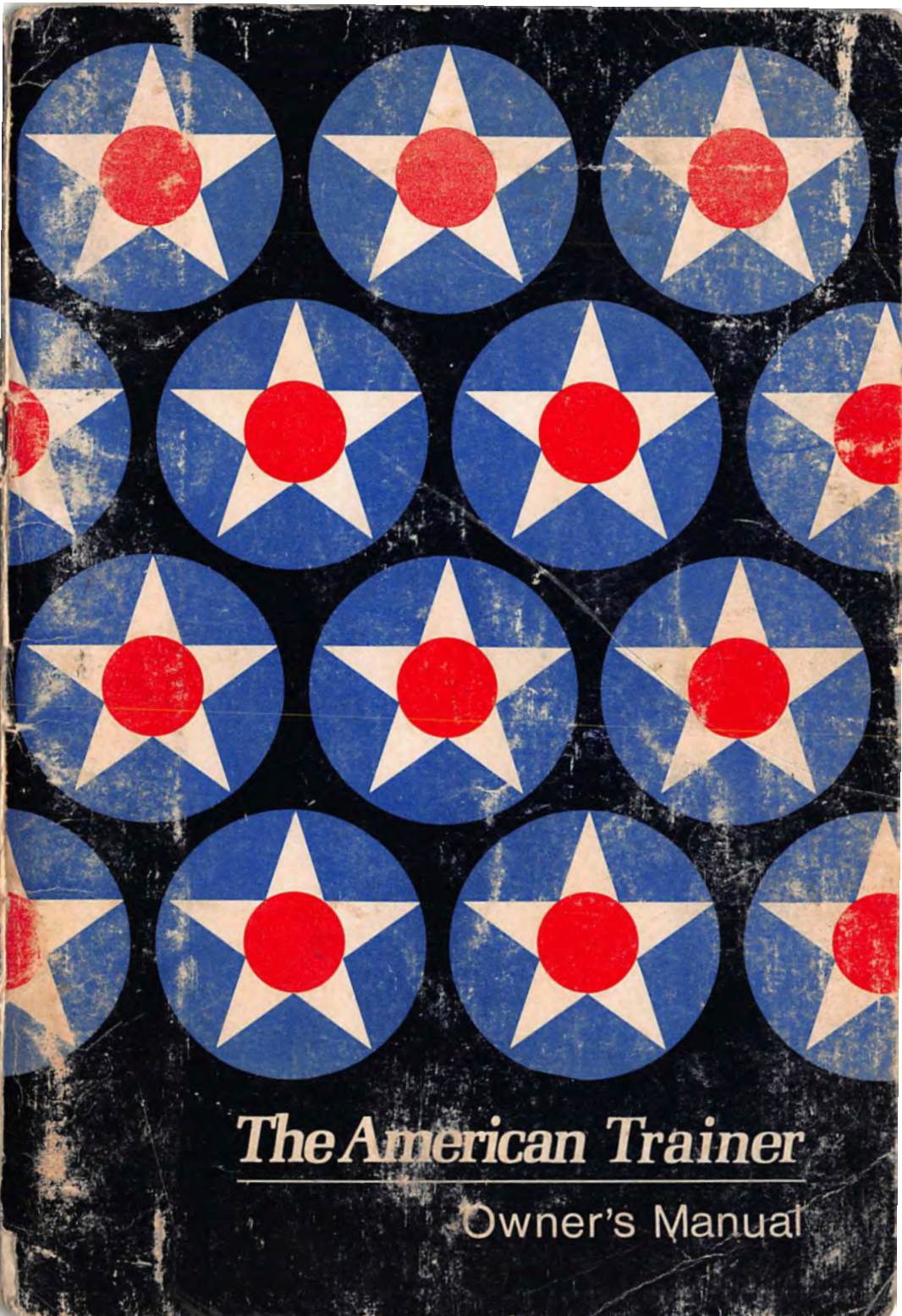

The American Trainer

Owner's Manual

The American Trainer

Owner's Manual

American Aviation Corporation

AA1A-137-3 PSC 4000 6/73

Owner _____ Registration No. N _____

Performance/Specifications: Model AA-1A

		Trainer	Cruise Trainer*
		AA-1B	
GROSS WEIGHT		1500 lbs 1560	1500 lbs
SPEED:	Top Speed at Sea Level	138 MPH	144 MPH
	Cruise, 75% Power at 3000 ft	125 MPH	134 MPH
	Cruise, 65% Power at 8000 ft	119 MPH	123 MPH
RANGE:	Cruise, 75% Power at 3000 ft	440 mi	466 mi
	22.0 Gallons, No Reserve	3.52 hrs	3.48 hrs
	Cruise, 65% Power at 8,000 ft	488 mi	501 mi
	22.0 Gallons, No Reserve	4.1 hrs	4.07 hrs
	Optimum Range at 10,000 ft	500 mi	516 mi
	22.0 Gallons, No Reserve	4.5 hrs	4.52 hrs
RATE OF CLIMB AT SEA LEVEL		765 fpm	720 fpm
SERVICE CEILING		13,750 ft	12,425 ft
TAKE OFF:	Ground Roll	725 ft	800 ft
	Total Distance Over 50-ft Obstacle	1400 ft	1440 ft
LANDING:	Ground Roll	395 ft	395 ft
	Total Distance Over 50-ft Obstacle	1065 ft	1065 ft
WING LOADING		14.9 lb/sq ft	14.9 lb/sq ft
POWER LOADING		13.9 lb/bhp	13.9 lb/bhp
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 108HP at 2600 RPM	O-235-C2C	O-235-C2C

*Cruise Trainer equipped with cruise propeller and wheel fairings.

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NOTE:
Range and endurance figures do not include take-off and climb allowance.

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 American Trainer 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 it in top condition. And the materials, techniques and design innovations which made this double-breakthrough possible also made the Trainer much stronger and more handsome than any light aircraft near its class.

The American Trainer's unique construction deserves a close look. Metal-to-metal *bonding* eliminates the thousands of sources of drag and stress concentration 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.

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

Get to know your authorized American Aviation Dealer. He can provide the rapid, expert service that will keep your Trainer 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 Trainer.

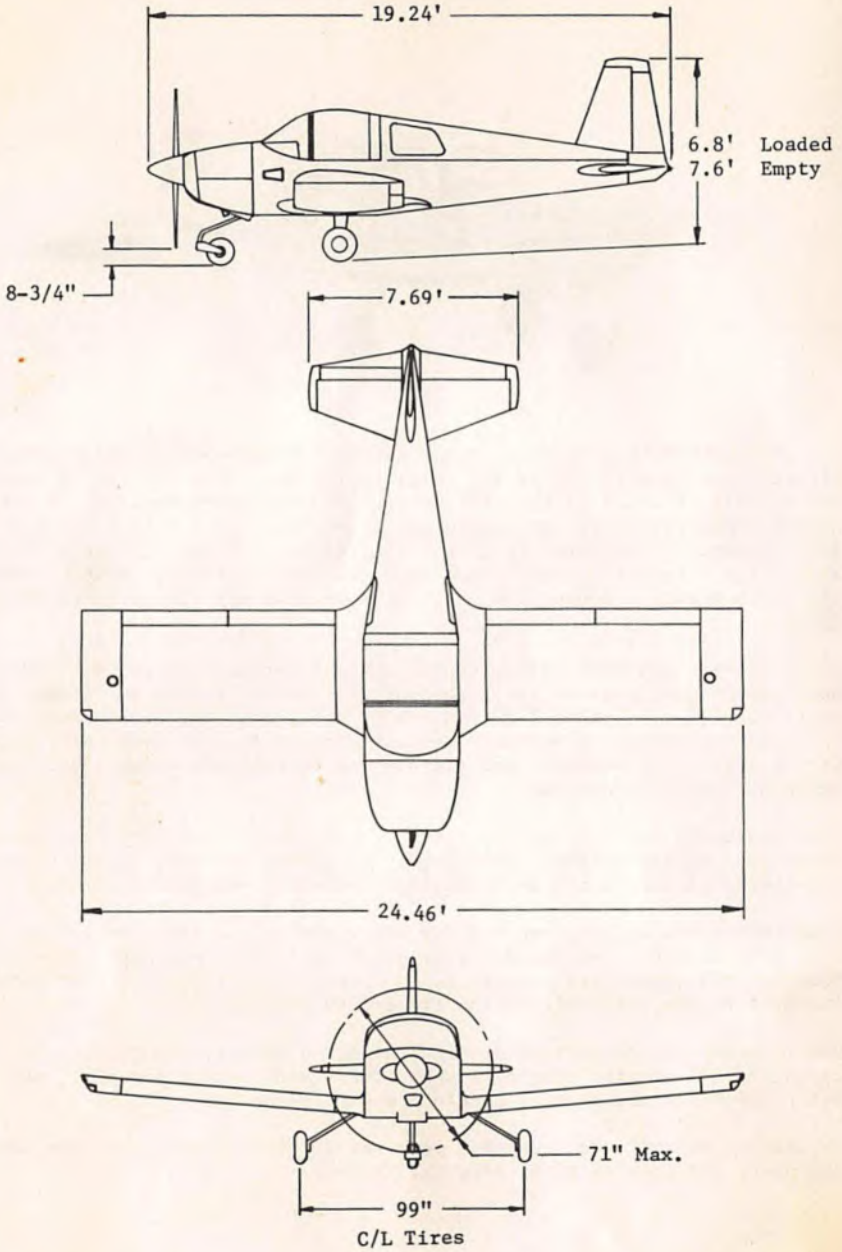


Figure 1. Trainer principal dimensions.

Section I
Description of Systems and Structures

The Model AA-1A American Trainer is a two-place, all-metal, low-wing monoplane with unique "Face-Saver" tricycle landing gear. The Trainer gets more performance from its 108 horsepower Lycoming four-cylinder, horizontally opposed engine than any 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 the Trainer with a fuselage cabin area tougher, stronger and more rigid than any light aircraft near its class.

Cabin Description:

The Trainer's 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.

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.

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, fuel selector valve, and the inboard seat belt holders.

The Trainer's 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 forward for easy access to the baggage compartment.

The Trainer's 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.)

Shoulder harnesses are provided for both occupants, and a storage receptacle is located on each side panel next to the seats.

Heating and Ventilating:

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 bypassing 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 right side 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 (Fig. 2) 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.

Electrical System:

The electrical system (Fig. 3) is extremely simple, yet is quite sophisticated in its approach to reliability. It employs a brushless 14-volt, 40-amp alternator. Internal power diodes in the alternator deliver DC power direct to the main bus through a 40-amp circuit breaker. An external transistorized voltage regulator controls the alternator's output voltage, and *automatically* adjusts the battery charging voltage to maintain proper charge. The alternator ammeter is located in the engine instrument cluster and indicates alternator output to the electrical bus and the battery.

The 25-ampere-hour battery, located on the upper right firewall in the engine compartment, is connected to the electrical bus through the battery solenoid when the master switch is in the ON position. The master switch also energizes the voltage regulator, and all electrical loads connected to the bus through their individual switches. With the master switch in the OFF position, the alternator is de-energized, and all electrical loads *except the cabin dome light* are de-energized. Note that it is possible to disconnect the alternator load from the bus by manually pulling the 40-amp circuit breaker, yet continue to feed the bus loads from the battery by leaving the master switch in the ON position.

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

The Trainer's dual-magneto ignition system is completely independent of the aircraft electrical system, and will continue to operate during any electrical emergency.

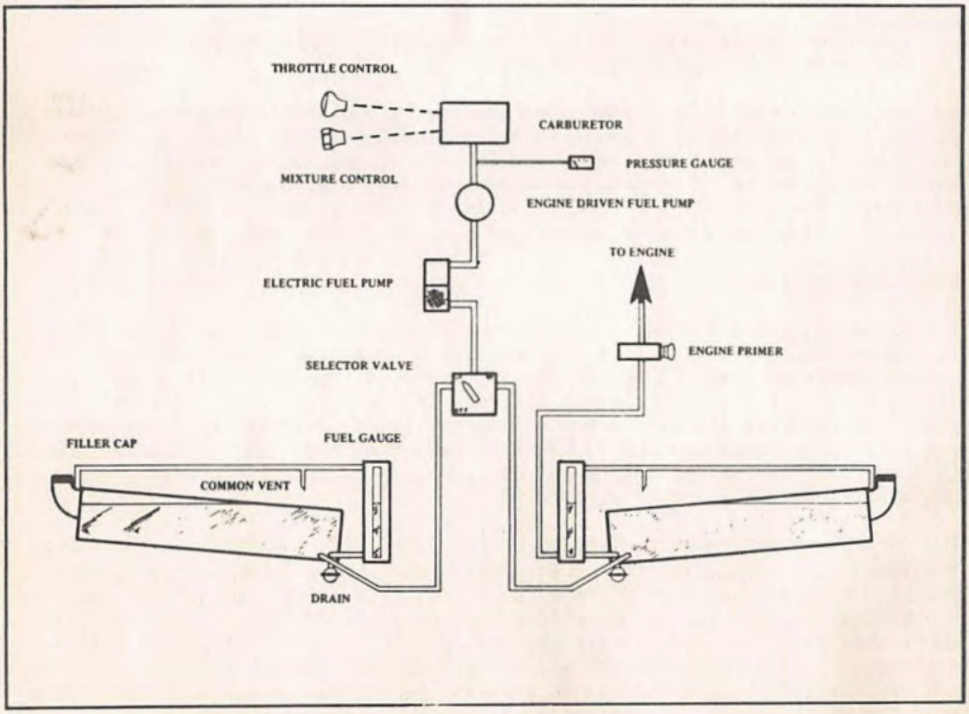


Figure 2. Fuel System Diagram

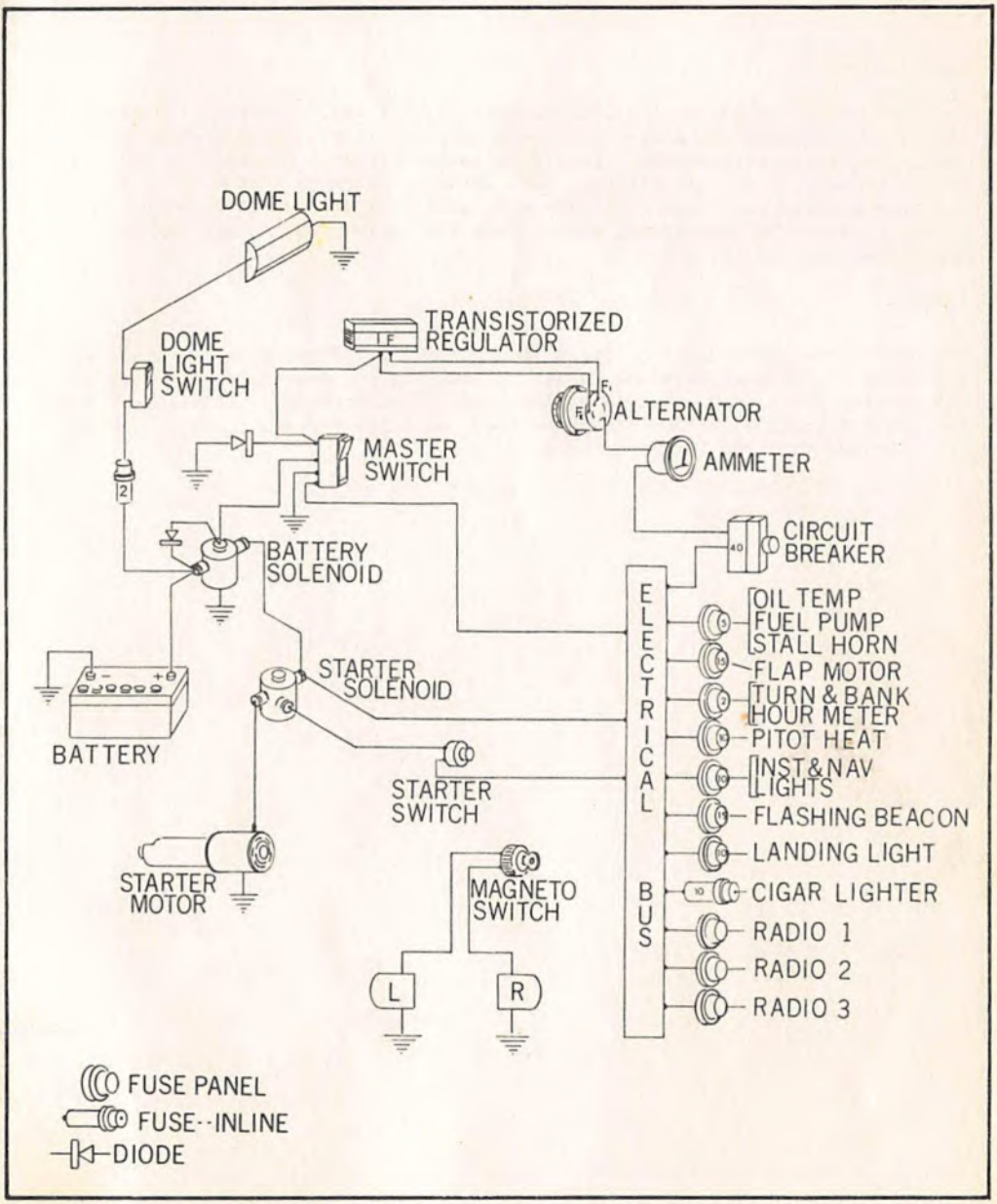


Figure 3. Electrical System Diagram

Landing Gear:

The FACE SAVER® main landing gear struts are of tough, laminated fiberglass to achieve outstanding shock absorption and damping. Its unusually wide stance (99" between the main wheels) imparts extraordinary ground stability and optimizes the performance of differential-braking steering at speeds below the rudder effectiveness threshold. The nose gear is free-castering to 90° on either side of the centerline, which gives the Trainer outstanding agility and maneuverability on the ground.

Brakes:

The brakes are toe-operated, single-disc hydraulic systems with integral parking brakes. 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.*

Section II

Operation Check List and Instructions

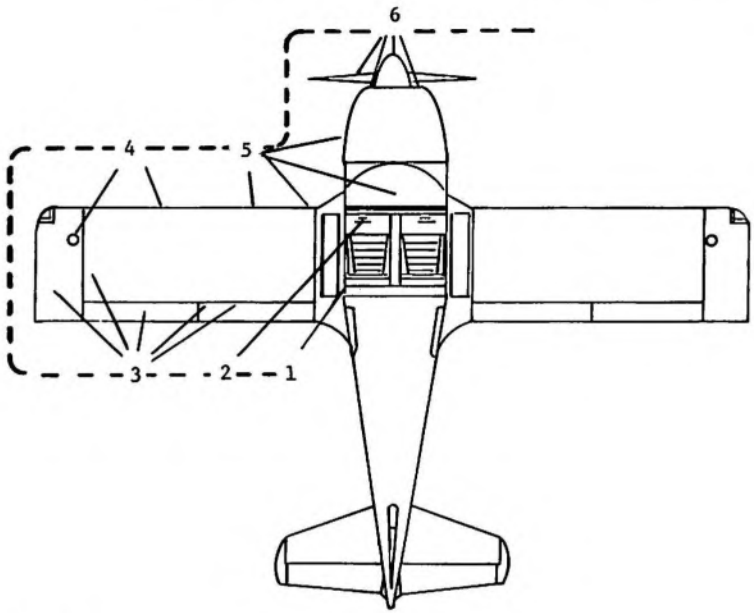


Figure 4.
Walk-around inspection.

Preflight: The airplane should be given a thorough visual inspection prior to each flight. This procedure is recommended as shown in Figure 4. and 5.

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 tie down.

4. Inspect pitot opening for foreign particles.
   Secure fuel cap for tight seal.

5. Fuel tank vent free of foreign material.
   Check windshield and canopy for general condition.
   Inspect landing gear and tires for general condition (wear, cuts, abrasions, leaking brakes, tire inflation).

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

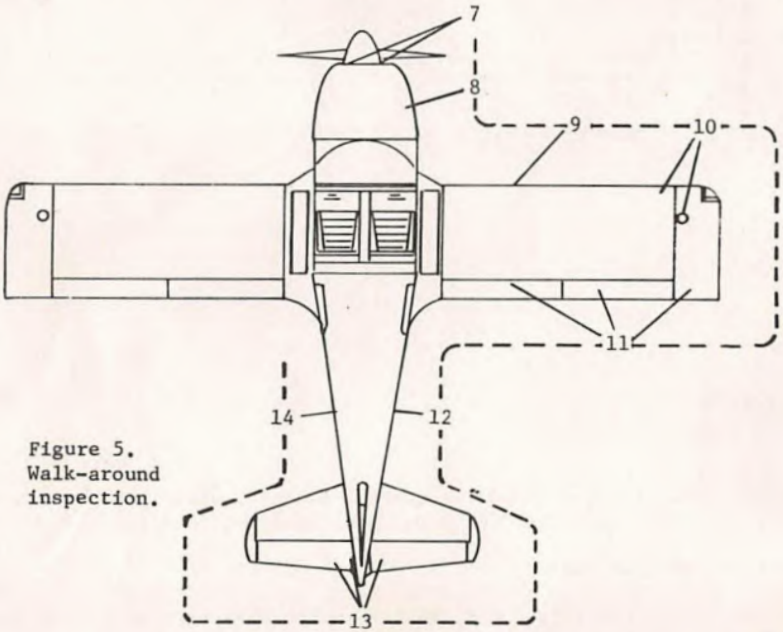


Figure 5.
Walk-around
inspection.

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

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

9. Inspect landing gear and tires for general condition (wear, cuts, abrasions, leaking brakes, proper inflation).
   Fuel tank vent free of foreign material.

10. Secure fuel cap for tight seal.
    Check stall switch vane for freedom of movement.

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

12. Check static source for foreign particles.

13. Check elevators, rudder and trim tab for freedom of movement.
    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 correct operation prior to starting engine. Always carry a flashlight during night operations.

Before Starting Engine:
1. Seats: Adjusted and locked.
2. Seat and shoulder belts: 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: 1 - 3 strokes.
2. Mixture control: Full rich.
3. Throttle: Open 1/8 inch.
4. Carburetor heat: OFF.
5. Master Switch: ON.
6. Auxiliary fuel pump: Fuel pump ON. Check for operation (Pressure 0.5 to 8 psi), then turn fuel pump OFF.
7. Clear propeller.
8. Ignition switch: On BOTH.
9. Press starter button.
10. Check oil pressure. If no pressure indication in 30 seconds, shut engine down and determine trouble.
11. 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.
   125 RPM maximum drop on either magneto.
   50 RPM maximum differential between magnetos.
4. Carburetor heat: Operation checked for RPM drop.
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 full throttle without hesitating or faltering.

Before Take-Off:

1. Console Check:
   a. Microphone (if installed): Secure.
   b. Flaps: Check for correct operation.
   c. Trim wheel: At take-off setting.
   d. Fuel: On fullest tank.
   e. Flaps: UP.

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. 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: then apply light elevator back pressure at 55 MPH.
4. Climb speed: 73 MPH

Climb

1. Normal 95 MPH - full throttle
2. Best rate 89 MPH @ sea level - full throttle
3. Best angle 75 MPH @ 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 feet.
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: 70 - 80 MPH.

Landing (Normal)

1. Touchdown on main gear.
2. Lower nose wheel slowly as speed decreases.
3. Directional control: Use rudder until it becomes ineffective (approximately 20 MPH.)
4. Brakes: As required for stopping and directional control.

Landing (Obstacle Clearance):

1. Flaps: Fully extended below 115 MPH.
2. Airspeed: 70 MPH.
3. Land on main wheels first.
4. Apply full up elevator.
5. Brakes: As required for stopping and directional control.
6. Flaps: UP.

Balked Landing:

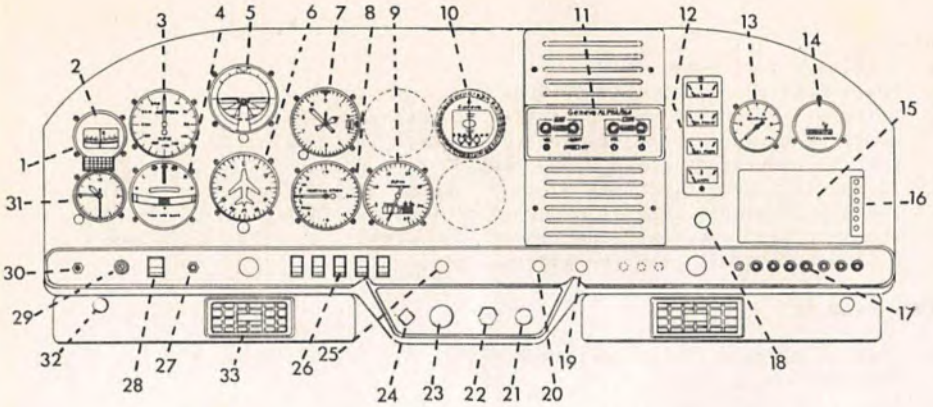
1. Apply full throttle.
2. Carburetor heat: OFF.
3. Establish climb attitude.
4. Flaps: Retract, after accelerating to a safe airspeed.

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 cutoff.
3. Magneto switch: OFF.
4. Master switch: OFF.
5. Install control lock.
6. Brakes: Set and/or wheels chocked.



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

Figure 6. Trainer instrument panel diagram.

Section III
Operating Procedures

Figure 7. Typical Trainer instrument panel.

Starting the Engine:

Before priming, set the parking brake by depressing the tops of both rudder pedals and pulling out the parking brake control knob. It is good practice to turn 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, as in any aircraft, will speed the start and conserve the battery charge.

With the parking brake set, set the mixture in the full-rich position; turn master switch ON; clear the propeller area; set ignition switch to BOTH; 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 that you have over-primed. Turn the ignition switch to OFF; open the throttle; and turn the engine approximately ten revolutions with the starter. Prime the engine again with one-half the original prime and repeat the starting procedure. *If the day is cold,* it is more likely that the problem is *under*-priming. In this case, a few extra strokes of the primer should provide a prompt start.

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 conducted 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 125 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 hesitating or faltering.

Take-Off:

Before beginning the take-off roll, align the airplane with the runway. Aligning the nosewheel 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 55 - 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 rotates the elevator should be eased foreward 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.

The soft field ground run can be reduced with the use of FULL flap. The flap extended take-off technique is identical to that with flaps retracted. The flaps should be retracted *after* clearing obstacles *and* reaching a safe airspeed. Best angle of climb speed with full flap is 70 MPH.

NOTE:

With the flaps full down, they are more susceptible to damage caused by loose gravel, mud, etc. thrown up from the wheels during the take-off roll.

Avoid prolonged engine runup 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 55 MPH apply light elevator back pressure for rotation, then climb at 73 MPH. When the 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 feet 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 for the Trainer 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 consumption 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.

AA1A-137-3R

NOTE:
If engine runs rough during cruise with carburetor heat on, it may be due to an overrich 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 Trainer's 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. Aileron and rudder controls remain effective throughout the stall, and both should be used as necessary to control roll and yaw respectively.

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-1A				
STALL SPEED - MPH CAS				
CONDITION	BANK ANGLE			
	0°	20°	40°	60°
FLAPS UP	63	65	72	89
FLAPS DN	60	62	69	85
1500LBS. POWER OFF				

63

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

Figure 8. Trainer's visibility is excellent for sight-seeing.

Normal Approach and Landing:

The Trainer should be trimmed to an approach speed between 70 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.

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 the light of his own experience and training.

NOTE:

A pilot-induced porpoise maneuver may be entered 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-round.*

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, the Trainer should be trimmed to an approach speed of 70 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 action 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, the Trainer should be trimmed to an approach speed of 70 MPH with flaps fully extended. Use power as necessary to control glide path and rate of descent, and use the shallowest possible 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 landing.

Slips to Landings:

Slips are very effective in the Trainer. 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 high response of the Trainer. It is then recommended that full slips be limited to 500 feet AGL or above until the pilot is proficient with the Trainer. 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 Trainer is easily handled on the ground by hand or 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. *In most circumstances, the control wheel should be locked in the forward position.*

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

Section IV
Operating Limitations

The Trainer is approved for day VFR operation with standard equipment installed. With appropriate optional equipment installed, the Trainer 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.

Normal Category Operation:

The normal category is limited to airplanes intended for non-acrobatic operation within the flight load factor limitations listed below. The Trainer is approved for the following normal category maneuvers:

1. Any maneuver incident to normal flying.
2. Stalls (except whip stalls); and
3. Lazy eights, chandelles, and steep turns in which the angle of bank is not more than 60°.

Maximum Design Weight	1500 LBS
Design Maneuvering Speed	120 MPH -CAS
Flight Load Factors - Flaps Up	+3.8-1.52
Flaps Down	+3.5

Utility Category Operation:

The utility category is limited to airplanes intended for limited acrobatic operation within the flight load factor limitations listed below. The Trainer is approved for the following utility category maneuvers:

1. All maneuvers listed under normal category operation; and
2. Lazy eights, chandelles, and steep turns, in which the angle of bank is more than 60°

Maximum Design Weight	1430 LBS.
Design Maneuvering Speed	127 MPH -CAS
Flight Load Factors - Flaps Up	+4.4-1.76
Flaps Down	+3.5

Acrobatic Limitations:

Maneuver	*Entry Speed - CAS*
Chandelles	127 MPH
Lazy Eights	127 MPH
Steep Turns	127 MPH
Stalls (except whip stalls)	Slow deceleration

SPINS PROHIBITED

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)	63-144 MPH - CAS
Flap Operating Range (White Arc)	60-115 MPH - CAS
Maneuvering Speed - Normal Category	120 MPH - CAS
Utility Category	127 MPH - CAS
Maximum Canopy Half Open	130 MPH - CAS

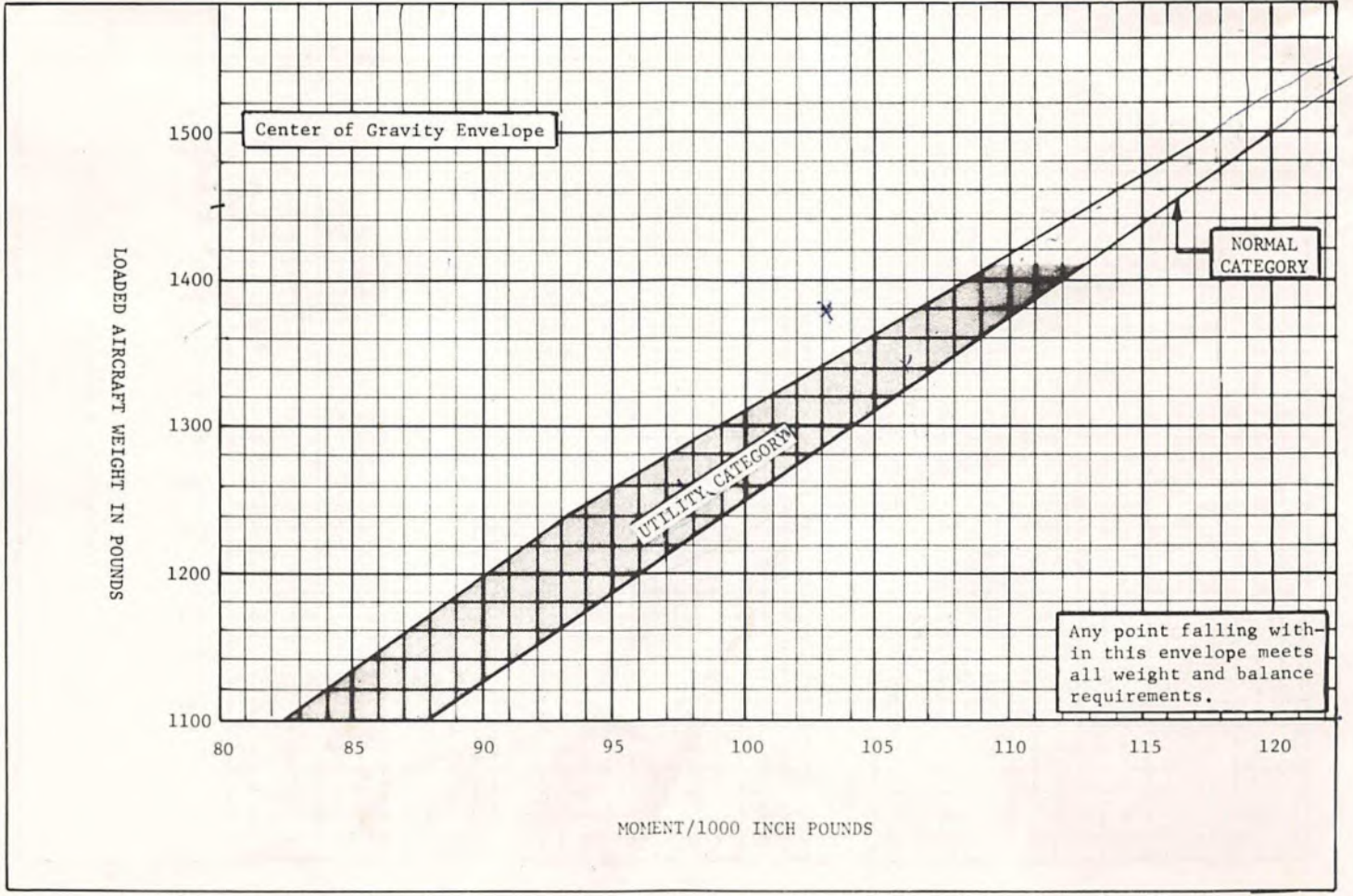
Engine Instrument Markings:

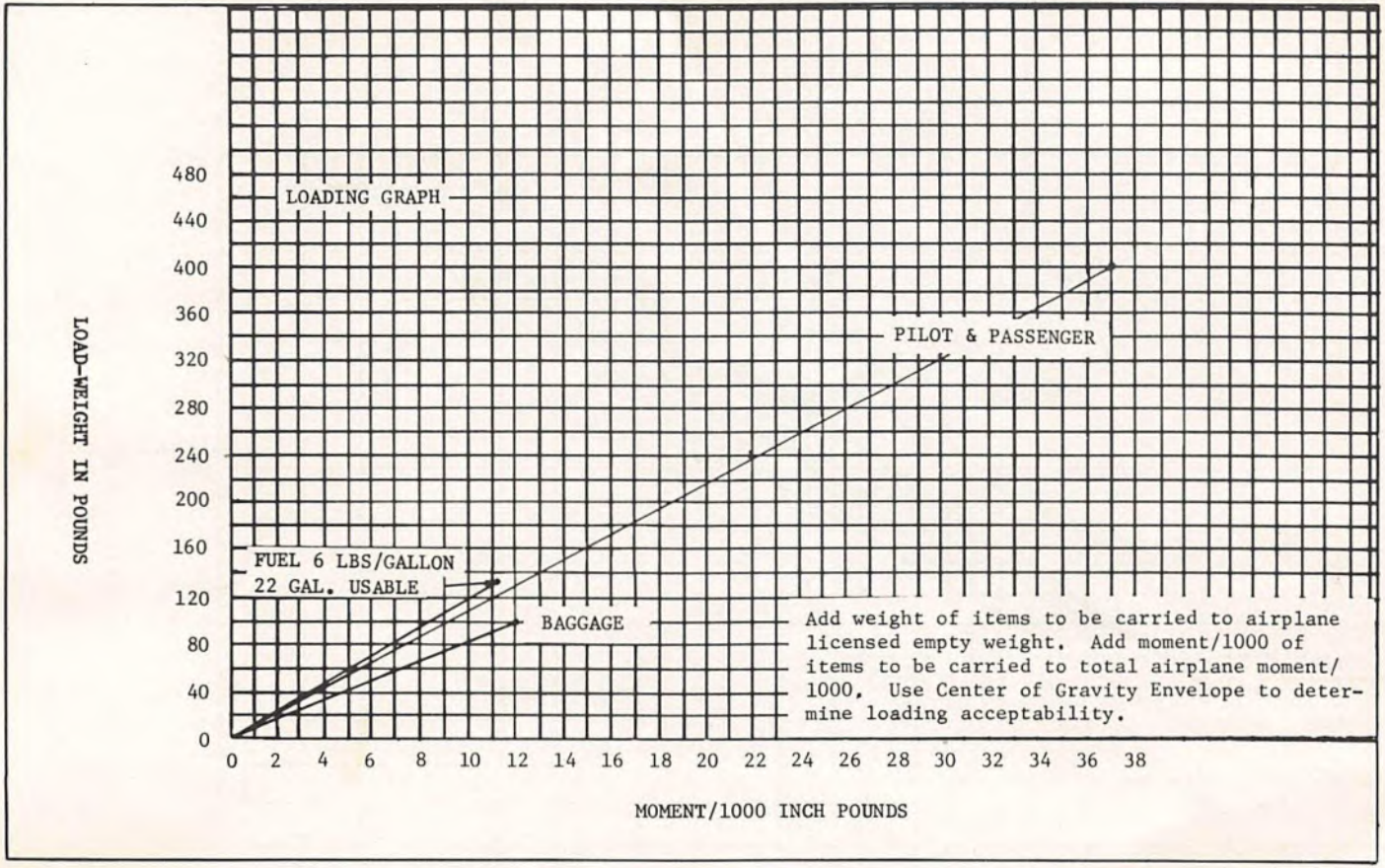
Oil Temperature Gauge - Normal operating range	Green Arc
Maximum allowable	245°F. (Red Line)
Oil Pressure Gauge - Minimum idling	25 PSI
Normal operating range	60-90 PSI
Maximum	100 PSI
Fuel Quantity Indicators - 0 means one gallon unuseable fuel remaining in the tank.	
Tachometer - Normal operating range	2000-2600 RPM

Weight and Balance:

In order to facilitate computation of the weight and balance of a particular Trainer, an example is given on page 26. All procedures for use of the charts are outlined in the weight and balance section. Remember, *always refer to the weight and balance of the Trainer you are flying - variations do exist from aircraft to aircraft.* The data given here is for a sample aircraft only. Add all applicable weights together in one column and total up the moments in the other. For convenience, a loading graph is provided giving the moment for each item.

Refer to the center of gravity envelope on page 25. Find the intersection of the total weight and moment on the graph. If this point is within the envelope, the loading is acceptable.


Center of Gravity Envelope
NORMAL CATEGORY
UTILITY CATEGORY
Any point falling within this envelope meets all weight and balance requirements.
LOADED AIRCRAFT WEIGHT IN POUNDS
1500
1400
1300
1200
1100
80
85
90
95
100
105
110
115
120
MOMENT/1000 INCH POUNDS


LOADING GRAPH
LOAD-WEIGHT IN POUNDS
480
440
400
360
320
280
240
200
160
120
80
40
0
PILOT & PASSENGER
FUEL 6 LBS/GALLON
22 GAL. USABLE
BAGGAGE
Add weight of items to be carried to airplane licensed empty weight. Add moment/1000 of items to be carried to total airplane moment/1000, Use Center of Gravity Envelope to determine loading acceptability.
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
MOMENT/1000 INCH POUNDS

Sample Loading Problem	Sample Airplane			Your Airplane		
	Weight (lbs.)	Arm (in.)	Moment (lb.-in. /1000)	Weight (lbs.)	Arm (in.)	Moment (lb.-in. /1000)
1. Empty weight (licensed)	1007		74.492			
2. Oil (6 qts.) 1 qt. = 1.8 lbs.	11	39.0	.429		39.0	
3. Fuel (in excess of unusuable)	132	84.5	11.154		84.5	
4. Pilot and Passenger	340	92.5	31.450		92.5	
5. Baggage (allowable 100 lbs.)	10	120.0	1.200		120.0	
6. Total Aircraft weight (loaded)	1500	79.1	118.725			

7. Locate this point (1500 at 118.725) on the Center of Gravity Envelope, and if the point falls within the Envelope, the above loading is satisfactory.

Section V
Performance Charts

Performance information has been derived from actual flight tests and corrected to standard atmospheric conditions at 1500 pounds maximum gross weight. All performance *except* the TAKE-OFF DISTANCE is representative of the American Trainer equipped with the standard McCauley 1A105/SCM 7153 climb propeller.

For conservatism, TAKE-OFF DISTANCE in the table is shown for the Trainer equipped with a McCauley 7157 cruise propeller. Actual take-off distances are reduced per Note 3 with the standard 7153 climb propeller installed.

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 Distance to Clear 50 ft. Obstacle - Hard Surface Runway

1500 Lbs. Gross Weight - Flaps Up; 73 MPH IAS (Cruise Propeller)

Altitude / Temperature	Wind Knots	Sea Level 59°F	2000 ft 52°F	4000 ft 45°F	6000 ft 38°F
Ground Run	0	800	911	1069	1240
Total Distance		1440	1677	2017	2450
Ground Run	10	561	645	765	895
Total Distance		1095	1286	1564	1920
Ground Run	20	360	420	500	606
Total Distance		788	938	1152	1446

NOTE:

1) Increase ground run 7% for each 20°F above standard temperature.
2) The increase in total take-off distance varies from 8% at sea level to 14% at 6000 ft. for each 20°F above standard temperature.
3) The reduction in total take-off distance with the 7153 climb propeller installed varies from 2.5% at sea level to 1.5% at 6000 ft.

Maximum Rate-of-Climb Performance
1500 Lbs. Gross Weight - Flaps Retracted (Climb Propeller)

Altitude Ft.	Temperature °F	IAS MPH	Rate of Climb Ft./Min.	Fuel Used From Sea Level - Gals.
S.L.	59 °	89	765	0.5
2500	50 °	88	645	1.0
4500	42.8°	87	550	1.5
6500	35.6°	86	450	2.0
8500	28.4°	85	350	2.6

NOTES:

1) Full throttle climb, mixture leaned above 5,000 ft. 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.
4) Rate of climb with the cruise propeller (7157) is 45 FPM less.

Cruise Propeller Data: An optional McCauley 1A105/7157 propeller is available for the Trainer. The cruise propeller will improve the cruise performance in accordance with the following table:

To Obtain	Subtract	Speed Differential	Fuel Consumption
75% BHP	120 RPM	+1.5 MPH	6.2 GPH
65% BHP	110 RPM	+1.5 MPH	5.4 GPH
55% BHP	75 RPM	+1.5 MPH	4.7 GPH

Model AA-1A Cruise Performance Table (Climb Propeller)

Altitude Feet	RPM	Percent Power	True Air-Speed MPH	Fuel Consumption GPH	Endurance Hours	Range Miles Zero Wind
	2600	76	125	6.4	3.2	406
	2500	70	119	5.8	3.6	430
2500	2400	63	113	5.2	3.9	445
	2300	58	107	4.9	4.3	456
	2200	53	101	4.6	4.5	459
	2100	50	96	4.4	4.7	453
	2600	73	125	6.1	3.3	414
	2500	67	118	5.5	3.7	437
4500	2400	61	112	5.1	4.0	452
	2300	56	106	4.8	4.3	456
	2200	53	101	4.5	4.5	455
	2100	50	96	4.4	4.6	447
	2600	70	124	5.9	3.5	429
	2500	64	117	5.3	3.8	445
6500	2400	59	111	5.0	4.1	455
	2300	55	105	4.7	4.3	455
	2200	52	100	4.5	4.6	451
	2600	67	122	5.6	3.6	439
8500	2500	62	116	5.2	3.9	451
	2400	58	110	4.9	4.1	454
	2300	55	105	4.7	4.3	452
	2600	66	121	5.3	3.7	446
10500	2500	61	115	5.1	3.9	453
	2400	57	110	4.9	4.0	445

NOTES:

1) Range and endurance data include allowance for take-off and climb.
2) Fuel consumption is for level flight with mixture leaned to best power. Continuous operation 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 and above standard temperature, respectively.

Landing Distance To Clear 50 ft. Obstacle - Hard Surface Runway
1500 Lbs. Gross Weight - Flaps Down; 70 MPH IAS at 50 ft. Zero Wind

Altitude	Sea Level	2000 ft.	4000 ft.	6000 ft.
Temperature	59°F	52°F	45°F	38°F
Ground Run	395	420	445	475
Total Distance	1065	1125	1190	1260

Stall Speed Table - Power Off (MPH CAS)
1500 Lbs. Gross Weight

Condition		Bank Angle 0°	20°	40°	60°
Aft CG Loading	Flaps — Up	61	63	70	86
	Flaps — Down	59	61	68	83
Forward CG Loading	Flaps — Up	63	65	72	89
	Flaps — Down	60	62	69	85

Airspeed Correction Table (MPH)
1500 Lbs. Gross Weight - Flaps Up - Down

IAS	60	70	80	90	100	110	120	130	140	150	160	170	180
CAS	61	70	79	90	99	109	118	128	138	147	157	166	176

Section VI
Emergency Procedures

Brake Failure:

Although brake failure is infrequent in any aircraft, landing without brakes is no problem in the Trainer. 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 your touchdown near the approach end of the runway. The aircraft's 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 may be caused by a malfunction in the indicating system, oil pump failure, or a 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 245°F 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 on the Trainer indicates alternator output. During normal operation, the ammeter will show a *typical* output of 10 to 20 amperes, to a maximum of 40 amperes dependent upon the number of circuits being used and the battery charge rate.

Should a component of the electrical system fail (landing light, radio, turn and bank indicator, etc.), visually check the related fuse, and replace if it is blown.

If the alternator circuit breaker opens (pops out), wait 15 seconds then reset by pushing the breaker back into position.

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

Excessive Output:

If a sustained output in excess of the maximum rated 40 amperes is noted, turn off all accessories one at a time until the defective circuit is located. Leave the defective circuit de-energized for the remainder of flight.

If the high alternator output continues with all accessories off, the current is most likely charging a low battery, or the voltage regulator is malfunctioning. In this event, turn OFF the master switch, and use it only as necessary for the remainder of flight.

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

Insufficient Output:

If the ammeter indicates "zero", an alternator failure may have occurred. The alternator circuit breaker, on the right side of the instrument panel, must be in the IN position.

Check to be sure that the Master Switch is ON. To determine if the alternator will function under a heavy electrical load, momentarily turn on the landing light. If no ammeter output indication is observed, turn off all unneeded electrical systems. Proceed to the nearest suitable airport for landing.

The engine in the Trainer is not dependent on the aircraft electrical system for power. Once the engine has been started, it is self-sustaining and is NOT affected by alternator or electrical system malfunctions. All electrically driven accessories may be affected, however, in cases of electrical system malfunctions.

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 85 MPH. AA-1B 89mph
2. Pick a suitable landing area and plan an approach.

3. Check fuel and switch the tank selector to the opposite tank if it contains fuel. Check fuel pressure and turn on fuel pump if necessary.
   Mixture - RICH
   Carburetor heat - ON
   Magnetos - check right and left. If engine runs on either one, leave the switch on that magneto.

4. If the engine does not restart promptly, attention should be shifted to the forced landing procedure.
5. Notify ATC of your location and problem.
6. Fuel selector OFF; mixture to idle-cutoff; turn ignition OFF; flaps as needed; and the master switch OFF.
7. Complete the landing and secure aircraft. Notify ATC by telephone, of your situation and location if known.

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 13, will help prevent engine-starting fires on the ground.

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

1. Keep the engine running to ingest the flames into the 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. However, the following procedures are suggested should one occur:

1. Fuel selector: OFF.
2. Mixture: Idle-CUTOFF.
3. Master switch: OFF
4. Cabin heat control: OFF.
5. Establish a maximum safe rate of descent. *Increasing speed may blow the fire out.*
6. Side slip maneuvers may be used, as necessary, to direct flames away from cabin area.
7. Select a suitable field for a forced landing.
8. Notify ATC if possible 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 the FAA controlling agency.
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 in the Trainer 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 overrich 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 altitude.

REMEMBER:

Flying in icing conditions is NOT APPROVED!

Section VII
Care of the Airplane

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

Exterior Care:

The painted surfaces of the Trainer 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 your Trainer 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 commercial paint removers are to be used on any Trainer airframe component unless specific prior approval has been received from the factory (see latest Service Bulletin No. 117).

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 plexiglass 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 plexiglass, flush with clean water. Rubbing with your hand is recommended to dislodge excess dirt and mud without scratching the plexiglass.
2. Wash with soap and water. Use a sponge or heavy wadding of 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 plexiglass surface with a thin coat of hard polishwax. Buff with a soft cloth.
4. 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, laquer thinner or glass cleaner to clean the plastic. These materials will damage the plastic and may cause severe crazing.

Propeller Care:

Damage from foreign objects, sometime 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 buildup. This type of foreign material on the propeller may cause an imbalance and accompanying vibration. We recommend cleaning agents such as carbon tetrachloride or mineral spirits for propeller care.

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 on your Trainer. If vibration is encountered, it may be due to 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 in your Trainer 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:

The Trainer Service Manual outlines procedures to use in the case of soft or ineffective brakes.

Fuel and Oil Requirements:

Aviation gasoline, grade 80/87 octane, is the standard fuel recommended by AAC and the engine manufacturer for the Trainer. Do not use lower octane fuel for it may cause serious engine damage. Lycoming's engine warranty is invalidated by the use of low grade fuel! The Lycoming O-235-C2C engines have an oil capacity of 6 quarts. Operational use is limited to an oil level of 4 quarts for local flight and 6 quarts for extended flight. *Absolute minimum safe quantity is 2 quarts.*

Lycoming recommends time between oil changes at 50 hours. If conditions dictate, a more frequent oil change may be required (refer to Lycoming engine manual for specifics). The following Aviation Grade Oils are recommended:*

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.

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 Trainer 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 500 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 overrich 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.

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

Warranty

AMERICAN AVIATION CORPORATION (herein AMERICAN) warrants each new aircraft and part thereof manufactured by it. together with all new aircraft equipment and accessories bearing the name "AMERICAN AVIATION," to be free from defects in material and workmanship under normal use and service, but extends no warranty of any kind, express or implied, to any items not manufactured by 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 AMERICAN under this warranty is limited to replacement or repair, at the option of AMERICAN, of any such aircraft, or any part or accessory which shall within six (6) months or one hundred fifty (150) hours of operation, whichever shall first occur and which shall be returned to DEALER and which,upon examination by 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 AMERICAN's opinion damaged as a result of being in any manner altered or repaired outside of the factory of AMERICAN or that shall have been subject to misuse or negligence.

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, EXPRESSED, STATUTORY OR IMPLIED IN FACT OR BY LAW, INCLUDING ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION OR LIABILITY ON THE PART OF AMERICAN, EXPRESSED OR IMPLIED, OF ANY NATURE WHATSOEVER. 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, Cleveland, Ohio 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
Tank Capacity (2)	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
Fill to 5 quarts for flights of less than 3 hours, and to 6 quarts for extended flights.

Hydraulic Fluid:

MIL-H-5606

Tire Inflation:

Nose Wheel	22 PSI	5.00 x 5 Tire
Large Main Wheels	19 PSI	6.00 x 6 Tires
Small Main Wheels	26 PSI	15-6.00 x 6 Tires

Fully illustrated Parts Catalogs and Service Manuals are obtainable through authorized Dealers of American Aviation Corporation or from the Customer Service Department, Cleveland, Ohio.

NOTES:

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CHECK LIST

MODEL AA-1A TRAINER

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 Switch - ON
6. Aux. Pump - ON (.5 to 8psi)
   Aux. Pump - OFF
7. CLEAR PROP
8. Ignition Switch - ON BOTH
9. Starter - PRESS
10. Oil Pressure - CHECK

ENGINE RUNUP

1. Brakes - ON
2. Throttle - SET (1800 RPM)
3. Engine inst. - CHECK
4. Magneto - CHECK (125 RPM ea.)
   (Max. Difference 50 RPM)
5. Carb. Heat - CHECK

BEFORE TAKE-OFF

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

TAKE-OFF

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 CUTOFF
3. Magnetos - OFF
4. Master Switch - OFF

MODEL AA-1A

CHECK LIST

American Aviation Corporation

518 Bishop Road/Cleveland, Ohio 44143/Telephone (216) 449-2200

Litho in U.S.A.