATING INSTRUCTIONS

PREFLIGHT (Continued)

6. Check propeller and spinner for cracks, nicks and security.
   Check cowling for damage and security of latches.
   Check landing light for damage.
   Check carburetor air passage for obstructions.

7. Engine baffles and cooling openings free of foreign materials/ obstructions.
   Remove tow bar from nose gear.

8. Check oil level. It is recommended you DO NOT OPERATE ENGINE WITH LESS THAN 4 QUARTS. FILL TO 6 QUARTS MAXIMUM FOR EXTENDED FLIGHT.
   Check nose gear and tire for wear, cuts, abrasions and proper inflation.

9. Inspect landing gear and tire for general condition (wear, cuts, abrasions, leaking brakes and proper inflation).
   Check security of shock mounted wheel fairings (if installed).
   Inspect fuel tank vent for foreign material.

10. Visually check fuel level and check cap for tight seal.
    Check stall horn vane for freedom of movement.

11. Check wing surface and tip for damage.
    Remove right tie down.
    Check ailerons for freedom of movement.
    Check for flap security.
    Drain fuel sample from right wing.

12. Check static source for foreign particles.

13. Check elevators and rudder for freedom of movement.
    Check trim tab for security.
    Check tail cone for security.
    Remove tail tie down.

14. Check static source for foreign particles.

NOTE

For night operations, always check instrument, position and landing lights for proper operation prior to starting engine. Always carry a flashlight during night operations.

BEFORE STARTING ENGINE

1. Seat: Adjusted and locked.
2. Seat belts and shoulder harnesses: Buckled and adjusted.
3. Brakes: Set.
4. Remove control lock.
5. Check all controls for operation.
6. Fuel selector: To fullest tank.
7. Radios and lights: OFF.

STARTING ENGINE

1. Prime engine if necessary.
2. Mixture control: Full rich.
3. Throttle: Open 1/8 inch.
4. Carburetor heat: OFF.
5. Master/Alternator switch: ON.
6. Auxiliary fuel pump: ON. Check for operation (Pressure 0.5 to 8psi.) then turn fuel pump OFF.
7. Clear propeller.
8. Ignition switch: ON LEFT.
9. Press starter button.
10. Ignition switch to BOTH.
11. Check oil pressure. If no pressure indicated in 30 seconds, shut engine down and determine trouble.
12. Warm up engine at 800 to 1200 RPM.

ENGINE RUN–UP

1. Throttle setting: 1800 RPM.
2. Engine instruments: Operating properly in green arc ranges.
3. Check magnetos: RIGHT–BOTH–LEFT–BOTH. 175 RPM maximum drop on either magneto, no more than 50 RPM difference between magnetos.
4. Carburetor heat: ON check for RPM drop, then OFF.
5. Suction gauge (if installed): 4.6 to 5.4 inches Hg.
6. Radio (if installed): Operation checked.
7. Engine is ready for take-off when it will take throttle without hesitating or faltering.

BEFORE TAKE–OFF

1. Console check:
   a. Microphone (if installed): Secure.

b. Trim Wheel: At take-off setting.
c. Flaps: Check for correct operation.
d. Flaps: UP.
e. Fuel: On fullest tank.

2. Panel and control Check:
a. Primer knob: In and locked.
b. Mixture: Full rich.
c. Carburetor heat: OFF.
d. Auxiliary fuel pump: ON.
e. Controls: Free-no binding-movement in proper direction.
f. Flight instruments: Set.
g. Radios: ON.
h. Engine instruments: Normal.

TAKE–OFF (Normal)

1. Auxiliary fuel pump: ON.
2. Throttle: Full open.
3. Raise nose wheel between 60 and 65 MPH.
4. Normal climb speed: 95 MPH.

TAKE–OFF (Obstacle Clearance)

1. Auxiliary fuel pump: ON.
2. Throttle: Full open.
3. Controls: Apply light elevator back pressure at 60 MPH, lift nose wheel at 65 MPH.
4. Climb speed: 75 MPH.

CLIMB

1. Normal 95 MPH-full throttle.
2. Best rate 89 MPH at sea level-full throttle.
3. Best angle 75 MPH at sea level-full throttle.

CRUISE

1. Auxiliary fuel pump: OFF.
2. Power Setting: 2100 to 2600 RPM.
3. Mixture: Full rich when operating at more than 75% power. If in doubt as to percentage of power being used, use full-rich mixture for all operations below 5,000 ft.
4. To maintain best *fuel load balance*, change fuel selector at approximately 30-minute intervals during cruise. If flying solo, maintain the left tank about 1/2-tank lower than the right. This technique will substantially improve lateral trim.

BEFORE LANDING

1. Fuel selector: To fullest tank.

2. Mixture: Full rich.
3. Auxiliary fuel pump: ON.
4. Carburetor heat: Check, leave ON if icing conditions are known to exist.
5. Wing flaps: As desired below 115 MPH.
6. Airspeed: 75 to 80 MPH.

LANDING (Normal)

1. Touchdown on main gear.
2. Lower nose wheel slowly as speed decreases.
3. Directional Control: Use rudder while it is effective (Down to approximately 20 MPH).
4. Brakes: As required for directional control and stopping.

LANDING (Obstacle Clearance)

1. Flaps: Fully extended below 115 MPH.
2. Airspeed: 72 MPH.
3. Land on main wheels first.
4. Apply full up elevator.
5. Flaps: UP.
6. Brakes: As required for directional control and stopping.

BALKED LANDING

1. Apply full throttle.
2. Carburetor heat OFF.
3. Establish climb attitude.
4. Flaps: Retract, after accelerating to safe airspeed.

AFTER LANDING

1. Flaps: UP.
2. Carburetor heat: OFF.
3. Auxiliary fuel pump: OFF.

SHUT–DOWN

1. All electrical equipment: OFF.
2 Mixture: To idle cut-off.
3. Magneto switch: OFF.
4. Master switch: OFF.
5. Install control lock.
6. Brakes: Set and/or wheels chocked.

OPERATING PROCEDURES

STARTING THE ENGINE

Before priming, set the parking brake by depressing the tops of both rudder pedals, and pulling out on the parking brake control knob. It is good practice to have all radios and lights off, both to limit battery drain during the start and to protect avionics from voltage surges.

NOTE

Normally, one to three strokes of the priming pump is sufficient for quick starting. In temperatures below 40°F, however, four to six strokes may be necessary. During extremely cold days, starting will be aided by pulling the propeller through four or five revolutions by hand. Switches must be OFF when pulling the propeller. Preheating the engine or oil before starting in sub-zero temperatures will speed the start and conserve the battery charge.

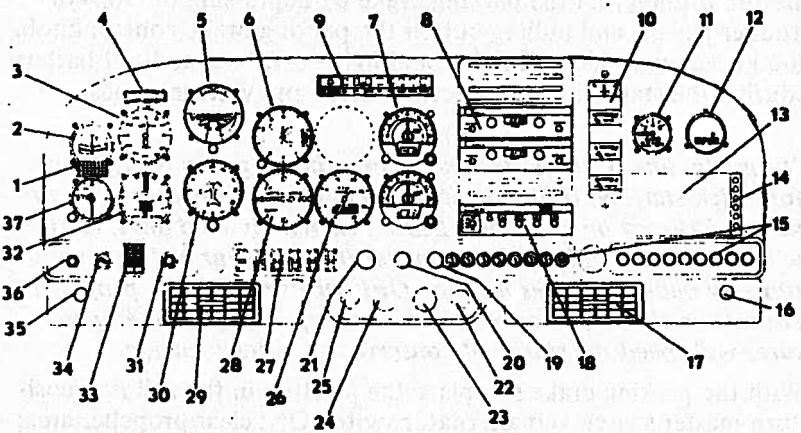
With the parking brake set, place the mixture in the full rich position; turn master switch and alternator switch ON; clear propeller area; set ignition switch to LEFT; and engage the starter. If the engine fails to start on the first attempt, a second attempt should be made without priming. If the day is hot and the second attempt fails, it is possible the engine is over-primed. Pull the mixture control to full lean, throttle 1/4 open, and turn the engine with the starter. When the engine starts, push the mixture control to full rich. If the day is cold, it is more likely the engine is under-primed. In this event, a few extra strokes of the primer should provide a prompt start. As soon as the engine starts set ignition switch to BOTH.

Check the oil pressure as the engine starts. If no oil pressure is indicated within 30 seconds (60 seconds on a very cold day), stop the engine and determine the source of trouble. Oil pressure should indicate approximately 25 psi with the engine at idle.

WARM–UP AND GROUND CHECK

Engine warm-up should be at 800 to 1200 RPM. The magneto check is run at 1800 RPM using the BOTH-RIGHT-BOTH-LEFT-BOTH sequence. Maximum RPM drop per magneto should not exceed 175 RPM, or 50 RPM differential between magnetos. The carburetor heat should be checked for operation at this time, then returned to the full OFF position. The engine is ready for take-off when it will take full throttle without hesitation or faltering.

INSTRUMENT PANEL



1. Compass Correction Card
2. Compass
3. Airspeed Indicator
4. Aircraft Registration Number
5. Horizon Gyro (opt.)
6. Altimeter
7. Omni Head (opt.)
8. Radios (opt.)
9. Radio Selector Switches (opt.)
10. Instrument Cluster
11. Suction Gauge (opt.)
12. Hourmeter (opt.)
13. Map Compartment
14. Spare Fuses
15. Fuses & Circuit Breakers
16. Vent Control (RH)
17. Vent Louver (RH)
18. Transponder (opt.)
19. Parking Brake Control
20. Cabin Heat Control
21. Instrument Light Rheostat
22. Engine Primer
23. Mixture Control
24. Throttle Control
25. Carb Heat Control
26. Tachometer
27. Individual Circuit Controls
28. Vertical Speed Indicator (opt.)
29. Vent Louver (LH)
30. Directional Gyro (opt.)
31. Starter Button
32. Turn & Bank Indicator (opt.)
33. Master Switch
34. Ignition Switch
35. Vent Control (LH)
36. Head Phone Jack
37. Clock (opt.)

Figure 4

TAKE–OFF

Before beginning the take-off roll, align the airplane with runway. Aligning the nose wheel with the take-off direction will allow minimum brake usage during the initial ground roll. When full power is applied for take-off, directional control is maintained with light toe pressure on the brakes. At speeds above 15-20 MPH, the rudder becomes fully effective and brake steering is NOT necessary. Continued use of brake steering will only prolong the take-off roll.

Accelerate to 60 MPH before applying a light back pressure on the control wheel to lift off. Raising the nose wheel too soon or to an excessive angle may increase take-off ground distance. When airborne, accelerate to the desired climb speed.

SOFT FIELD TAKE–OFF

After alignment in the take-off direction and with the elevator held in the full up position, apply take-off power smoothly. As the airplane accelerates and the elevator becomes effective, the nose load will lighten reducing nose wheel drag. As the nose raises, the elevator should be eased forward so the nose wheel is held just clear of the ground. After lift-off, accelerate to the best angle of climb speed (75 MPH at sea level) or best rate of climb speed (89 MPH at sea level) depending on obstacles.

NOTE

Avoid prolonged engine run-up in loose gravel, since the propeller will tend to pick up stones and debris causing blade damage.

SHORT FIELD TAKE–OFF

After alignment in the take-off direction, advance the throttle without hesitation, and begin the take-off roll with the elevator neutral. Use light smooth brake pressures to maintain low speed directional control. At 60 MPH apply elevator back pressure for rotation, then climb at 75 MPH. If terrain or further obstacles are to be cleared after take-off and above the 50 foot obstacle, accelerate to the best angle of climb speed for that altitude. When obstacles are cleared, accelerate to the desired climb speed.

NOTE

Speeds given are for gross weight, sea level conditions.

CLIMB

A normal climb speed of 95 MPH is recommended once over ground obstacles. This speed offers good visibility, excellent over-the-ground speed and rate of climb. The best rate of climb speed varies from 89 MPH at sea level to 84 MPH at 10,000 ft. The best angle of climb speed varies from 75 MPH at sea level to 80 MPH at 10,000 ft.

Refer to Section V performance charts for additional information.

NOTE

The mixture should be full rich during take-off and climb at altitudes below 5000 ft. MSL. However, during take-off or climb from high-altitude airports, the engine should be leaned to achieve best power (maximum RPM).

CRUISE

The maximum recommended cruise power setting is 75% of the rated horsepower. True airspeeds, which are determined by the particular altitude and power setting chosen, can be obtained from the tables in Section V.

Fuel comsumption can be reduced significantly, especially at high altitudes, by leaning the mixture in cruising flight. For optimum fuel consumption in cruise at 75% power or less, lean the mixture as follows:

1. Slowly move the mixture control from full rich position toward lean position.
2. Continue leaning until engine roughness is noted.
3. Enrich mixture slightly until engine runs smoothly.

The Cruise Performance fuel consumption given in Section V is based upon this leaning technique.

Continuous use of carburetor heat during cruising flight decreases engine efficiency, and is *not* recommended. Use carburetor heat only as necessary. When applying carburetor heat, do so slowly to the full-on position (and only for a few seconds) at intervals to determine if ice has developed.

NOTE

If engine runs rough during cruise with carburetor heat on, it may be due to an over-rich condition. To correct for engine roughness in such a situation, lean to smooth engine operation.

To maintain a laterally trimmed condition in cruise, it is recommended that the fuel selector be changed approximately every 30 minutes. If flying alone, initial trim should be obtained by using from the left tank until approximately 1/2-tank of fuel is burned; *this requirement may be eased however, by judicious placement of baggage to the right of the baggage compartment.*

STALLS

The stall characteristics are conventional in all configurations. Elevator buffeting occurs approximately 3 MPH above the stall and becomes more pronounced as the stall occurs. An audible stall warning horn begins to blow steadily 5 to 10 MPH above the actual stall speed.

NOTE

Rudder is the primary control for yaw and roll through the stall. In addition, the aileron is effective for roll control. Both controls should be used as necessary to control roll and yaw through the stall.

The table below indicates stalling speed as a function of bank angle and flap setting at maximum weight and a forward center of gravity loading. Note that the stalling speed markedly increases with bank angles.

MODEL AA-1B				
STALL SPEED – MPH CAS				
CONDITION	BANK ANGLE			
	0°	20°	40°	60°
FLAPS UP	64	66	73	91
FLAPS DN	61	63	70	86
1560 LBS POWER OFF				

Avoid uncoordinated use of the controls at the stalling speed as this may result in a spin. SPINS ARE PROHIBITED.

NORMAL APPROACH AND LANDING

Trim the airplane to an approach speed between 75 and 80 MPH, depending on weight and wind conditions. Normal approach speed is 75 MPH. Maximum flap extension speed is 115 MPH. Any flap setting may be used for landings, however the landing distances given in Section IV are with the flaps down, to obtain the shortest distances.

As a general rule, it is good practice to contact the ground at a minimum safe speed consistent with existing conditions. After touchdown, hold the nose wheel off as long as possible on roll-out. Lower the nose gently and apply brakes as needed. Retract the flaps after touchdown to minimize the possibility of skidding when braking. In gusty or crosswind conditions, many pilots prefer to increase their airspeed slightly above the normal approach speed; this decision, however, can only be made by the pilot in light of his own experience and training.

NOTE

A pilot-induced porpoise maneuver may be encountered during landing by contacting the nose wheel first with excessive touchdown speed. The porpoise could be accentuated by a wavy or rolling runway surface. Should a porpoise occur, use the following technique to recover:

1. ***Apply full power.***
2. ***Maintain steady elevator-back pressure for a normal climb.***

3. *Normal climb-95 MPH.*
4. *Carburetor heat - OFF.*
5. *Retract flaps.*
6. *Execute normal go-around.*

A power-off tail-low touchdown attitude is the best assurance of a porpoise-free landing, and excessive touchdown speed is not required with direct crosswinds up to 13 MPH. Use normal crab or wing-low side-slip landing approach techniques under these conditions.

SHORT FIELD LANDING

When making a landing where obstacle clearance or ground roll is a factor, trim to an approach speed of 72 MPH with flaps fully extended. Touchdown should be made on the main gear at the slowest safe airspeed. Use braking as necessary while holding the control wheel full back to increase brake effectiveness. Best braking can be obtained by applying light pressure immediately after touchdown and continuously increasing brake pressure just enough so the wheels do not skid.

SOFT FIELD LANDING

For soft fields, trim to an approach speed of 72 MPH with flaps fully extended. Use power as necessary to control glide path consistent with existing conditions. Touchdown in a rough or soft field should be in a nose-high pitch attitude at the slowest safe airspeed. The nose wheel should be held off the surface as long as possible, and braking should be the minimum required for directional control and safety. (Maximum braking on soft surfaces may lead to excessive gear loads.)

BALKED LANDINGS (Go-arounds)

Should a landing be balked, apply full power immediately; carburetor heat OFF; establish a positive rate of climb; retract the flaps and trim for normal climb.

SLIPS TO LANDINGS

Slips are very effective and rapid descents with high sink rates can be obtained through a properly executed slip. It is recommended, however, that slips be practiced at altitude until the pilot is familiar with the airplane. The recommended slip speeds are 80 to 85 MPH, depending on load, pilot proficiency, and local conditions. Pilots should make themselves familiar with the airplane at a variety of slip speeds.

GROUND HANDLING AND TIE–DOWN

The airplane is easily handled on the ground by hand with the aid of a tow bar attached to the nose wheel fork. Tie-down rings are provided under each wing tip and under the tail. Proper tie-down is the best insurance against damage to the airplane by gusty or strong winds. Installation of the control wheel lock helps avoid damage to the movable surfaces under such conditions.

Care should be taken when using the parking brakes for an extended period of time during which an air temperature rise could cause the hydraulic fluid to expand, which in turn could damage the brake system and/or cause difficulty in releasing the parking brake. For prolonged parking, tie-downs and wheel chocks are recommended.

ENGINE ROUGHNESS

If a rough-running engine is encountered, it may be for any one of the following reasons:

1. Lead or oil fouled spark plugs.
2. Incorrect fuel/air mixture.
3. Partial ignition failure.
4. Incorrect use of carburetor heat.

Spark plugs may become oil-fouled during taxiing, prolonged power-off descents, or cruising with an improper fuel-to-air mixture. The majority of engine roughness encountered is due to fouled spark plugs. This may be eliminated by increasing engine power to 75%, leaning the engine to the correct fuel/air ratio for the altitude and burning the plugs clean. Prolonged engine roughness may be due to partial ignition failure. An ignition failure or partial failure is checked by momentarily selecting the left and right ignition on the key-operated switch. If *either* position produces a significant increase in engine roughness, a partial ignition failure is likely. *The aircraft is equipped with two totally independent ignition systems to compensate for such matters.* Place the key-operated ignition switch in the BOTH position - there is NO immediate danger. Proceed and land at the next convenient airport.

Improper use of carburetor heat also may induce engine roughness. Abrupt application of carburetor heat when cruising above 5000 MSL may result in momentary engine roughness. This condition is caused by warm air being fed into the carburetor. Warm air is less dense and tends to upset the fuel/air ratio, thus causing an over-rich mixture condition. Returning the carburetor heat to OFF will tend

to correct this condition. It may be necessary, from time to time, to fly with partial carburetor heat. Adjust mixture for smooth operation.

NOTE

Flying with partial carburetor heat is not recommended unless the aircraft has a functioning carburetor air temperature gauge installed.

ADDITIONAL ENGINE OPERATING INFORMATION

Refer to the "Operating Instructions" section of the "Lycoming Engine Operator's Manual" for additional information on fuel mixture leaning procedures, the use of carburetor heat and general good engine operating procedures to assure maximum engine performance.

OPERATING LIMITATIONS

This aircraft is approved for day VFR operation with standard equipment installed. With appropriate optional equipment installed, it is certified for day and night VFR and IFR. Operation must be in accordance with all FAA approved markings, placards and check lists in the airplane.

UTILITY CATEGORY OPERATION

The AA-1B is certificated in the utility category. The utility category is restricted to airplanes intended for limited acrobatic operation within the flight load factor limitations listed below. The following utility category maneuvers are approved.

1. Any maneuver incident to normal flying.
2. Stalls (except whip stalls).
3. Lazy eights, chandelles, and steep turns.

MAXIMUMS

Gross Weight	1560 lbs.
Maneuvering Speed	135 MPH
Flight Load Factors - Flaps Up	+4.4—1.76
Flight Load Factors - Flaps Down	+3.5

ACROBATIC LIMITATIONS

Maneuver	Maximum Entry Speed — CAS
Chandelles	135 MPH
Lazy Eights	135 MPH
Steep Turns	135 MPH
Stalls (except whip stalls)	slow deceleration

SPINS ARE PROHIBITED

In the event of an inadvertent spin, use the following recovery technique with *brisk* application of anti-spin controls:

1. Simultaneously apply full down elevator and full rudder opposite to the spin rotation while neutralizing the aileron.
2. Hold anti-spin controls until rotation stops.
3. When rotation has stopped, neutralize the anti-spin rudder

and elevator, then apply *smooth* elevator back pressure to bring the nose up to a level flight attitude.

NOTE

If recovery controls are not briskly applied in the first turn, more than one additional turn will be required for recovery. For quick recovery, apply full anti-spin controls as the spin begins, before one turn is completed.

AIRSPEED LIMITATIONS

Maximum Glide or Dive, Smooth Air (red line)	195 MPH CAS
Caution Range (Yellow Arc)	144-195 MPH CAS
Normal Range (Green Arc)	64-144 MPH CAS
Flap Operating Range (White Arc)	61-115 MPH CAS
Maneuvering Speed	135 MPH CAS
Maximum-Canopy Open to Placard	130 MPH CAS

ENGINE INSTRUMENT MARKINGS

Oil Temperature Gauge - Normal Operating Range	Green Arc
Maximum Allowable	245° (Red Line)
Oil Pressure Gauge - Minimum Idling	25 PSI
Normal Operating Range	60-90 PSI
Maximum Allowable	100 PSI
Fuel Pressure Gauge - Normal Operating Range	0.5-8 PSI

Fuel Quantity Indicators - 0 means one gallon unuseable fuel remaining in the tank.

Tachometer - Normal Operating Range	2000-2600 RPM

WEIGHT AND BALANCE

The following information will enable you to fly your airplane within the prescribed weight and center of gravity limitations. To calculate the weight and balance for your airplane, use the Sample Problem, Loading Graph and Center of Gravity Envelope charts as follows:

Write down the "Licensed Empty Weight" and "Moment" on the Sample Loading Problem chart under the column marked "your airplane", from the Weight and Balance Data sheet (and/or changes listed on FAA Form 337) included with your aircraft papers. Also add all additional weights and their corresponding moments (obtained from the "loading graph") of items to be carried on the flight. Plot the total weight and moment on the "Center of Gravity Envelope" chart and if the intersection point is within the envelope, the loading is acceptable.

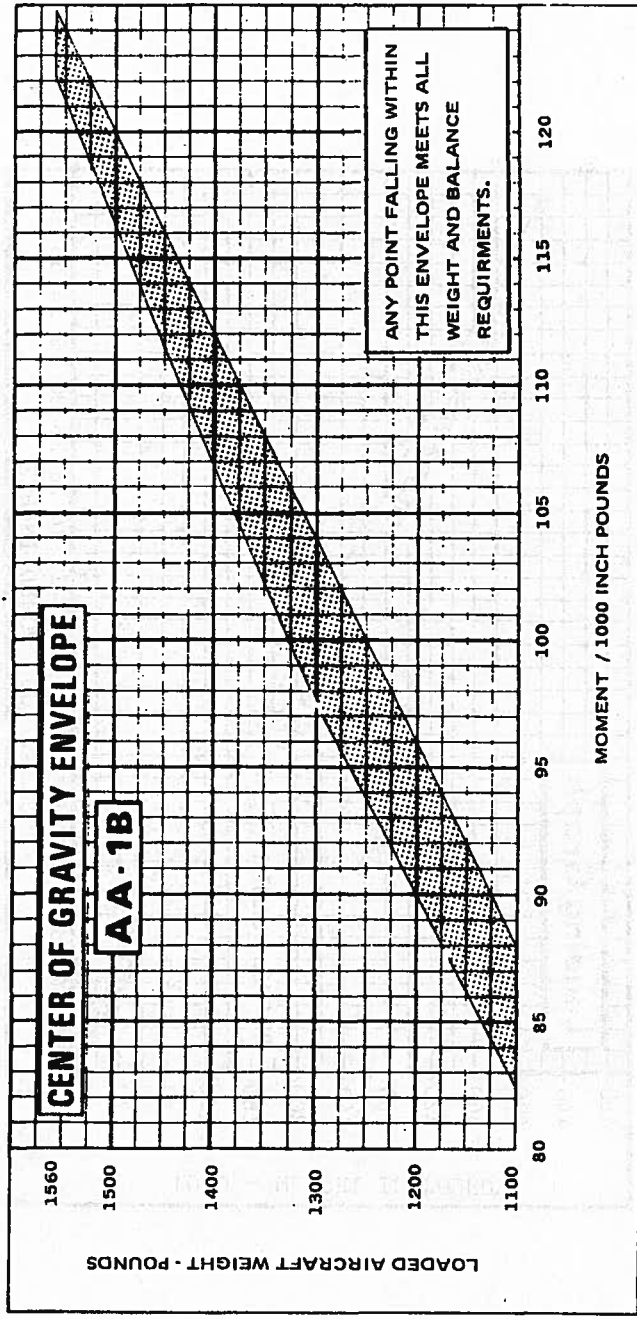

CENTER OF GRAVITY ENVELOPE
AA-1B
ANY POINT FALLING WITHIN THIS ENVELOPE MEETS ALL WEIGHT AND BALANCE REQUIREMENTS.
LOADED AIRCRAFT WEIGHT - POUNDS
1560
1500
1400
1300
1200
1100
80
85
90
95
100
105
110
115
120
MOMENT / 1000 INCH POUNDS

Figure 5

1. Add weight of items to be carried to licensed empty weight.
2. Add moment/1000 of items to be carried to total moment/1000.
3. Use center of gravity envelope to determine loading acceptability.

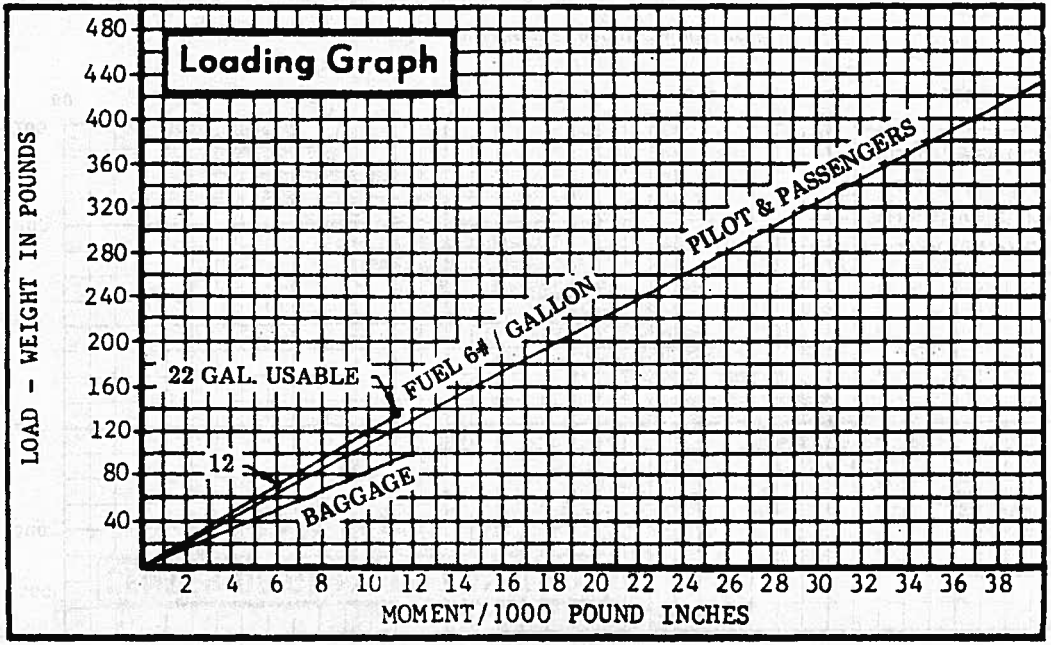
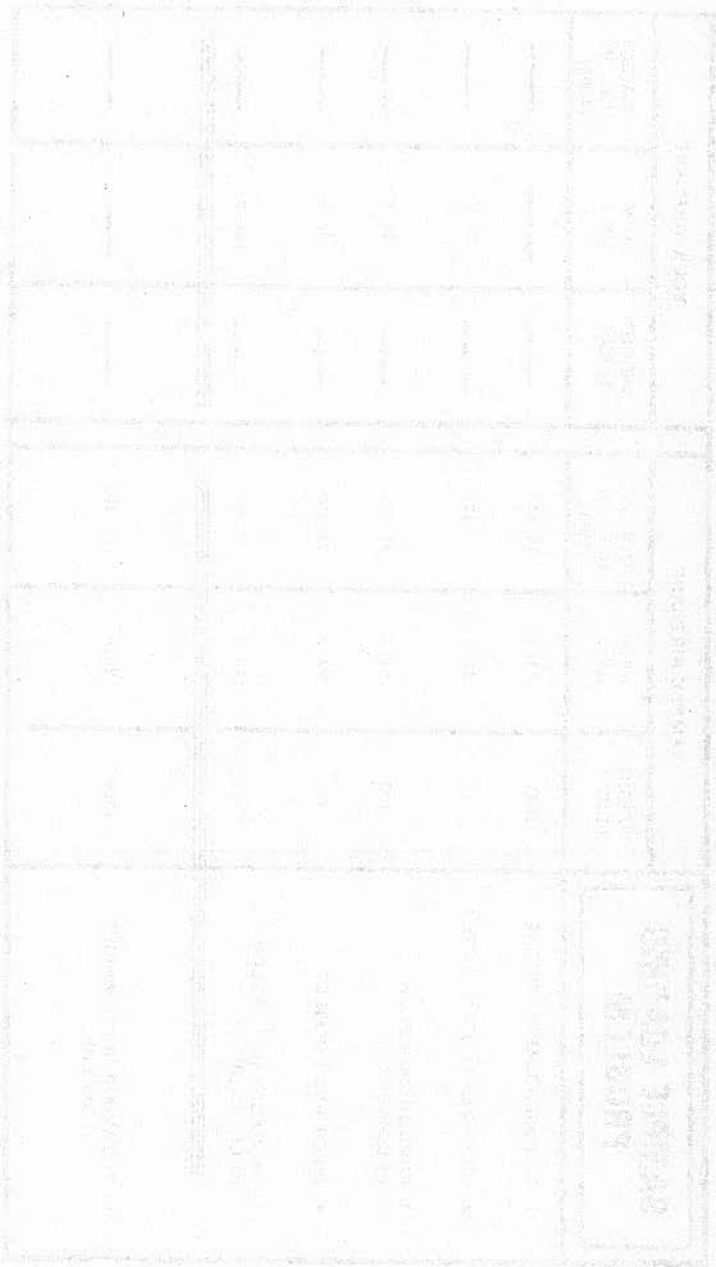


Figure 6

SAMPLE LOADING PROBLEM	SAMPLE AIRPLANE			YOUR AIRPLANE		
	WEIGHT (LBS.)	ARM (IN.)	MOMENT (LB. - IN. /1000)	WEIGHT (LBS.)	ARM (IN.)	MOMENT (LB. -IN. /1000)
1. LICENSED EMPTY WEIGHT	1041	73.4	76.449	—	—	—
2. OIL-6 QTS. (1 QT. =1.8 LBS.)	11	39.0	.429	—	39.0	—
3. FUEL (IN EXCESS OF UNUSEABLE)	132	84.5	11.154	—	84.5	—
4. PILOT AND CO-PILOT	340	92.5	31.450	—	92.5	—
5. BAGGAGE (MAX. ALLOWABLE 100 LBS.)*	36	120.0	4.320	—	120.0	—
6. TOTAL AIRCRAFT WEIGHT (LOADED)	1560	79.4	123.802	—	—	—

*Maximum allowable is 100 pounds if C.G. is within Center of Gravity Envelope.

Figure 7



SECTION V

PERFORMANCE CHARTS

Performance information has been derived from actual flight tests and corrected to standard atmospheric conditions at 1560 pounds maximum gross weight. Aircraft performance data is representative of the AA-1B Trainer equipped with a climb propeller (standard on the trainer) and the AA-1B Tr-2 equipped with a cruise propeller and wheel fairings (both standard on the Tr-2). These aircraft are both available with either propeller, so check the aircraft equipment list and/or the log books to determine how your aircraft is equipped.

Actual performance will vary from standard due to variations in atmospheric conditions, engine and propeller condition, mixture leaning technique, and other variables associated with the particular performance item.

TAKE-OFF DATA

HARD SURFACE RUNWAY - FLAPS UP

AIRCRAFT	GROSS WT. LBS.	IAS AT 50 MPH	HEAD WIND KNOTS	AT S.L. & 59° F.		AT 2000 FT. & 52° F.		AT 4000 FT. & 45° F.		AT 6000 FT. & 38° F.	
				GROUND RUN	TOTAL TO CLEAR 50 FT. OBS.	GROUND RUN	TOTAL TO CLEAR 50 FT. OBS.	GROUND RUN	TOTAL TO CLEAR 50 FT. OBS.	GROUND RUN	TOTAL TO CLEAR 50 FT. OBS.
AA -1B TRAINER WITH CLIMB PROP (STD.)	1560	75	0	810	1550	912	1810	1055	2179	1207	2655
			10	569	1185	651	1399	758	1698	875	2093
			20	373	858	431	1032	510	1266	599	1586
AA-1B TR-2 WITH CRUISE PROP (STD.)	1560	75	0	890	1590	1015	1850	1190	2220	1380	2695
			10	625	1215	725	1430	855	1730	1000	2125
			20	410	880	480	1055	575	1290	685	1610

NOTES:
1. Increase ground run 7% for each 20° F. above standard temperatures.
2. The increase in total take-off distance varies from 8% at sea level to 14% at 6000 feet for each 20° F. above standard temperature.

Figure 8

MAXIMUM RATE-OF-CLIMB DATA

1560 POUNDS GROSS WEIGHT - FLAPS RETRACTED

AIRCRAFT	ALTITUDE FEET	TEMPERATURE °F.	IAS MPH	RATE OF CLIMB FT./MIN.	FUEL USED FROM S.L. GALLONS
AA-1B TRAINER WITH CLIMB PROP (STD.)	S.L.	59°	89	705	1.0
	2500	50°	88	585	1.6
	4500	43°	87	485	2.1
	6500	36°	86	390	2.6
	8500	28°	85	290	3.3
	10500	21°	84	190	4.1
AA-1B TR-2 WITH CRUISE PROP (STD.)	S.L.	59°	89	660	1.0
	2500	50°	88	540	1.6
	4500	43°	87	440	2.1
	6500	36°	86	345	2.7
	8500	28°	85	245	3.4
	10500	21°	84	145	4.2

NOTES:

1. Full throttle climb, mixture leaned above 5,000 feet to smooth engine operation.
2. Fuel used includes taxi and warm up allowance.
3. Power loss attributable to the presence of humidity can be as high as 7%, this represents approximately 100 FPM loss in climb rate at sea level.

Figure 9

CRUISE & RANGE PERFORMANCE

AA-1B TR-2

* WITH CRUISE PROPELLER (STD.)

GROSS WEIGHT 1560 LBS.
STANDARD CONDITIONS
ZERO WIND
LEAN MIXTURE

ALTITUDE	RPM	PERCENT POWER	TRUE AIR SPEED	GALLONS/ HOUR	ENDURANCE HOURS	RANGE MILES
2500	2600	86	136	7.4	2.8	379
	2500	78	130	6.6	3.1	404
	2400	71	123	5.9	3.6	433
	2300	64	116	5.3	3.9	449
	2200	58	108	4.8	4.3	460
	2100	52	99	4.5	4.6	456
4500	2600	82	135	7.0	3.0	395
	2500	75	129	6.3	3.3	418
	2400	67	121	5.6	3.7	441
	2300	61	113	5.1	4.0	453
	2200	56	106	4.7	4.4	458
	2100	51	96	4.4	4.6	444
6500	2600	79	134	6.7	3.1	407
	2500	72	127	5.9	3.5	432
	2400	65	119	5.4	3.8	446
	2300	59	112	4.9	4.2	460
	2200	54	104	4.5	4.5	464
8500	2600	75	133	6.3	3.3	426
	2500	68	125	5.7	3.6	440
	2400	62	117	5.2	3.9	454
	2300	57	109	4.7	4.3	459
10,500	2600	72	130	5.9	3.5	435
	2500	66	122	5.4	3.8	447
	2400	60	114	5.0	4.1	455

NOTES:

1. Range and endurance data include allowance for take-off and climb.
2. Fuel consumption is for level flight with mixture leaned. See Section III for proper leaning technique. Continuous operations at powers above 75% should be with full rich mixture.
3. Speed performance is with wheel fairings. Subtract 2 MPH for speed performance without wheel fairings.
4. For temperatures other than standard, add or subtract 1% power for each 10° F. below or above standard temperature respectively.
5. Cruise propeller is standard on TR-2. For TR-2's equipped with optional climb propeller use Trainer data and add 2 MPH.

Figure 10

CRUISE & RANGE PERFORMANCE

AA-1B TRAINER

* WITH CLIMB PROPELLER (STD.)

GROSS WEIGHT 1560 LBS.
STANDARD CONDITIONS
ZERO WIND
LEAN MIXTURE

ALTITUDE	RPM	PERCENT POWER	TRUE AIR SPEED	GALLONS/ HOUR	ENDURANCE HOURS	RANGE MILES
2500	2600	77	125	6.5	3.2	400
	2500	70	118	5.8	3.6	420
	2400	64	112	5.3	3.9	437
	2300	59	106	4.9	4.2	445
	2200	54	100	4.7	4.5	444
	2100	52	95	4.5	4.6	441
4500	2600	74	124	6.2	3.3	410
	2500	68	117	5.6	3.7	428
	2400	62	110	5.1	4.0	438
	2300	57	105	4.8	4.3	444
	2200	54	100	4.6	4.4	442
	2100	52	97	4.5	4.5	437
6500	2600	71	122	5.9	3.5	419
	2500	65	116	5.4	3.8	431
	2400	60	109	5.0	4.0	439
	2300	57	104	4.8	4.3	443
	2200	54	100	4.6	4.4	439
8500	2600	68	120	5.7	3.6	428
	2500	63	114	5.3	3.9	437
	2400	59	108	4.9	4.1	442
	2300	57	104	4.8	4.2	438
10,500	2600	66	119	5.5	3.7	433
	2500	62	114	5.2	3.9	438
	2400	59	109	4.9	4.1	440

NOTES:

1. Range and endurance data include allowance for take-off and climb.
2. Fuel consumption is for level flight with mixture leaned. See Section III for proper leaning technique. Continuous operations at powers above 75% should be with full rich mixture.
3. Speed performance is without wheel fairings. Add 2 MPH for wheel fairings.
4. For temperatures other than standard, add or subtract 1% power for each 10° F. below or above standard temperature respectively.
* 5. Climb propeller is standard on Trainer. For Trainers equipped with optional cruise propeller use TR-2 data and subtract 2 MPH if not equipped with wheel fairings.

Figure 11

LANDING DATA

LANDING DISTANCE ON HARD SURFACE RUNWAY
ZERO WIND—FLAPS DOWN-1560 LBS. GROSS WEIGHT
72 MPH IAS AT 50 FEET

ALTITUDE TEMPERATURE	SEA LEVEL 59 ° F.	2000 FT. 52 ° F.	4000 FT. 45° F.	6000 FT. 37 ° F.
GROUND RUN TOTAL DISTANCE	410 1100	430 1155	460 1210	490 1265

NOTE: 1. Reduce total landing distance 10% for each 5 knots of head wind.

STALL SPEEDS – MPH CAS

CONDITION		BANK ANGLE			
1560 LBS. GROSS WT.-POWER OFF		0°	20°	40°	60°
AFT CG LOADING	FLAPS UP FLAPS DOWN	62 60	64 62	71 69	88 85
FORWARD CG LOADING	FLAPS UP FLAPS DOWN	64 61	66 63	73 70	91 86

AIRSPEED CORRECTION TABLE

IAS	60	70	80	90	100	110	120	130	140	150	160	170
CAS	61	70	80	90	99	109	118	128	138	147	157	166

1560 LBS. GROSS WEIGHT – FLAPS UP – FLAPS DOWN

Figure 12

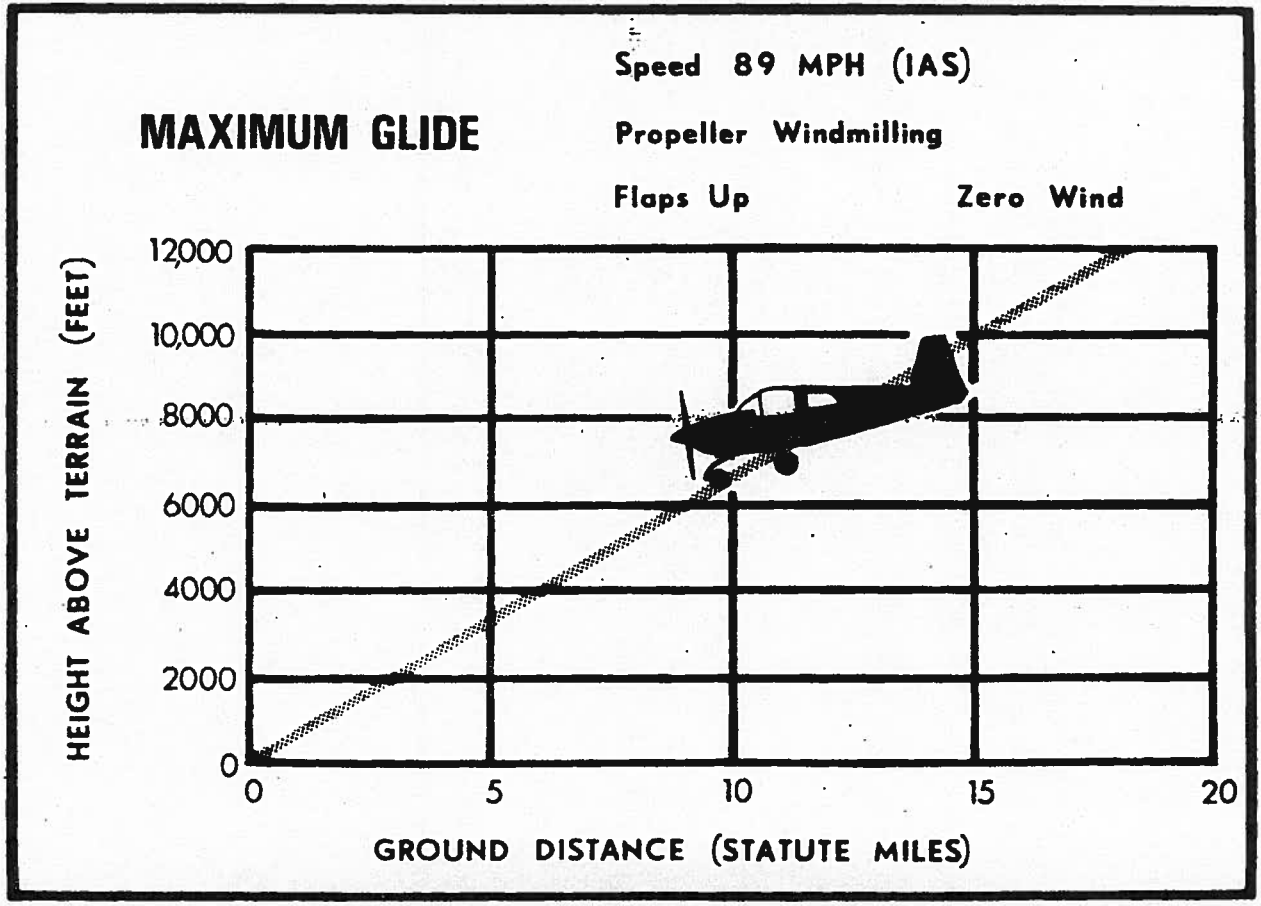

MAXIMUM GLIDE
Speed 89 MPH (IAS)
Propeller Windmilling
Flaps Up
Zero Wind
HEIGHT ABOVE TERRAIN (FEET)
12,000
10,000
8000
6000
4000
2000
0
0
5
10
15
20
GROUND DISTANCE (STATUTE MILES)

FIGURE 13

EMERGENCY PROCEDURES

BRAKE FAILURE

Although brake failure is infrequent in any aircraft, landing without brakes is no problem. If a brake failure is detected, proceed to the nearest airport with adequate runway length to accommodate an emergency brake-failure landing. It is recommended, with a single brake failure, that neither brake be utilized during landing and roll-out.

Plan the touchdown near the approach end of the runway. The aircraft nose should be aligned with the runway centerline. Use minimum safe airspeeds for existing conditions. Maintain directional control straight down the runway with use of rudder only. Allow the airplane to roll to a stop without the use of brakes. The engine may have to be stopped (with mixture control) to stop the ground roll. Request assistance from the appropriate ground control authority, and it is recommended that towing to a parking area be accomplished with hand tow or "tug".

LOW OIL PRESSURE/ENGINE OVERHEAT

A low oil pressure reading may be caused by malfunction of the indicating system, oil pump failure, or loss of oil. Monitor the oil temperature gauge for a marked increase in temperature. If no temperature change is detected, the failure is most likely in the oil pressure indicating system. Proceed to the nearest airport, land, check the oil level and determine the difficulty.

In flight, if the oil pressure indication is low and is confirmed by high oil temperatures, reduce power and proceed to the nearest airport or suitable landing area. If possible, notify the nearest ATC radio facility of your difficulty and land.

REMEMBER: A thorough and complete preflight will usually prevent low-oil pressure emergencies.

Since the engine does not have a thermostatically controlled oil cooler, the oil temperature may approach red line when operating in high outside air temperatures. This is not detrimental and is not cause for concern unless the oil temperature exceeds the red line on the oil temperature gauge. A reduced power setting will lower the oil temperature; should it exceed the red line in flight, land at an airport and correct the problem.

ELECTRICAL SYSTEM MALFUNCTION

The ammeter system indicates current flow to or from the battery. During normal operation, with a fully charged battery, the ammeter will indicate near zero or slightly toward the charge side. This indication will be true even though all electrical systems are energized, unless the capacity of the alternator (60 amps) has been exceeded. Failure of the alternator is easily detected since the ammeter will show discharge to the extent of the loads being applied. Should a component of the electrical system fail (landing light, radio, turn and bank indicator, etc.), visually check the related circuit protector and replace or reset it as required. If the alternator circuit breaker opens (pops out), wait 15 seconds then reset by pushing the circuit breaker back into position.

If either fuses or circuit breakers continue to indicate a malfunction, turn off the electrical component causing the problem or turn off the alternator switch respectively, and land at an airport for electrical system inspection.

EXCESSIVE BATTERY CHARGING RATE

If a sustained high battery charging rate of more than two needle widths (caused by a malfunction in the charging system) is noted on a long flight, it is possible to overheat and evaporate the battery electrolyte at an excessive rate and cause battery damage. In this event, turn off the alternator switch and use only the minimum electrical components to conserve the battery. Reactivate the alternator switch only as required for emergency power to complete the flight.

NOTE

Malfunctions caused by electrical shorts will cause the related fuse or circuit breaker to open.

OVERVOLTAGE PROTECTION

Overvoltage protection is provided by a diode attached to the field circuit breaker forward of the instrument panel. A sustained overvoltage condition will result in failure of the diode and subsequent opening of the alternator field circuit breaker. The breaker will not reset until the fault is corrected and the diode replaced.

INSUFFICIENT OUTPUT

If the ammeter shows discharge, an alternator failure has occurred, or the electrical system load exceeds the output of the alternator. The alternator switch must be on. To determine if alternator capacity has been exceeded, turn off the accessories one at a time and note if ammeter moves toward the charge side. No change in the ammeter indicates the alternator is not charging. If this is the case, turn OFF all unnecessary electrical components, to conserve the battery, and proceed to the nearest suitable airport for a landing.

NOTE

The engine's dual-magneto ignition system is completely independent of the aircraft electrical system, and will continue to operate in the event of an electrical system failure.

ENGINE FAILURE

Engine failures are very rare in modern aircraft. Should an engine failure occur, the basic procedures listed below may be a useful guide:

1. Establish best glide speed of 89 MPH for best range.
2. Check wind direction for landing.
3. Pick a suitable landing area and plan an approach.
4. Check fuel and switch the tank selector to the opposite tank if it contains fuel. Check fuel pressure and turn on electric fuel pump if necessary.
   Mixture - Rich
   Carburetor heat - ON
   Magnetos - check right and left. If engine runs on either one, leave switch on that magneto.
5. If the engine does not start promptly, attention should be shifted to the forced landing procedure.
6. Notify ATC of your location and problem, if possible.
7. Fuel selector OFF; mixture to idle cut-off; turn ignition OFF; flaps as needed; and the master switch OFF.
8. Complete the landing and secure the aircraft. Notify ATC by telephone of your situation and location.

WINDSHIELD OBSCURATION

A windshield obscuration caused by ice or moisture condensation may be encountered. Turn cabin heat and defroster full ON to clear the windshield of moisture. If obscuration persists, open the canopy, secure the thumbscrew located in the left canopy track, and proceed to the nearest safe airport. A safe landing may be accomplished by using a forward slip to a landing while looking through the opening in the canopy.

GROUND FIRES

Ground fires may be caused by over-priming the engine. Proper starting procedure, outlined on page 3-1, will help prevent fires when starting engine.

Should a ground fire occur, the following procedures are suggested:

1. Keep the engine running to ingest the flames into carburetor. Increasing engine RPM may help.
2. Dispatch ground personnel for fire equipment.
3. When assistance arrives, turn fuel selector valve OFF. Let engine stop due to fuel starvation.

4. If no assistance is available or the fire is beyond control, turn the fuel selector valve OFF, mixture OFF. ABANDON AIRCRAFT.

IN–FLIGHT ENGINE FIRES

In-flight engine fires in today's modern aircraft are extremely rare and it should be noted that the presence of smoke does not always mean that a flaming fire exists. As an example, it may be engine oil on the exhaust system. If, in the pilot's judgement, an engine fire exists the following procedures are suggested:

1. Fuel selector: OFF
2. Mixture: Idle cut-off
3. Cabin heat control: OFF
4. Establish a maximum safe rate of descent. Increasing speed may blow the fire out.
5. Side slip maneuvers may be used, as necessary, to direct flames away from cabin area.
6. Select a suitable field for a forced landing.
7. Notify ATC of your location and problem, if possible.
8. Turn master switch OFF and complete the forced landing. Do not attempt to restart the engine.

IN–FLIGHT ELECTRICAL FIRES

Indication of in-flight electrical fires may be wisps of smoke or the smell of hot or burning insulation. Should an electrical fire develop, the following procedures are suggested:

1. Master switch: OFF.
2. All electrical switches: OFF.
3. Ignition switch: ON.
4. Cabin air vents: OFF (If ventilation is necessary, the cabin air vent may be opened for brief periods. Under these conditions the canopy may be cracked or opened as required.)
5. Proceed to nearest suitable airport for landing.

If electrical power is necessary for safety of flight under the above conditions, the following procedures are recommended:

1. Disengage and isolate each power circuit.
2. Master switch: ON.
3. Engage each electrical circuit separately. Allow sufficient time to analyze for faulty operation.
4. Analyze each circuit separately until the malfunctioning system is detected. DO NOT disengage circuits that are determined to be functioning properly.
5. Disengage faulty circuit and report any problems to ATC.
6. If necessary, proceed to nearest suitable airport and land.

BLOWN TIRES

If a landing is to be made with a blown tire, the following procedures are suggested:

Main Tires

1. Plan your approach with a slightly long final for a slow rate of descent.
2. Approach at the slowest safe speed for the conditions. A power-on approach is recommended.
3. Touch down on the good tire only. Use power to cushion the landing (this is the time for a "greaser"). Allow the nose wheel to touch down.
4. Hold the blown tire off the ground with aileron as long as possible.
5. After the blown tire has touched down, allow the aircraft to roll to a stop, lightly and intermittently applying the brakes on the "good" tire to maintain directional control.

Nose Tire

1. Plan a slightly long, power-on approach for a slow rate of descent.
2. Touch down in a slightly nose-high attitude at a safe air speed.
3. Gently lower the nose wheel as the air speed decreases to the point at which elevator control is lost, thereby averting the hard impact when the nose "falls through".
4. After the nose wheel touches down, allow the aircraft to roll to a stop without the use of brakes. Use of brakes places additional weight on the defective nose gear tire.

ICING CONDITIONS

Carburetor ice may be encountered at any time. The first indication of carburetor ice should be a slight drop in engine RPM. Slight engine roughness may or may not accompany this engine RPM drop. If carburetor icing is suspected, the following procedures are suggested:

1. Slowly apply full carburetor heat. Engine roughness may then occur due to an over-rich mixture or water from the melting ice.
2. Continuous engine operation with carburetor heat ON is not recommended due to the decrease in engine efficiency.

Flying in known icing conditions is prohibited by FAA regulations. However, should wing icing occur the following procedures are suggested:

1. Turn pitot heat ON.

2. Turn windshield defroster full ON.
3. If IFR or under control of an in-flight ground facility, notify them of the condition and request assistance. A change of altitude, if possible, or reversing course to fly out of the icing conditions may be desirable.
4. Pilot technique is important in this situation:
   a. Increase and decrease engine RPM to keep propeller clear of ice.
   b. Increase airspeed if possible. This technique reduces angle of attack exposing less surface area for ice accumulation.
   c. Do not extend flaps. A clean configuration will expose less surface to ice and will prevent a change in air flow over the tail surfaces.
5. Monitor engine RPM for any indication of carburetor ice. (Refer to carburetor ice procedures.)
6. Plan a landing at the first suitable airport. The following procedures are suggested:
   a. If the windshield is obstructed, the canopy may be opened to improve visibility. A forward slip may be helpful.
   b. Remember that ice accumulation increases wing loading, decreases performance, decreases range and increases stall speeds. When landing, plan a slightly higher than normal air speed during landing approach. Guard against increased stall speed created by the above mentioned conditions. Touch down in a level attitude.

REMEMBER: Flying in icing conditions is NOT APPROVED!

EMERGENCY LOCATOR TRANSMITTER OPERATION (Optional—Factory Installed)

In the event of an inadvertant landing in a remote area, the emergency locator transmitter will automatically be activated by a deceleration of 5 G's along the flight axis of the aircraft or it can be manually activated by removing the left side empennage inspection cover and moving the transmitter control switch to the "on" position. The lower attach holes in the inspection cover are slotted to allow emergency removal of the cover without the use of tools by pulling it up at this point. The transmitter emits a signal on the standard aircraft emergency frequencies of 121.5/243.0 MHZ and the self contained batteries have power to provide operation for a minimum of 48 hours.

NOTE

Protect hands with a handkerchief or rag during emergency inspection cover removal to prevent cuts.

CARE OF THE AIRPLANE

Proper maintenance and general attention to detail will assure a long life and maximum reliability for your aircraft and it has been made surprisingly easy, fast and economical.

EXTERIOR CARE

The painted surfaces of the aircraft have a long-lasting, all-weather finish and should require no buffing or rubbing out in normal conditions. However, it is desirable to wax and polish it to preserve the outstanding exterior finish. It is recommended that wax or polish operations be delayed *(at least 60 days after date of certification)* to allow proper curing of the paint.

The paint can be kept bright simply by washing with water and mild soap. Avoid abrasive or harsh detergents. Rinse with clear water and dry with terry cloth towels or chamois. Oil and grease spots may be removed with kerosene or mineral spirits.

NOTE

No commerical paint removers are to be used on any airframe component unless specific prior approval has been received from the factory (see latest Service Manual).

If you choose to wax your airplane, use a good automotive-type wax applied as directed. The use of wax in areas subject to high abrasion, such as leading edges of wings and tail surfaces, propeller spinner and blades, is recommended.

WINDSHIELD, CANOPY AND WINDOW CARE

It is recommended that you keep the plexiglas in the canopy, windshield and cabin windows clean and unscratched. The following procedures are recommended:

1. If large deposits of mud and/or dirt have accumulated on the plexiglas, flush with clean water. Rubbing with your hand is recommended to dislodge excess dirt and mud without scratching the plexiglas.

2. Wash with soap and water. Use a sponge or heavy wadding

of a soft cloth. DO NOT rub, as the abrasive action in the dirt and mud residue will cause fine scratches in the surface.

3. Grease and oil spots may be removed with a soft cloth soaked in kerosene.
4. After cleaning, wax the plexiglas surface with a thin coat of hard polish-wax. Buff with a soft cloth.
5. If a severe scratch or marring occurs, jeweler's rouge is recommended. Follow directions, rub out scratch, smooth, apply wax and buff.

REMEMBER! NEVER use gasoline, benzine, alcohol, acetone, carbon tetrachloride, fire extinguisher fluid, anti-ice fluid, lacquer thinner or glass cleaner to clean plastic. These materials will damage the plastic and may cause severe crazing.

PROPELLER CARE

Damage from foreign objects, sometimes referred to as "nicks", may appear in the leading edges of the propeller from time to time. *It is vital that these nicks be corrected as quickly as possible. Such minor damage may cause stress concentrations and result in cracks forming in the propeller.* Keep the blades clean and free of dirt or grass build-up. This type of foreign material on the propeller may cause an imbalance and accompanying vibration. We recommend a cleaning agent such as mineral spirits followed by waxing or coating with a light film of oil.

TIRE SERVICE

All tires and wheels are balanced at the factory prior to original installation. A similar relationship of the tire, tube and wheel should be maintained. If vibration is encountered, it may be due to out-of-round or out-of-balance conditions. When wheel, tire or tube is replaced due to wear, it is recommended that they be re-balanced.

BATTERY SERVICE

The battery is accessible by removing the top cowl. The battery is equipped with an overboard manifold vent, thereby eliminating the need for the battery box to be vented. The battery is rated at 12 volt, 25 ampere-hours. It should be inspected periodically for proper fluid level. If the fluid level is found to be low, fill as recommended by the battery manufacturer. DO NOT fill above the visible battery baffle plates.

BRAKE SERVICE

Service the hydraulic brake system with an approved hydraulic fluid conforming to MIL-H-5606. The Aircraft Service Manual outlines procedures to use in the case of soft or ineffective brakes.

FUEL REQUIREMENTS

Aviation grade fuel 80/87 octane minimum or grade 100/130 AVGAS with 2 c. c. tel. max. (Refer to the latest revision of Lycoming Service Instruction No. 1070).

OIL REQUIREMENTS

New engines have been carefully run-in by Avco Lycoming and therefore no further break-in is necessary insofar as operation is concerned; however, new or newly overhauled engines should be operated on STRAIGHT MINERAL OIL for a minimum of 50 hours or until oil consumption has stabilized. After this period a change to an approved additive oil may be made, if so desired.

*Recommended Grade Oil

Average Ambient Air	Mineral Grade	Ashless Dispersant
Above 60° F	SAE 50	SAE 40 or SAE 50
30° to 90° F	SAE 40	SAE 40
0° to 70° F	SAE 30	SAE 40 or SAE 30
Below 10° F	SAE 20	SAE 30

* Refer to latest revision of Lycoming Service Instruction No. 1014.

Oil Sump Capacity	6 U. S. Quarts
Minimum Safe Quantity in Sump	2 U. S. Quarts

It is recommended that the lubricating oil be changed every 50 flying hours.

NOTE

After the first twenty-five hours operating, new engines should undergo draining and renewing of lubricating oil.

WARRANTY

GULFSTREAM AMERICAN CORPORATION (herein GULFSTREAM AMERICAN) warrants each new aircraft and part thereof manufactured by it, together with all new aircraft equipment and accessories bearing the name "GULFSTREAM AMERICAN CORPORATION," to be free from defects in material and workmanship under normal use and service, but extends no warranty of any kind, expressed or implied, to any items manufactured by GULFSTREAM AMERICAN, or not so bearing its name; whether incorporated into or installed in the aircraft, except that the workmanship involved in installing such items is warranted to be without defect. The obligation of GULFSTREAM AMERICAN under this warranty is limited to replacement or repair, at the option of GULFSTREAM AMERICAN, of any such aircraft, or any part or accessory which shall within six (6) months of operation be found defective. Such aircraft, part or accessory is to be returned to a GULFSTREAM AMERICAN DEALER upon which examination by GULFSTREAM AMERICAN, shall disclose to its reasonable satisfaction to have been thus defective. This warranty shall not in any way apply to or cover any products which are in GULFSTREAM AMERICAN's opinion damaged as a result of being in any manner altered or repaired outside of the factory of GULFSTREAM AMERICAN or that shall have been subject to misuse or negligence.

GULFSTREAM AMERICAN makes no warranty whatsoever with respect to engines, radios, propellers, ignition apparatus, starting devices, generators, batteries, or other trade accessories, inasmuch as such products are generally warranted separately by their respective manufacturers.

"THESE WARRANTY PROVISIONS ARE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSSED, STATUTORY OR IMPLIED IN FACT OR BY LAW, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION OR LIABILITY ON THE PART OF GULFSTREAM AMERICAN, EXPRESSED OR IMPLIED, OF ANY NATURE WHATSOEVER. GULFSTREAM AMERICAN NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON OR BUSINESS ORGANIZATION TO ASSUME FOR IT ANY OTHER WARRANTY OR LIABILITY IN CONNECTION WITH THE SALE, USE OR OPERATION OF ITS PRODUCTS."

IMMEDIATELY ON COMMENCING FIRST USE OF AN AIRCRAFT, A WARRANTY VALIDATION CARD MUST BE FILLED OUT AND MAILED TO THE ATTENTION OF THE CUSTOMER SERVICE MANAGER, COMMERCIAL LIGHT AIRCRAFT, P.O. BOX 2206, SAVANNAH, GEORGIA 31402. NO WARRANTY CLAIMS WILL BE HONORED IF THIS CARD IS NOT ON FILE AT THE FACTORY.

SERVICE REQUIREMENTS

FUEL:

Aviation grade ..... 80/87 minimum grade
Capacity each tank ..... 12 gallons

ENGINE OIL:

Aviation Grade
* Recommended Grade Oil

Average Ambient Air	Mineral Grade	Ashless Dispersant
Above 60° F	SAE 50	SAE 40 or SAE 50
30° to 90° F	SAE 40	SAE 40
0° to 70° F	SAE 30	SAE 40 or SAE 30
Below 10° F	SAE 20	SAE 30

Oil Sump Capacity ..... 6 U.S. quarts

Minimum Safe Quantity in Sump ..... 2 U.S. quarts

HYDRAULIC FLUID:

MIL-H-5606

TIRE INFLATION:

Nose Wheel	22 PSI	5.00 x 5 tire
Main Wheels	19 PSI	6.00 x 6 tires

* Refer to latest revision of Lycoming Service Instruction No. 1014.

Fully Illustrated Parts Catalogs and Service Manuals are obtainable through authorized Dealers of Gulfstream American Corporation.

CHECKLIST – MODEL AA-1B

BEFORE STARTING

1. PREFLIGHT – Fuel, Oil, Prop, Tires, Aircraft General Condition
2. Seats and Belts – ADJUSTED
3. Brakes – ON
4. Controls – FREE
5. FUEL – Fullest Tank

STARTING ENGINE

1. Primer – AS REQUIRED
2. Mixture – RICH
3. Throttle – OPEN 1/8 INCH
4. Carb. Heat – OFF
5. Master/Alt. Switch – ON
6. Aux. Pump – ON (0.5 to 8 psi)
   Aux. Pump – OFF
7. CLEAR PROP
8. Ignition Switch – ON LEFT
9. Starter – PRESS
10. Ignition Switch to BOTH
11. Oil Pressure – CHECK

ENGINE RUNUP

1. Brakes – ON
2. Throttle – SET (1800 RPM)
3. Engine Inst. – CHECK
4. Magneto – CHECK (175 RPM ea.) (Max. Difference 50 RPM)
5. Carb. Heat – CHECK

BEFORE TAKEOFF

1. Flaps – CHECK OPERATION
2. Flaps – UP
3. Trim – SET
4. Primer – LOCKED
5. Mixture – RICH
6. Carb. Heat – OFF
7. Controls – CHECK
8. Engine Inst. – CHECK
9. Flight Inst. – SET & CHECK
10. Canopy – CHECK

TAKEOFF

1. Aux. Pump – ON
2. FULL THROTTLE
3. Raise Nose – 60 to 65 MPH

CLIMB

1. FULL THROTTLE
2. Normal – 95 MPH

CRUISE

1. Power – 2100 to 2600 RPM
2. Aux. Pump – OFF
3. Lean – AS REQUIRED
4. Fuel Quantity – CHECK

BEFORE LANDING

1. FUEL – Fullest Tank
2. Aux. Pump – ON
3. Mixture – RICH
4. Carb. Heat – AS REQUIRED
5. Flaps – AS REQUIRED (Max. 115 MPH)
6. Approach – 75 MPH

AFTER LANDING

1. Flaps – UP
2. Carb. Heat – OFF
3. Aux. Pump – OFF

SHUT DOWN

1. Elec. Equip. – OFF
2. Mixture – IDLE CUT-OFF
3. Magnetos – OFF
4. Master Switch – OFF