

AIR TRACTOR, INC.
Olney, Texas



FAA APPROVED

AIRPLANE FLIGHT MANUAL
01-0055

FOR

AIR TRACTOR MODEL AT-602

RESTRICTED CATEGORY ONLY

THIS DOCUMENT MUST BE CARRIED IN THE
AIRPLANE AT ALL TIMES

SERIAL NO. _____

REGISTRATION NO. _____

FAA APPROVED: _____

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1.4 POWERPLANT LIMITATIONS:

b. Engine Operating Limits (PT6A-65AG)

POWER SETTING (5)	SHp	TORQUE (4) LB.FT	NOMINAL ITT°C	MAXIMUM OBSERVED ITT°C	Ng RPM %	Np RPM	OIL PRESSURE PSIG (6)	OIL TEMPERATURE °C (10)(11)
Take-Off	1050	3245		(13) 820	104.0	1700	90 to 135	10 to 99
MAX. Contin- uous	1050	3245		810	104.0	1700	90 to 135	10 to 99
Recom- mended Climb/ Cruise	956	2950 3140 3350	700	750	104.0	1700 1600 1500	90 to 135	10 to 99
MIN. Idle (Run) Min. Idle (Flight)				715 (9)	58.0 68.0		60 Min.	-40 to 99
Starting				1000 (7)			0 to 200	-40 to 99
Transient		5100 (8)		870 (8)	104.0	1870 (8)	40 to 200 (8)	-40 to 110 (14)
MAX. Reverse	900			760		1650	90 to 135	0 to 99

1.4 POWERPLANT LIMITATIONS (Continued):Notes for Engine Operating Limits:

Take-Off Power settings are allowable for 5 minutes. The maximum allowable torque must not be exceeded.

- (1) Refer to the following page(s) for listing of approved engine oils.
- (3) If fuels conforming to bulletin information are not available, Aviation Gasoline MIL-G-5572, all grades, may be used for a maximum of 150 hours between overhaul periods. Operating time on Avgas is computed on the basis of quantity used and average consumption.
- (4) Torque limit applies within a range of 1000 to 1700 rpm propeller shaft; below 1000 rpm, torque is limited to 2000 lb. ft.
- (5) Engine inlet conditions limits for engine operation:

Altitude: Sea level to 12,500 feet (3810 meters).
- (6) Normal oil pressure is 90 to 135 psig at gas generator speeds above 72%. With engine torque below 3000 lb. ft. minimum oil pressure is 85 psig at normal oil temperatures (60 to 70° C). Oil pressures under 90 psig are undesirable. Under emergency conditions, to complete a flight, a lower oil pressure limit of 60 psig is permissible at reduced power level not exceeding 2000 lb. ft. torque. Oil pressures below 60 psig are unsafe and require that either the engine be shut down or a landing be made as soon as possible using the minimum power required to sustain flight.
- (7) These values are time limited to 5 seconds.
- (8) These values are time limited to 20 seconds.
- (9) Applies over speed range 58% to 68% N_G.
- (10) For increased service life of engine oil, an oil temperature of between 74 and 80°C (165 to 176°F) is recommended.
- (11) Oil temperature limits are -40°C (-40°F) to 99°C (210°F)
- (12) 100% gas generator speed corresponds to 37,468 rpm.
- (13) Limit to 5 minutes operation.
- (14) Time limited to 10 minutes at any condition.

c. APPROVED FUELS

FUEL - ASTM D1655-70, JET A, JET A1 (NATO Code F34, F35)

JET B (NATO Code F40)

MIL-T-5624, JP-4 (NATO Code F40), JP-8 (NATO Code F34, F35)

If jet fuel is not available, Aviation gasoline MIL-G-5572, all grades, may be used for maximum of 150 hours between overhauls.

WARNING: When using aviation gasoline, the electric fuel boost pump must be turned on and remain on for the duration of the flight.

1.4 POWERPLANT LIMITATIONS (Continued): (PT6A-65AG)

- d. APPROVED OILS – The approved engine oils for this aircraft comply with the following specifications:

MIL-PRF-23699 (NATO Spec 0-156)

MIL-PRF-7808 (NATO Spec 0-148)

Aircraft is delivered from the factory with one of the following Air Tractor Approved oils:

Eastman/Exxon/BP 2380 Turbo Oil, Mobil Jet Oil II, or AeroShell Turbine Oil 560. Oil brand and type used is placarded on the oil access door. Mixing or changing oil types or brands should be done in accordance with instructions in Pratt & Whitney Canada Service Bulletin S.B. 13001.

Capacity: 10.0 Qts. (9.5 Ltrs), 6.0 Qts. (5.7 Ltrs.) usable. It is recommended that the engine be filled to 1 quart below maximum when hot.

- e. PROPELLER - (One) HARTZELL HC-B5MP-3C/M10876AS or HC-B5MP-3C/M10876ANS
 Minimum diameter - 110.7 in. (281.2 cm)
 Maximum diameter - 111.2 in. (282.4 cm)
 Pitch (42 in. Sta.) (106.7 cm) - 16.5° low, 79.0° Feather, -11.0° Reverse
 OR: (One) HARTZELL HC-B5MP-3F/M11276NS
 Minimum diameter - 114.7 in. (291.3 cm)
 Maximum diameter - 115.2 in. (292.6 cm)
 Pitch (42 in. Sta.) (106.7 cm) - 13.9° low, 83.1° Feather, -10.0° Reverse
- f. STARTER LIMITS - Maximum starter duration 30 seconds, to be followed by one minute cool down. Total of 3 cycles to be followed by 30 minute starter cool down.

1.5 POWERPLANT INSTRUMENT MARKINGS:

The following markings are applicable to the PT6A-65AG:

<u>Instrument</u>	<u>Redline Minimum</u>	<u>Green Arc Normal</u>	<u>Yellow Arc Caution</u>	<u>Redline Maximum</u>	<u>Starting Red ▲</u>
Torque (Lb-Ft.)	N/A	0 - 3245	N/A	3245	
Tachometer RPM (Ng)	N/A	58 - 104		104.0	
Tachometer RPM (Np) (Note 1)	N/A	0 - 400 900 - 1170 1400 - 1700	400 - 900* 1170 - 1400*	1700	
Tachometer RPM (Np) (Note 2)	N/A	0 - 400 900 - 1050 1200 - 1600	400 - 900* 1050 - 1200* 1600 - 1700*		
Temperature (ITT) °C	N/A	400 - 810	810 - 820	820	1000
Oil Press (PSI)	60	90 - 135	60 - 90	135	
Oil Temp (°C)	-40	10 - 99	-40 - 10	99	
Fuel Press (PSI)	5	10 - 25	5 - 10	25	

Note 1: *Stabilized ground operation between 400 and 900 RPM and between 1170 and 1400 RPM is prohibited. (For HC-B5MP-3C/M10876AS or HC-B5MP-3/M10876ANS propellers)

Note 2: *Stabilized ground operation is prohibited between 400 and 900 RPM and between 1050 and 1200 RPM. Stabilized ground operation is prohibited above 1600 RPM except when aircraft is headed into wind. (For HC-B5MP-3F/M11276NS propeller)

1.6 WEIGHT LIMITS:

Maximum: 12,500 lbs. (5670 kg.)

Maximum Landing: 12,000 lbs. (5443 kg.)

Baggage Compartment: 60 lbs. (27.2 kg.) (+98.0 in.) (248.9 cm)

Maximum Hopper Load: 6,500 lbs. (2948 kg.)

(630 U.S. Gallons (2385 liters) at +16.0 in. (40.6 cm).

NOTE: It is the responsibility of the airplane owner and operator to insure that the airplane is properly loaded. See Weight and Balance data for proper loading instructions.

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1.7 CENTER OF GRAVITY LIMITS:

(+17.5 in.)(44.5 cm.) to (+24.0 in.)(61.0 cm.) at 12,500 lbs. (5670kg.)

(+17.5 in.)(44.5 cm.) to (+24.0 in.)(61.0 cm.) at 12,000 lbs. (5443 kg.)

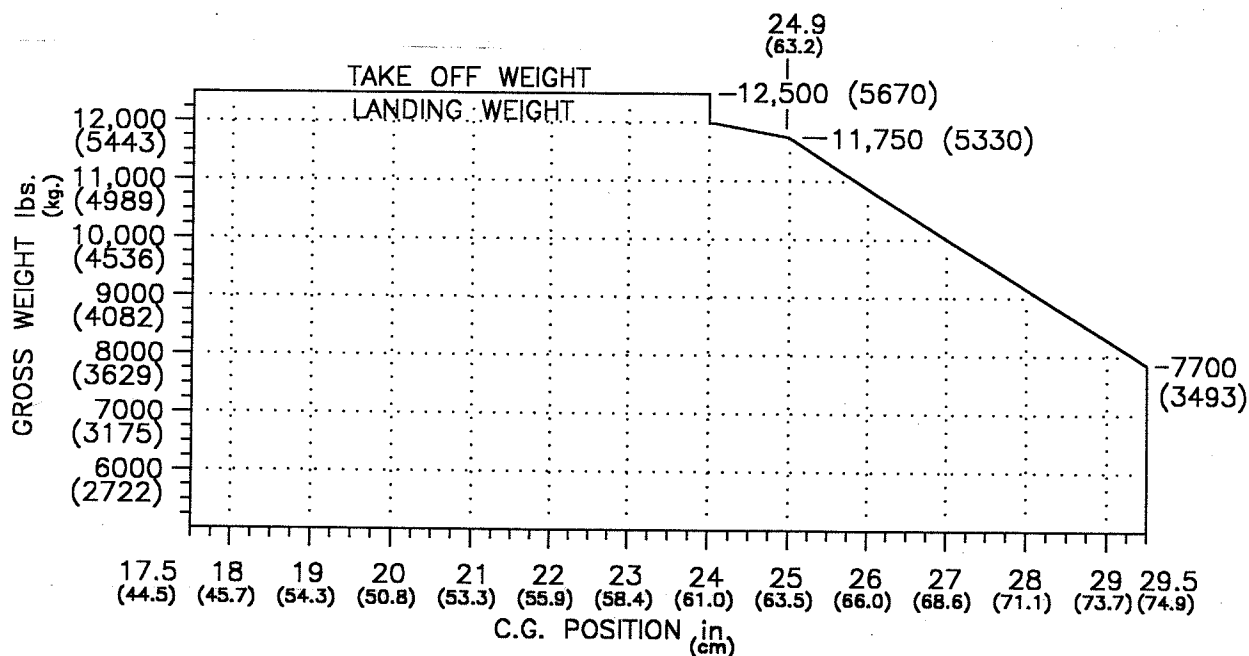
(+17.5 in.)(44.5 cm.) to (+24.9 in.)(63.2 cm.) at 11,750 lbs. (5330 kg.)

(+17.5 in.)(44.5 cm.) to (+29.5 in.)(74.9 cm.) at 7,700 lbs. (3493 kg.)

The pilot is responsible for determining maximum weight.

Straight line variation between points.

Datum is wing leading edge.



1.8 MANEUVER LIMITS:

No acrobatic maneuvers, including spins, are approved.

1.9 FLIGHT LOAD FACTOR LIMITS:

		Flaps Retracted	Flaps Extended
Maximum Positive	(9,200 lbs.) (4173 kg.)	+3.80	+2.0
	(12,500 lbs.) (5670 kg.)	+2.80	+1.5
Maximum Negative	(9,200 lbs.) (4173 kg.)	-1.90	0.0
	(12,500 lbs.) (5670 kg.)	-1.40	0.0

2.0 FLIGHT CREW LIMITS:

One Pilot (+74.0 in.)(188.0 cm)

One Crew (+107.0 in) (217.8 cm) when optional loader seat is installed in accordance with drawing 11524.

2.1 KINDS OF OPERATION:

This airplane is certificated in the RESTRICTED CATEGORY for Agricultural and Forest/Wildlife Conservation special purposes and is eligible for the following kinds of operations when the appropriate instruments and equipment required by the airworthiness and/or operating regulations are installed, approved, and are in operable condition.

- a. DAY VFR
- b. NIGHT VFR (Only if Strobe lights, instrument, flap and dome lights are installed)
- c. Flight into icing conditions is prohibited.
- d. Night work operations are prohibited unless appropriate working lights are installed and operable.
- e. Flight in vicinity of thunderstorms prohibited.
- f. The following equipment must be installed:
 - (1) Stall warning system
 - (2) 24-volt electrical system
 - (3) Slip indicator
 - (4) Fire Extinguisher
- g. The following equipment is optional:
 - (1) Light package of Strobe, Instrument, Dome, Flap Lights, Landing Lights
 - (2) Standard Spray System
 - (3) Dust Spreader
 - (4) Air Conditioning System
 - (5) Micronair Spray System
 - (6) Automatic Flagger
 - (7) Drift Finder Smoker
 - (8) Cockpit Heater
 - (9) Conventional Fire Bomber Gate
 - (10) Attitude Gyro
 - (11) Turn Coordinator
 - (12) COM radio or NAV/COM radio
 - (13) Transponder
 - (14) Night Work Lights
 - (15) Hopper Rinse Tank
 - (16) Commercial Band Radio
 - (17) Emergency Locator Transmitter
 - (18) Automatic Direction Finder
 - (19) Vertical Speed Indicator
 - (20) King Audio Control Console
 - (21) Directional Gyro
 - (22) Loader Seat

2.2 FUEL LIMITATIONS:

One 117 gallon capacity tank in each wing

Maximum capacity (Standard) - 236 U.S. Gallons (893 Liters) (+33.0 in.) (83.8 cm)
230 U.S. Gallons (870 Liters) Usable

OPTIONAL

One 108 gallon capacity tank in each wing.

Maximum capacity (optional) 218 U.S. Gallons (825 Liters) (+33.0 in) (83.8 cm)
212 U.S. Gallons (802 Liters) Usable

OPTIONAL

One 189 gallon capacity tank in each wing.

Maximum capacity (optional) - 292 U.S. Gallons (1105 Liters) (+33.0 in) (83.8 cm)
286 U.S. Gallons (1082 Liters) Usable

Use of fuel flowmeter must not be used as a primary means of gauging fuel.

Use of Fuel System Icing Inhibitors (FSII):

At high altitudes and/or cold temperatures, water suspended in jet fuel can form ice particles which can accumulate and block the normal flow of fuel in the airplane's fuel system. The use of a Fuel System Icing Inhibitor (FSII) will prevent such blockage.

A FSII can be premixed by the fuel supplier, can be mixed with fuel when off-loaded into a fuel farm, or can be blended at the fuel nozzle during airplane fueling. The FSII (conforming to Specification MIL-I-27686) must be blended into the airplane fuel in concentrations not less than 0.06% or more than 0.15% by volume.

FOR OPERATION BELOW 40°F (4.4°C), FUEL SYSTEM ICING INHIBITOR (FSII) MUST BE BLENDED WITH AIRPLANE FUEL.

2.3 OPERATING LIMITATIONS:

- a. Outside Air Temperatures for Airplane Operation
 - (1) Maximum: ISA +53° F. (ISA +44.4°C)
 - (2) Minimum: +0°F(-17.8°C) (+40°F (4.4°C) in visible moisture)
- b. Do not operate engine above 1500 Ft-Lbs torque on ground run-up or tail will come up.
- c. Do not move power lever into reverse position with the engine stopped or controls will be damaged.
- d. Maximum operating altitude: 12,500 feet MSL.
- e. A crash helmet meeting DOT, Mil-Spec, or DOI/USFS specifications must be worn when operating this aircraft.
- f. Maximum crosswind velocity during landing 20 mph (17 kts).
- g. Use Fuel System Icing Inhibitors (FSII) when operating below 40° F (4.4° C). See Section 2.2 for details.
- h. Noise abatement: This airplane has not been shown to comply with the noise limits in FAR Part 36 and must be operated in accordance with the noise operating limitation prescribed under FAR 91.815

2.4 PLACARDS AND MARKINGS:

The following information on placards pertaining to flight and operating limitations must be displayed: For Australian or Canadian Aircraft use values in "[]".

(a) On Canopy Doors: RESTRICTED

(b) Attached to skin of aircraft:

- (1) Next to fuel filler caps:
FUEL 108* GAL. [397.5 Liters] JET A. FUEL TANKS ARE INTERCONNECTED. ALLOW SUFFICIENT TIME FOR FUEL LEVEL TO EQUALIZE BEFORE TOP-OFF OF TANK.
*117 [435] (when standard 117 gallon (443 Liter) tanks are installed in Australia a/c)
*117 [443] (when standard 117 gallon (443 Liter) tanks are installed in Canada a/c)
*145 [541] (when optional 145 gallon (549 Liter) tanks are installed in Australia a/c)
*145 [549] (when optional 145 gallon (549 Liter) tanks are installed in Canada a/c)
- (2) Next to Oil Filler Cap: OIL TANK 10.0 QT. [9.5 LITER] CAP.
- (3) Next to pitot static buttons: STATIC AIR – KEEP CLEAN
- (4) On side of engine air scoop: LEVELING POINT.
Planes with nose-mounted ram air engine inlet have placard above left hand gear leg that reads LEVELING POINT IS TOP OF GEAR LEG 5° TAIL DOWN.
- (5) On baggage door: 60 POUNDS [27.2 KG.]. MAXIMUM BAGGAGE.
- (6) Aft of fuel tank Placard: CAUTION BEFORE REFUELING AIRCRAFT CONNECT GROUNDING CONNECTION TO LANDING GEAR TOW RING. FOR OPERATION BELOW 40°F[4.4°C] ANTI-ICING ADDITIVE PER MIL-I-27686 OR PHILLIPS PFA-55MB MUST BE BLENDED INTO THE AIRCRAFT FUEL IN CONCENTRATIONS NOT LESS THAN 0.06% OR MORE THAN 0.15% BY VOLUME.
- (7) On hopper lid: FOR AGRICULTURAL PURPOSES: MAX. HOPPER LOAD 6,500 POUNDS [2948 KG.] MAX AIRCRAFT GROSS WT. 12,500 POUNDS [5670 KG.]
- (8) Below Hopper Rinse Fill: HOPPER RINSE TANK FILL
- (9) Below Windshield Washer Fill: WINDSHIELD WASHER FILL
- (10) In loader seat compartment (if installed): OCCUPANT MUST ATTACH SEATBELT AND SHOULDER HARNESS AND WEAR A D.O.T. APPROVED OR MIL-SPEC CRASH HELMET.
- (11) Above canopy door handles: OPEN

(c) In full view of pilot:

- (1) THIS AIRPLANE MUST BE OPERATED IN RESTRICTED CATEGORY IN ACCORDANCE WITH THE AIRPLANE FLIGHT MANUAL. NO ACROBATIC MANEUVERS, INCLUDING SPINS. DESIGN MANEUVERING SPEED 162 MPH [141 KNOTS]. MAX FLAP DOWN SPEED 130 MPH [113 KNOTS]. MAX CROSSWIND VELOCITY DURING LANDING 20 MPH [17 KNOTS]. ALT. LOSS FROM STALL 300 FT.
- (2) THE OPERATION OF THIS AIRPLANE IS LIMITED TO DAY AND NIGHT* VFR CONDITIONS. FLIGHT INTO KNOWN ICING CONDITIONS IS PROHIBITED.
*Delete the words AND NIGHT unless aircraft is equipped with operable lighting package. (see page 7)
- (3) PUSH STICK FORWARD TO UNLOCK TAILWHEEL. **(NOTE 1)**
- (4) PARK BRAKE OPERATION: ON: DEPRESS PEDALS AND PULL LEVER OFF: DEPRESS PEDALS.
- (5) DO NOT OPERATE ENGINE ABOVE 1500 FT-LBS TORQUE ON GROUND RUN-UP OR TAIL WILL COME UP.
FLIGHT IN VICINITY OF THUNDERSTORMS PROHIBITED.
FLIGHT IN VISIBLE MOISTURE BELOW 40°F [+4.4°C] PROHIBITED.
FLIGHT BELOW 0°F [-17.8°C] PROHIBITED.
USE FSII WHEN OPERATING BELOW 40°F. [+4.4°C]
MAXIMUM OPERATIONAL ALTITUDE 12,500 FT. MSL.

2.4 PLACARDS AND MARKINGS (Continued):

- (6) WARNING DO NOT MOVE POWER LEVER INTO REVERSE POSITION WITH ENGINE STOPPED OR CONTROLS WILL BE DAMAGED.
- (7) DO NOT OPERATE PUMP ABOVE 160 MPH [139 KNOTS].
- (8) WARNING: SULFUR DUSTING IS PROHIBITED UNLESS SPECIAL FIRE PREVENTION MEASURES ARE INCORPORATED IN AIRCRAFT.
- (9) Below Caution Lights on Upper Panel: LOW FUEL, FUEL FILTER, CHIP DETECT, AIR FILTER, PROP IN BETA, RINSE PUMP, GENERATOR OUT
- (10) On engine Control Quadrant at respective HI and LO Idle positions: FLIGHT IDLE and RUN. On Start Control Lever: S.
- (11) On aft end of engine Control Quadrant next to Power Lever: REV. At the stop detent: IDLE. On power Control Lever: POWER.
- (12) On Prop Control Lever: P and on aft end of travel: F
- (13) On Canopy Doors: DO NOT OPEN DOORS IN FLIGHT
IF DOORS WILL NOT OPEN AFTER OVERTURN
KICK OUT WINDOW WITH KNEES OR FEET.
- (14) Next to Airspeed Indicator: MANEUVERING SPEED 160 MPH [139 KNOTS] IAS
- (15) Next to Compass Card: COMPASS CORRECTIONS WITH RADIOS OFF
- (16) On Lower instrument panel: NO SMOKING
- (17) On L/H Canopy Door: EMERGENCY EXIT OPEN
- (18) A CRASH HELMET MEETING DOT, MIL-SPEC, OR DOI/USFS SPECIFICATIONS MUST BE WORN WHEN OPERATING THIS AIRCRAFT.
- (19) WARNING: TURN OFF STROBE LIGHTS WHEN TAXIING IN VICINITY OF OTHER AIRCRAFT, OR DURING FLIGHT THROUGH CLOUD, FOG OR HAZE. STANDARD POSITION LIGHTS TO BE ON FOR ALL NIGHT OPERATIONS.
- (20) On instrument panel: A STALL DURING SKIDDING TURNS WILL CAUSE THE NOSE TO PITCH DOWN SHARPLY AND RESULT IN A SIGNIFICANT LOSS OF ALTITUDE. MAINTAIN COORDINATED FLIGHT AT ALL TIMES.
- (21) On instrument panel if loader seat is installed:
LOADER SEAT MUST NOT BE OCCUPIED DURING CHEMICAL APPLICATION.
- (22) On Boom Pressure Gauge: BOOM PRESSURE
- (23) On instrument panel: AVOID SKIDDING TURNS WHICH MAY RESULT IN FUEL MIGRATION FROM ONE TANK TO THE OTHER. THE ENGINE MAY QUIT WHEN EITHER TANK BECOMES EMPTY. MONITOR THE FUEL LEVEL IN EACH TANK FREQUENTLY WHEN FUEL LEVEL IS LESS THAN 1/2 TANK.
- (24) On the Tail Wheel Lock Lever on aircraft having the manual tail wheel lock system: TAIL WHEEL
- (25) On the pilot's console on aircraft having the manual tail wheel lock system: TAIL WHEEL UNLOCKED and TAIL WHEEL LOCKED and CAUTION: DO NOT UNLOCK TAIL WHEEL IN FLIGHT
- (26) On floor next to Emergency Engine Induction door cable (If Installed): TURN TO UNLOCK PULL UP FOR EMERGENCY ENGINE INDUCTION SYSTEM.
- (27) On fire extinguisher (Dry-chemical type only): DO NOT USE IN FLIGHT. MAY CAUSE TEMPORARY BLINDNESS AND DIFFICULTY BREATHING IF INHALED.

Note 1: This placard is not installed on aircraft having the manual tail wheel lock system.

BEFORE TAKE-OFF (Continued):

7. Re-check engine instruments and fuel quantity gauge.
8. Before proceeding with ground run-up, ensure that the propeller control system is purged by feathering the propeller once or twice with the power lever in the Idle position.
9. For aircraft having the manual tail wheel lock system installed, move the tail wheel lock lever forward to the locked position and taxi forward until tail wheel lock pin is felt to engage. For aircraft that do not have the manual tail wheel lock system, taxi forward with the stick back until tail wheel lock pin is felt to engage. Aircraft should be lined up with runway centerline.
10. Re-check Start Control Lever "S" - Position forward to FLIGHT IDLE.
11. Re-check parking brake lever - Full Forward (OFF).
12. Hold brakes and set power at 1500 Lb.-Ft. torque. (Stick full back).
13. Move Prop Lever "P" aft to check propeller RPM decrease. Return to flight position (Full forward).
14. Check that engine control quadrant friction knob is tight enough for proper control function without uncommanded creep of engine controls.
15. Turn Air Conditioning OFF.
16. Check position of aileron trim tab on L/H wing - NEUTRAL.

TAKEOFF: (NORMAL-UP TO 9,200 POUNDS (4173 KG.) GROSS WEIGHT)

1. With power still approximately 1500 Lb.-Ft. torque, Check Np at 1700 RPM, release brakes and as aircraft moves forward gradually advance power lever to provide a smooth and continuous acceleration of the engine to maximum take-off power.
2. As Power lever is advanced make sure temperature and torque limits are not exceeded.
3. Allow the tail to come up to the desired take-off attitude.
4. Best rate of Climb speed at 9,200 lbs. (4173 kg.) take-off weight is 100 mph. (87 kts.) (IAS).
5. Adjust trim wheel for climb and check temperature and torque limits. If desired reduce propeller RPM to approx. 1550 RPM for climb.

CAUTION: Reduction of prop RPM will increase Torque and can cause torque limit to be exceeded when already operating at max. torque.

TAKEOFF (FULL HOPPER LOAD OR ABOVE 9,200 POUNDS (4173 KG.) GROSS WEIGHT)

Use the same procedure as for normal take-off except as follows:

1. Lower flaps to 10° position (First Mark).
2. Position elevator trim lever slightly nose down from normal flaps up take-off position.
3. After breaking ground do not retract the flaps until at least 105 mph (91 kts.)(IAS) is reached.
4. Best rate of climb speed at 12,500 lbs. (5670 kg.) take-off weight is 115 mph (100 kts.) (IAS).

FUEL MANAGEMENT

Pay attention to the rudder trim in cruise. The ball in the slip indicator should be centered, otherwise fuel will transfer from one tank to another. Fuel migrates in the same direction that the ball indicates in the slip indicator. For instance, if the ball in the slip indicator is to the right of center that means the fuel is transferring to the right tank.

FUEL MANAGEMENT (Continued):

It's important to keep the fuel equalized in each tank especially when the quantity gets down to one-half and below. Fuel has a tendency to migrate to the right tank due to torque effects so if you want to transfer fuel back to the left tank to equalize the tanks, then use the rudder trim so that the ball in the slip indicator is to the left of the center position. Fuel should transfer from the right tank to the left tank.

Once you have the tanks equalized, then retrim the rudder such that the ball is centered. **If you run either tank completely dry the engine can flame out even if you have a substantial amount of fuel in the other tank.** This is because the header tank is out of fuel and the engine is starting to ingest air. For more information, read Service Letters 178 and 178A.

CRUISE:

1. Reduce propeller RPM to approximately 1425 RPM. Use higher RPM with heavy loads (Such as 1700 RPM with full hopper).
2. Reduce torque to comfortable setting and check ITT limit does not exceed nominal. Nominal is 740°C for PT6A-45R, 750°C for PT6A-60AG, 700°C for PT6A-65 series.
3. Check that the engine Control Quadrant friction knob is tight enough to prevent creep of Prop and Start Control levers during Power Lever movements.
4. If severe turbulence is encountered, the igniter switch should be placed in the "Continuous" position to preclude a possible flame-out from a temporary fuel interruption.

GLIDE AND APPROACH (Before Landing):

1. Prop Lever "P" - Full forward (Reduce power a little first).
2. Start Lever "S" - Flight Idle position (68 to 70% Ng).
3. Engine control quadrant friction knob - check friction is tight enough for proper control function without uncommanded creep of engine controls.
4. Power Lever - Adjust to provide required rate of descent. Do not move power lever below the idle stop position. Check Beta light - OUT.
5. Flaps - As desired.
6. Brake System – Depress both brakes firmly (to confirm brake function and ensure parking brakes released)
7. For aircraft having the manual tail wheel lock system check lock lever position - TAIL WHEEL LOCKED.
8. Turn Air Conditioner OFF.
9. Final Approach –
Recommend 95 mph (83 kts.) IAS for full flaps at 9,200 pounds (4173 kg.) gross weight.
Recommend 115 mph (100 kts.) IAS for full flaps at 12,000 pounds (5443 kg.) gross weight.
10. Maximum demonstrated crosswind velocity during landing 20 MPH. (17 Kts.)

AFTER LANDING:

1. Power Control Lever - As desired during landing roll. If reverse thrusting is necessary, the thumb latch on top of the power lever must be pushed forward and the power lever moved slowly aft until the Beta Light is observed ON. Reverse thrust may be selected as necessary by continued aft movement of the power lever (Keep control stick fully aft). Ensure Torque and/or ITT limits are not exceeded
2. Start Control Lever – Leave in FLIGHT IDLE position for taxiing to keep prop RPM in the green.

AGRICULTURAL FLYING (Continued):

Turns:

1. The previous training and experience will influence the operator flying the AT-602. All conventional types of turns may be performed in the AT-602.
2. Flaps may be used as a turning aid providing small deflections are used (5 to 8 degrees). The usual method of using flaps is to make the pull-up and initial bank with flaps retracted. As the aircraft is being banked to turn back into the field, touch the flap switch briefly and let off a little back pressure on the stick, as the flaps cause a slight pitch up tendency. Continue the turn, and as you line up for your pass, retract the flaps.
3. Make coordinated turns. Use the slip indicator as a means of determining whether or not you are carrying bottom rudder. The AT-602 has excellent stall characteristics and if the aircraft is inadvertently placed in an impending stall situation, it is only necessary to relax some back pressure on the stick to make recovery, and little altitude is lost, providing the turn is coordinated. A stall from a skidding turn will result in the nose dropping sharply with a significant loss of altitude.
4. In addition to being hazardous, a skidding turn can transfer fuel from one tank to another, which will result in flameout if one tank runs dry. Monitor the fuel level in each tank when the fuel level reaches 1/2 tank. For aircraft with a single fuel gauge, leave the selector switch on the low tank. Fuel transfer can occur when flying a racetrack pattern if the turns are not coordinated.

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FUEL FLOWMETER OPERATION:

MICROFLOW Dgital Fuel Management System.

WARNING

MICROFLOW is a Fuel Flow Measuring System and NOT a quantity sensing device. Therefore, initial programming of the unit must be accurate and be based on the total usable fuel for the fuel tank system in use.

Initial Programming:

Initial programming involves entering into the MICROFLOW memory the total usable fuel quantity of the fuel tanks in use. The programmed total can then be recalled as needed during future fueling operations. MICROFLOW can be programmed to show fuel load in gallons, liters, or pounds.

Procedure:

1. Power the unit up by turning the aircraft master switch to ON position.
2. Move the ADD/FULL toggle switch to the FULL position and hold for the entire procedure.
3. Simultaneously press the ENTER/TEST button and move the USED/REM. toggle switch to the REM. position. Hold both. The system will count down for 15 seconds displaying the count on the left in the display window.
4. The message "FULL" and the current full fuel value will appear in the display window. Release the ENTER/TEST button and the USED/REM. TOGGLE SWITCH. Keep holding the ADD/FULL toggle switch in the FULL position.
5. Move the USED/REM. toggle switch to the REM. position to increment the full fuel number or to the USED position to decrement the number. (The longer you hold the switch in position, the faster the number will be updated).
6. After reaching the correct total usable fuel figure press the ENTER/TEST button and the computer will store that number as full fuel. The word "FULL" disappears and the computer returns to the operating mode. Release the ADD/FULL toggle switch.
7. To verify that the data is stored properly press the ENTER/TEST button. The computer will run the diagnostic check and then display "GOOD". If the test is successful it will then display the maximum usable fuel value.

NOTE: Do not turn the power off to the computer for approximately one minute.

Pre-flight Check:

Initiate the diagnostic software built into the system by pressing the ENTER/TEST button; the program checks the hardware and the display. If the test is successful the word "GOOD" appears in the display window.

Move the USED/REM. toggle switch to the USED position. The system will display the fuel used since last fuel entry or fuel used since last reset.

Move the USED/REM. toggle switch to the REM. position. The system will display the fuel remaining on board.

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No Fuel Added:

As data is already stored, no action is needed.

Fuel Tanks Full:

1. Move the ADD/FULL toggle switch to the FULL position and hold.
2. Press the ENTER/TEST button.
3. Release the ADD/FULL toggle switch so it returns to the center position.
4. To verify, move the USED/REM. toggle switch to the REM. position. Total usable fuel will be displayed.

Partial Fuel Added:

1. Move the ADD/FULL toggle switch to the ADD position and hold.
2. Move the USED/REM. toggle switch to the REM. position to increment the fuel added figure until the amount of fuel added is reached.
3. Press the ENTER/TEST button.
4. Release the ADD/FULL toggle switch so it returns to the center position. The computer will arithmetically add the added fuel to the fuel remaining and use the total as the current fuel remaining.
5. To verify, move the USED/REM. toggle switch to the REM. position. The current usable fuel remaining will be displayed.

Correcting Fuel On Board Entry Error

In case an error has been made by exceeding the correct amount entering the number for total usable fuel, move the USED/REM. toggle switch to the USED position and simultaneously press and hold ENTER/TEST button. Fuel used will be reset and the fuel remaining figure will appear and pause in the display window for four seconds. The figure will decrement (the longer you press, the faster the decrementing). When the correct figure is reached, release both the USED/REM. toggle switch and the ENTER/TEST button.

To avoid repeating the four-second pause before decrementing, hold the USED/REM. toggle switch in the USED position and use the ENTER/TEST button to control the decrementing.

Test Function:

Diagnostic software is built into the system. To activate it press the ENTER/TEST button. All of the display digits will be filled with a checkerboard pattern. This display will flash on and off three times. Next all digits will be filled with a second checkerboard pattern, the inverse of the first, which will also flash on and off three times. Careful monitoring of these patterns will verify operation of every element of display unit.

If the test is successful, the word "GOOD" will appear in the display window for three seconds.

NOTE: Using the test function while engine is running will cause the computer to lose 17 seconds of fuel count.

IN-FLIGHT OPERATING:

Instrument Responses:

1. Fuel flow is continuously displayed on the left side of the display window.
2. Endurance in hours and minutes is continuously displayed on the right side of the display window except when viewing fuel remaining or fuel used information.

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Instrument Responses (Continued):

3. Fuel remaining is displayed by moving the USED/REM. toggle switch to the REM. position; the information is shown on the right side of the display window as long as the switch is held in the REM. position and for three seconds after it is released.
4. Fuel used is displayed by moving the USED/REM. toggle switch to the USED position; the information is shown on the right side of the display window as long as the switch is held in the USED position and for three seconds after the switch is released.
5. The display brightness is controlled by the BRIGHT/DIM toggle switch. Moving the BRIGHT/DIM toggle switch to BRIGHT repeatedly will make the display brighter and moving it to DIM repeatedly will dim the display. The default brightness after power up is full brightness.

FOR GREATER DETAIL, READ MICROFLO OPERATING MANUAL

LOW FUEL WARNING LIGHT SYSTEM:

This aircraft incorporates a low fuel warning system that consists of two float switches, one in each tank, connected to a red warning light. Either float switch can activate the light independent of the other. The floats are positioned so that the light is activated with approximately 22 gallons usable quantity remaining (total in both wing tanks), if the aircraft is in level coordinated flight. An unbalanced fuel load (due to uncoordinated flight, flying all turns in one direction, or other cause), may result in fewer than 22 gallons usable at the time of warning light illumination. The fuel gauges are the primary instruments for fuel management, and the pilot should not use the warning light system as a means of determining the quantity of fuel remaining.

Corrective Action:

If the Low Fuel warning light illuminates, fly straight and level and monitor fuel gauges. Land as soon as practical. However, if fuel gauge monitoring indicates a fuel imbalance with adequate fuel remaining, flight may be continued after allowing fuel to transfer and equalize.

An intermittent (flickering) low fuel warning light should be treated the same as a steady warning light.

FERRY FUEL SYSTEM:

The ferry fuel system utilizes the hopper as a fuel tank and is not an FAA Certificated fuel system. However it may be installed in accordance with drawing 50280 providing a logbook entry is made for both the installation and the removal.

If the optional ferry fuel system is installed, hopper fuel may be used by turning the fuel selector handle 90° counter-clockwise to point towards the left.* All take-offs and landings are to be made on main tank fuel. A safe altitude should be attained before switching and it is advisable to operate the fuel boost pump for a few seconds prior to switching to hopper fuel. Turn boost pump OFF before switching to hopper fuel.

When switching back to wing fuel turn boost pump ON after valve handle is rotated clockwise to point straight forward for wing fuel. Leave pump ON for a few seconds and monitor fuel pressure until it is clear that fuel flow is established.

*For S/N 602-0566 and subs. For S/N 602-0001 thru 602-0565 having the Aero Supply fuel valve, turn fuel selector handle 180° counter-clockwise to point aft.

Be sure to use the hopper fuel first. Keep in mind that if you run the wing tanks dry and then switch to hopper fuel, the fuel boost pump is not in the circuit between the hopper fuel and the engine. Therefore, if you run the wing tanks dry, resulting in an airlock in the system, there is no way to clear the airlock and restart the engine.

ENGINE FAILURE:

An engine failure has different symptoms than the case of engine flame-out. Engine failure symptoms could include any or all of the following indications:

- (a) Loud noises followed by heavy vibrations and loss of power.
- (b) Rapid loss of power with unusual noises, vibrations, or sudden increase in ITT.
- (c) Loss of power following drop in oil pressure below redline or increase in oil temperature above redline or both.
- (d) Loss of power following overspeed of gas generator (Ng).
- (e) Engine explosion.

If it is clearly perceptible that the engine has failed, proceed as follows:

- 1. Prop Control Lever "P" - Pull aft to feather stop "F".
- 2. Start Control Lever "S" - Pull aft to fuel cut-off "C".
- 3. Power Lever - Idle Position.
- 4. Fuel valve lever - OFF
- 5. All switches - OFF
- 6. Prepare for a forced landing and if terrain is rough turn battery Switch "Batt" ON and extend flaps as desired, then turn "Batt" switch OFF.

WARNING: Caution is mandatory during a suspected engine failure on take-off or landing in order to avoid shutting down the engine un-necessarily. Do not attempt to restart an engine which is definitely known to have failed.

ENGINE FLAME-OUT:

The symptoms of an engine flame-out will be the same as those of an engine failure only as regards a drop in ITT, Torque pressure, and Ng speed. The flame-out may result from the engine running out of fuel, or possibly may be caused by unstable engine operation. Severe turbulence can cause a flame-out by creating a temporary fuel interruption. Once the fuel supply has been restored to the engine or the cause of unstable operations eliminated, the engine may be restarted in the manner described under AIR STARTS.

CAUTION: Do not attempt a re-light if the Ng tachometer indicates zero rpm.

Remember that turbine engines seldom fail so long as fuel is being provided. An important procedure in this respect is to know the location of the fuel boost pump switch and the CONTINUOUS position for the ignitor switch. You should have a solid reaction to do two things anytime there is an indication of a power loss:

- 1. Put the ignitor on CONTINUOUS
- 2. Turn ON the fuel boost pump switch.

At the same time you should be pushing the stick forward to get the nose down to make sure the airplane doesn't stall while you are in the process of finding out what is wrong.

AIR STARTS:

The best air-start technique is to initiate the re-light procedure immediately after a flame-out occurs, providing the pilot is certain that the flame-out was not the result of some malfunction which might make it dangerous to attempt a re-light.

Air Starts are to be conducted in the same manner as Ground Starts.

Successful air starts may be achieved at all altitudes and airspeeds normally flown. However, with the gas generator rpm (Ng) below 10%, starting temperatures tend to be higher and caution is required.

IMMEDIATE RE-LIGHTS:

There is always the chance that the engine may light up successfully just as soon as the ignitor is turned ON. In an emergency, turn ON the ignitor (Move Ignitor Switch down to "Continuous" position) as soon as possible after flame-out, provided the generator speed (Ng) has not dropped below 50%. Under these conditions it is not necessary to shut off the fuel or feather the prop. The Power Lever should be retarded to the Idle position, and the fuel boost pump turned ON.

NOTE: Propeller feathering is dependent on circumstances and is at the discretion of the pilot. However, a minimum engine oil pressure of 15 psi should be registered if propeller is windmilling.

FORCED LANDING: (Engine Failure - Proceed as time and altitude permit)

IF CARRYING LIQUID IN HOPPER PROCEED AS FOLLOWS:

1. Dump hopper load. Feather prop to extend glide.
2. If a re-start is to be attempted, proceed with AIR-START Procedures as described earlier.
3. Maintain 100 to 110 mph (87 to 96 kts) (IAS) with approximately 10° flap and look for suitable landing area.
4. Tighten seat belt and shoulder harness.
5. If landing is to be made on road with a strong cross-wind, leave flaps retracted.
6. If landing in open field extend flaps and maintain at least 90 mph (78 kts) (IAS) until flare for landing.
7. Turn OFF fuel valve once air-start procedure is abandoned.
8. Pull Start Control Lever "S" aft to fuel cut-off position "C".
9. All switches OFF.
10. Open both canopy doors during approach.

IF CARRYING SOLIDS IN HOPPER PROCEED AS FOLLOWS:

1. Open hopper gate to reduce weight as much as possible.
2. Feather prop to extend glide.
3. Lower flaps to approx. one-half position (14°).
4. Maintain 110 mph (96 kts) (IAS) if gross weight is above 9,200 lbs. (4173 kg.)
5. Tighten seat belt and shoulder harness.
6. All Switches OFF.
7. Open both canopy doors during approach.
8. Extend full flaps during flare for landing.

RUNAWAY AILERON TRIM TAB:

1. Reduce airspeed to 140 mph (122 kts) IAS or less.
2. Land as soon as possible.

FUEL BOOST PUMP DESCRIPTION:

The AT-602 incorporates an engine-driven airframe fuel boost pump and an electric fuel boost pump located below the cockpit. Either of these pumps will deliver fuel at a minimum pressure of 15 psi to the fuel control pump which is part of the engine.

The airframe fuel boost pump operates continuously while the electric fuel boost pump is used only to fill the fuel lines prior to starting and as a back-up to the airframe boost pump. HOWEVER, when using aviation gasoline (avgas), the electric fuel boost pump must be used continuously for the duration of the flight.

AIRFRAME FUEL BOOST PUMP FAILURE:

If the airframe fuel boost pump becomes inoperative, the electric fuel boost pump should be switched ON.

If the electric fuel boost pump should also fail, the fuel control pump is adequate for unrestricted engine operations up to the maximum altitude of 12,500 ft (3810 meters). Continued flight should be below this altitude. HOWEVER, if these conditions should occur when avgas is in use, the flight should be terminated as soon as practical and landing made at the nearest suitable landing site.

ILLUMINATION OF CAUTION LIGHTS (AMBER):

<u>CAUTION</u>	<u>ACTION</u>
Prop in Beta Range	Indicates propeller blade pitch angle is at or below the minimum fine pitch that is safe for continued in-flight control. During ground operations it indicates that propeller is properly positioned for application of reverse thrusting power.
Air Filter	Indicates that the normal air flow to the engine inlet is being restricted from flow through the filter (Check for possible icing or foreign object blockage. Open engine alternate air door if installed and monitor available power and ITT indications.) Land as soon as practical. Service air filter system and close alternate air door. Do not rely on this light to determine air filter cleaning/replacement intervals.
Chip Detector	Indicates that a metal particle is in contact with the detector terminals and there is the possibility of other metal particles in the engine oil. Land as soon as possible and service chip detector.
Fuel Filter	Indicates that the fuel filter is partially blocked and the electric fuel boost pump should be turned ON. Land as soon as possible and service fuel filter.
Low Oil Pressure (If Installed)	Indicates oil pressure has dropped to 60 psig and further flight should be at reduced power not exceeding 2000 lb. ft. torque. Land as soon as possible and service engine oil system.
Fuel Pressure (If Equipped)	Indicates that fuel pressure to engine is below 15 psi minimum and that the airframe boost pump may have failed. Refer to AIRFRAME BOOST PUMP FAILURE procedure.

ILLUMINATION OF WARNING LIGHTS (RED):

Generator Out	Indicates generator is not charging normally. Monitor voltmeter and check charging system.
Low Fuel (If Equipped)	Indicates a low fuel condition in either or both wing fuel tanks. Fly straight and level and monitor fuel gauges. Land as soon as practical. However, if fuel gauge monitoring indicates a fuel imbalance with adequate fuel remaining, flight may be continued after allowing fuel to transfer and equalize. An intermittent (flickering) Low Fuel warning light should be treated the same as a steady warning light.