

PITTS MODEL 12 PILOT OPERATING HANDBOOK

Registration: _____

Designation of Aircraft:

Manufacturer: _____

Model: _____

Serial Number: _____

This handbook shall always be carried onboard during flight.

Pilot's Operating Handbook is prepared by:

Name: _____

Address: _____

Date: _____

PITTS MODEL 12

AIRPLANE FLIGHT MANUAL and MAINTENANCE MANUAL

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AIRPLANE FLIGHT MANUAL

SECTION 0 GENERAL SPECIFICATIONS

The PITTS Model 12 is a high performance aerobatic biplane. Operation of this aircraft

CRUISING SPEED AT SEA LEVEL:

70% power (2500 RPM) 175 MPH (TAS)

RATE OF CLIMB: 3200 FPM

SERVICE CEILING: 25000 FT

STALLING SPEED: 64 MPH

TOTAL FUEL: 54 GAL

CRUISING RANGE, (65 % power): 525 MILES

ROLL RATE: 300+ DEG/SEC

TAKE-OFF RUN, sea level,
No wind, std day: 550 FT

LANDING RUN, sea level,
No wind, std day: 780 FT

BAGGAGE COMPARTMENT: MAX 40 LBS

WEIGHTS:

Gross weight: 2250 LBS

Acro max gross weight: 2150 LBS

Empty weight: 1540 LBS

WING AREA AND LOADING:

Wing area: 154 SQ.FT

Wing loading: 15.5 PSF

DIMENSIONS:

Wingspan upper: 22 FT

Wingspan lower: 21 FT

Length: 19 FT 8 in

Height: 9 FT

PROPELLER:

MTV9 250 CM, constant speed

ENGINE:

M-14P (PF), Automatic lean, 360 (400) HP rated at 2900 RPM.

ENGINE EQUIPMENT:

- * Airstarter system
- * Alternator
- * Voltage regulator
- * Over voltage regulator
- * Battery
- * Fuel pump (engine driven and electric boost)
- * Oil scavenge pump
- * Exhaust
- * Oil cooler

FUEL AND OIL CAPACITY:

Fuel capacity: 54 GAL, 53 usable, 100 Octane only

Oil capacity: 17 quarts (16 liter),

Minimum 8.5 quarts (8 liter),

Oil Use: 1 quart per hour (1 liter), 3 quarts per hour (2.8 liter) during aerobatic power setting.

Use 60 wt Aero shell W120 or equiv oil. Do not use multi grade oil, only 60 wt. In very cold condition, 50 wt W100 can be used. Also if traveling it is hard to get 60 wt, Use 50 wt. For acro oil level should be 11 to 9.5 liters. For cross country 11-15 liters. Most of the oil is lost thru the vent system.

LANDING GEAR:

Main gear: Aluminum spring gear

Main Wheels: 6:00-6 with disk brakes

Main Tires: 6:00-6

Tail wheel unit: Aviation Products 6" double fork

SECTION 1 OPERATION LIMITATIONS

A. Airspeeds: (MPH CAS)

Normal operation range from stall speed	Vs	65 MPH
Max maneuvering speed	Va	165 MPH
Never exceed speed	Vne	239 MPH
Max Snap Roll Speed		140 MPH

G limits: +6, - 4.5 at 2250 lbs

B. Power plant:

Vedeneyev M-14P(PF) Engine and MTV-9-C/CL250(260)-29 propeller.

Power settings:	Take off	Nom I (max acro)	Nom II (mid acro)	Cruise I (norm)	Cruise II (econ)
HP	400	310	255	195	165
RPM	2900	2400	2050	1860	1730
MP In. HG	40	35	33	29	27
Fuel burn US gal/hr	46	34	26	16	14

Minimum fuel grade:	100 Octane
Oil pressure min:	55 Psi
Oil pressure max:	85 Psi
Cylinder temp max:	464 F
Fuel pressure High:	7 Psi
Fuel pressure Low:	3 Psi

C. Weights:

Max gross weight	2250 lbs
Max Aerobic Weight	2150 lbs
Empty Weight	1540 lbs
Baggage, maximum	40 lbs

Note: No Aerobic Maneuvers with Baggage

Design useful normal load and aerobic load referred to page 1 in weight and balance diagram SECTION 4.

D. Flight load factor aerobatics:

Positive max:	+6 G
Negative max:	- 4.5 G

The aircraft is designed to perform all known and unknown maneuvers within its limitation.

E. Flight limitations:

This aircraft must be operated as a DAY VFR airplane only. Flight into icing condition is prohibited.

F. Usable fuel:

Of the 54 U.S. gallon total fuel capacity, 53 gallons are usable during all normal flight conditions.

SECTION 2:

A NORMAL PROCEDURE

Engine start

A pre-start procedure is required for the M-14PF in your model 12, much like those used on all radial engine aircraft. Follow these steps to ensure the best engine care:

Master and Mags are off. Visually check that all switches are off.

Open intake drain if no open. It should still be open from storage with a can hanging on it.

Pull the prop thru a minimum of 6 revolutions, that's 18 blades. This is to check of the presence of oil in the lower cylinders that could damage the engine during start up. Do not be alarmed if oil is observed dripping from the exhaust or the intake drain, this is normal. If there is enough oil in a cylinder to cause damage, the crank will not pull thru complete revolutions. If this occurs, remove the lower spark plugs and drain the oil from the cylinder.

Priming: Your Pitts Model 12 is equipped with an electric primer. To prime the COLD engine, turn on the master switch and the fuel boost pump switch. Hold the primer switch up for 10 seconds then turn off all switches. Master and fuel pump switches to OFF position until ready to start.

Starting: Close and latch Canopy BEFORE starting!! Open engine oil shut off (Push Forward). The starter will not work with the oil valve in the off position. Air bottle to open position. Master and fuel pump switches to ON position and the throttle at 1- inch fwd of the rear stop. Use start switch to start engine. Starting is done in a quick 'blips of the start switch. Do not turn and hold in start position like a Lycoming start. Only allow 3 blades to pass in a single start attempt. If the engine does not start immediately, you do not have the prime correct. Usually, add more prime.

Once the engine is running, turn off the fuel boost pump. Use the boost pump only for starting, priming and in an emergency if loss off fuel pressure is experienced.

Run up and Warm Up. Your Pitts Model 12 has tremendous thrust.

CAUTION

DO NOT EXCEED 2000 RPM DURING RUN UP OR THE TAIL WILL RISE DURING PROP CYCLING EVEN WITH FULL AFT STICK AND BRAKES APPLIED.

Pull prop to full course or low RPM. Advance throttle to 1500 to 1900 RPM and hold while oil temp rises. When the oil temp reaches normal temp, reduce throttle and increase RPM. Perform standard magnetos and propeller check at 1900 RPM normal drop is 100 RPM and between magnetos is 50 RPM.

GROUND HANDLING

The PITTS Model 12 ground handling qualities are typical of the tail-wheel type, and entirely normal in this respect.

HOWEVER: Do not over-control the airplane on ground with brakes and rudder. Adjust your responses to the airplane and you will find your model 12 as pleasant on the ground as it is in flight.

Toe-brakes are standard equipment.

TAKE OFF

Check:	Fuel Valve:	ON
	Elevator trim:	Neutral
	Flight Control:	Free

Check MASTER CAUTION during roll

CAUTION! DO NOT lift up the tail during take off! The propeller may hit the ground due to it's length and low ground clearance if the airplane pitches nose down too far. A positive take off should be performed with the stick held at neutral elevator.

AEROBATIC FLIGHT

The PITTS Model 12 is an extremely high performance aerobatic airplane. The following points are so obvious as to be self evident, but their importance is so great that we repeat them here:

- Do not perform aerobatic with baggage.
- Do not perform aerobatic with less than ¼ tank of fuel, at low altitudes.
- Do be certain that you have ample altitude for the maneuvers you want to perform.
- Do be sure that you are familiar enough with the maneuvers, and the airplane, that a bad recovery will produce no worse result than embarrassment.
- Do be certain that the airplane is located within the weight and CG.
- Know the limitation on your PITTS Model 12 and yourself.

EMERGENCY SPIN RECOVERY

- POWER OFF
- REMOVE YOUR HAND FROM THE STICK
- DETERMINE DIRECTION OF SPIN ROTATION
- APPLY FULL OPPOSITE RUDDER
- WHEN ROTATION STOP, RECOVER

LANDING:

- Propeller control: HIGH RPM 2400 RPM
- Approach speed: 90 MPH/ 78 KT
- Three point landing shall be performed

On cross-wind landing, develop the habit of removing the crab before touchdown to avoid possible ground-loop.

ENGINE SHUT DOWN

After landing and taxiing in run the engine at 1200 RPM for 1 minute. Prop to full fwd if not already there. Shut down engine with the mag switches to off position.

Close or Pull out the oil shut off valve below the fuel selector. With master switch on, flip the oil scavenge switch up and allow the pump to run until starts to skip, about 1-2 minutes. Then turn scavenge pump OFF and master OFF.

Close all switches OFF

Close air tank valve

When pushing your PITTS Model 12, use the I-struts for push points. DO NOT push the spinner, the propeller, or the empennage.

STORAGE

When leaving the airplane parked outside, you should:

- Leave it parked into the wind
- Chock both main wheels
- Secure the stick with the seat-belt

For storage after and between flights, place exhaust drip cans on the tail pipes as well as the small can on the intake drain, open the intake drain first. Also place a soda can on the vent pipe at the tail.

Refilling the start air tank with APU tank:

USE ONLY AIR IN THE SYSTEM> NEVER USE PURE OXYGEN!!

The fill fitting is located near the air tank valve assembly.

- To fill the tank from your APU bottle,
- Remove the safety cap
- Connect the fill hose onto the fitting
- Check that bleed valve on the APU tank is closed. Open the tank and allow air to flow into the airplane tank. Fill onboard tank to 800PSI in pressure. Close OFF both bottle and APU.
- Open bleed valve to relieve hose pressure. Remove hose from fill fitting and tank and replace the safety valve cap.
- Ready to start

B. EMERGENCY PROCEDURES

Your PITTS Model 12 are equipped with a EIS (Engine Instrument System) which allows you to get a red MASTER CAUTION light on preset values on the engine parameters.

Those preset parameters values are:

Oil pressure
Oil temp
Cylinder temp
RPM
Manifold pressure
Fuel pressure

Respect those warnings and take proper action based on aircraft position (on ground or in air).

IN-FLIGHT ENGINE RESTART:

1. Establish glide at 100 MPH
2. Fuel Selector CHECK ON
3. Master Switch CHECK ON
4. Air Bottle CHECK OPEN
5. Throttle OPEN ¼ FULL
6. Boost pump ON
7. Engage starter to start propeller wind milling if it is not turning

FIRE

ENGINE FIRE, STARTING ENGINE

In case of an engine fire during starting, continue to crank the engine in attempt to start the engine and use any fuel in the lines. DO NOT use the boost pump. Set the fuel selector to OFF.

ENGINE FIRE ON GROUND

IN CASE OF AN ENGINE FIRE OR POTENTIAL FIRE (in case of crash landing or ground collision while taxiing) switch the fuel selector to OFF. If possible, keep the engine running until the fuel in the lines is exhausted.

ENGINE FIRE AT TAKE OFF

In case of engine fire during the takeoff roll or immediately after lift-off, land and stop the aircraft immediately. After complete stop and if possible give power and switch the fuel selector OFF. If not possible (due to intensive fire) magnetos OFF, leave aircraft.

ENGINE FIRE DURING FLIGHT

Immediately switch fuel selector OFF to block the flow of fuel to the engine. A bailout decision should be made based on apparent severity of the fire. As you are a pilot with parachute you should commit to bail out when there is clear evidence of an out of control fire situation or the surface on ground makes a bailout a safer choice than an emergency landing.

Best glide speed, engine out, is: 100 MPH

CANOPY:

In case of emergency bailout, open the canopy with normal handle and the canopy will leave the aircraft.

SECTION 3: PERFORMANCE

Altitude loss during power off stalls:	450 FT
Demonstrated flight time inverted:	2,5 min
Demonstrated cross wind velocity is:	22 MPH
Takeoff roll to reach 50 ft GRD std atmosphere	600 FT
Landing roll threshold at 50 ft GRD std atmosphere	900 FT

SECTION 4: WEIGHT AND BALANCE

See Aircraft Weight and Balance diagram included in the aircraft records. A copy of the WB diagram should be included in the paperwork in the aircraft at all times along with the Operation Limitations.

MAINTENANCE MANUAL

MODEL 12 RIGGING INSTRUCTIONS

See model 12 rigging instructions included in the aircraft records.

SERVICE AND GENERAL MAINTENANCE

Fuel: The M14P (PF) engine installed in PITTS Model 12 uses 100 Octane aviation gasoline. Tank capacity is 54 U.S gallons (36 fuselage, 18 wing) maximum, 53 gallons usable in normal flight.

Oil: The oil capacity is 16 liters. It is recommended that the engine oil be changed every 50 hours flying hours or more often in adverse condition.

W120 SHALL BE USED IN HOT CLIMATE

W100 SHALL BE USED IN WARM TO COLD CLIMATE.

Smoke system: A 7 U.S Gallon smoke tank is located aft of the rear seat under the baggage compartment, the smoke oil is transferred to the exhaust by a 12 V fluid pump. No baggage allowed when smoke oil tank is in use.

AIR START SYSTEM:

The PITTS Model 12 has an air bottle for starting the engine. The bottle can be recharged from a external bottle, max pressure in start tank bottle is 850 PSI. For refill procedures, refer to "NORMAL OPERATION, REFILLING THE START AIR TANK WITH APU TANK"

BATTERY:

A 12 Volt battery is standard equipment. The battery should be maintained in a charged condition at all times. If the battery requires, recharge at a maximum initial charge rate of 2 amps. The master switch should be off when charging.

CANOPY:

The canopy on the PITTS Model 12 is made of Plexiglas with a steel frame. In order to keep it clean, the following procedure is recommended.

1. Flush with clear water to dislodge dirt, mud, smoke oil, etc.
2. Clean with an aircraft grade Plexiglas windshield cleaner, using a soft cloth
3. Scratches may be removed by polishing with proper Plexiglas products.

BRAKE SYSTEM:

The brake system is filled with a petroleum base hydraulic fluid complying with MIL-H-5605 or other proper product. If it is necessary to add fluid to the system, do so as follows:

1. Remove filler plugs from master cylinders.
2. Fill with correct hydraulic fluid such that the level is ½” below the top of the reservoir.
3. Reinstall filler plugs
4. Check brake system for proper operation

When it is necessary to refill or to bleed the brake system to remove air, follow this procedure:

1. Remove filler plug from master cylinders.
2. Loosen bleeder screw on brake unit at wheel and drain system.
3. Onto the loosened bleeder screw, insert brake bleeder hose, which is fastened to a pump-type pressure oil can filled with correct hydraulic fluid.
4. Fill the system from the bottom up using the pump-type pressure oil can.
5. When master cylinder is filled to within ½” from top of reservoir, tighten brake bleeder screw and removing bleeder hose.
6. Reinstall filler plugs in master cylinders
7. Check system for proper operation

TIRES:

For maximum service keep the tube type tires inflated to 35 pounds per square inch. The tires can be removed from the wheels by first deflating the tubes, then removing the wheel through bolts allowing the wheel halves to be separated. See wheel and brake manufacturer’s information for additional details and procedures.

FABRIC:

The fabric covering the PITTS Model 12 is Poly Fiber HD fabric with PPG top coat Urethane color paint. Covering is per JKE, Inc. procedure.

METAL FINISH:

Parts of the fuselage are finished in Epoxy chromate primer and the same PPG Urethane color paint as on the fabric. It is necessary to etch the metal parts prior to application of the normal finish.

LANDING GEAR:

The main landing gear is a spring aluminum landing gear type manufactured by Grove Aircraft.

The tail gear consists of a steerable swivel tail wheel assembly a massive stainless steel spring for energy absorption and two steering spring assemblies.

FUSELAGE:

The Fuselage of the PITTS Model 12 is of conventional welded tube construction. The entire fuselage frame assembly is sandblasted and powder coated for protection against corrosion.

TAIL ASSEMBLY:

The entire tail assembly is constructed of welded tubes and sheet and is protected in the same manner as the fuselage.

CONTROL SYSTEM:

Extensive use of ball bearings in the control system assures smooth trouble free operation and minimum wear. Keep all jam nuts and all bolts in rod end bearings tight. The inner race of all ball bearings must be tight and not allowed to rotate on the thru bolt.

MAINTENANCE SCHEDULE

DAILY INSPECTION:

1. Check aircraft documents and ascertain if there are any reported defects.
2. Inspect aircraft generally for external signs of damage, particularly under lower wing, under fuselage, and under tail.
3. Check control surfaces for full and free travel. Check that there is no excessive backlash in the aileron or elevator system. Ensure that there is tension in the rudder circuit.
4. Check operation of elevator trim.
5. Carry out a general assessment of tension of wing streamline wire. Investigate any uneven tension or change of tension.
6. Check tension of tail plane bracing wire.
7. Check cockpit for freedom from foreign matter.
8. Check condition of Hooker Harness
9. Check inside of wheel fairing for accumulation of mud.
10. Check tires for condition
11. Check tail wheel unit and spring for condition
12. Check brake units for condition and signs of fluid leakage
13. Visually check instruments for condition.
14. Check pitot head and static holes for condition
15. Check engine cowling and inspect engine installation visually for leak of oil and fuel.
16. Check oil level
17. Check exhaust for cracks
18. Visually check engine mounting for condition.
19. Visually check air starter fittings
20. Check fuel drains.
21. Check the cowling attachment
22. Check spinner for security and condition
23. Check propeller blades for freedom from damage
24. Check fabric covering for sign of internal damage or distortion
25. Check fuel level

50 HOUR INSPECTION

CHECK:

1. The satisfactory external condition of the aircraft, especially wing tips, propeller, empennage extremities and fuselage belly and under wing surfaces.
2. That all cowling, panels and spinner are secured and check condition generally.
3. Tire pressure (35 PSI) and condition of tires, i.e. free from cuts, fractures, undue wear, tire creep.
4. Brake units free from fluid leaks and check brake pads for wear.
5. Check main landing gear for cracks.
6. Tail wheel assembly and spring for condition and steering action from rudder. Lubricate as required.
7. Remove any control surface locking devices, and check the action of all flying controls for freedom and correct movement. Lubricate all hinges.

NOTE Any undue slackness or tension in controls and correct as required.

8. Security of pitot head and mountings and orifices of obstructions.
9. All control surface hinges are free and undamaged.
10. Canopy for condition.
11. Hooker Harness in good working order
12. Battery and terminals secure
13. Electrical system functioning, Check circuit breakers.
14. Fuel tank lines for security and lack of leaks, and vent clear. Clean gascolator fuel filter.
15. Fuel valve correct action.
16. Check fuel drains for water and foreign matter.
17. Oil level in engine sump for condition and change oil.
18. Obvious signs of non normal leakage of oil, fuel or exhaust gasses.
19. Check attachment of engine mount to engine.
20. Engine control for condition, action and correct movement.
21. Check that there are no loose items that can foul the controls.
22. Check safety straps and attachments for condition and security and lock for action and lightly lubricate.
23. Check engine air starter for leaks and condition.
24. Clear all drain and vent holes
25. Check seats and attachment for security. Check condition of the moving rudder pedals and security of floorboards in cockpit.
26. Check wheel pants for condition.
27. Check firewall for condition
28. Check engine mount for condition and security, especially attachment to firewall.
29. Clean cockpit and aft fuselage if necessary.
30. Check cowling for condition and security.
31. Check smoke system for leakage

WINGS:

1. Check fabric covering for condition and possible damage from stones, etc
2. Check leading edge for condition or damage.
3. Check wing tips for condition.
4. Check ribs and trailing edge for damage, security or warping. Inspect for damage in region of walk and cockpit entrance.
5. Check fuselage in vicinity of main landing gear.
6. Inspect rear and main spar carry-through tubes in fuselage
7. Check main and rear spar attachment to fuselage for condition and signs of movement, or slackness of bolts.
8. Check rib lacing for condition
9. Clear all vent holes
10. Clean and check flying and landing wires for nicks and bends.
11. Check tension of wing rigging wires.

MAIN LANDING GEAR AND TAIL WHEEL:

1. With aircraft at rest on wheels, check that aircraft stands level.
2. Check tail wheel spring for cracks or distortion.
3. Jack up aircraft, with one wheel off ground at a time. Remove wheel for service of brakes and bearings per manufacturer recommendations.
4. Check tail wheel assembly for security of attachment to spring and fuselage. Lubricate as required.
5. Check tail wheel tire, wheel bearings, pivot, actuating levers and coil springs for condition and wear. Lubricate wheel bearings.
6. Check main tires for condition and pressure 35 PSI. Check tires for creep.
7. Check wheel bearings and brakes for freedom and correct operation.
8. Check brake system for leaks and top up reservoirs if necessary.
9. Refit wheels

TAIL PLANE:

1. Check tail plane main attachments for security and condition.
2. Carry out general inspection, especially at junction of tail plane and fuselage.
3. Remove tail fuselage inspection panels to complete this inspection.
4. Clear drain holes
5. Check rudder and elevator hinges

FLYING CONTROLS:

1. Check all control surfaces for play in hinges and freedom of movement
2. Check all controls for correct and full travel
3. Check rudder cables for correct tension, check cable for condition, particularly in the vicinity of fairleads.
4. Check fairleads and rubbing blocks for security and wear. Check push-pull rod adjustment locknuts for security and self aligning bearings for full movement.
5. Check all control surfaces for damage or trailing edge warp. Check ribs and structure for security.
6. Check fabric condition of all surfaces and clear draint holes. Check rib lacing and condition of surfaces.
7. Check the rudder pedals for wear and security.
8. Check action of trim and condition of operating cable, especially in vicinity of trim control horn. Lubricate
9. Carry out full lubrication schedule.
10. Check trim operation mechanism for wear.

INSTRUMENT AND SYSTEM:

1. Check pitot head for condition and security, also static holes.
2. Check all lines at instrument panel mountings
3. Check all flexible lines for condition and security and lack of kinks at bends
4. Check instrument for correct action
5. Check compass and mounting security.
6. Check compass condition i.e., glass and freedom from leaks, Check function.
7. Check electrical system for condition and functioning, and wiring condition and security. Check all circuit breakers.
8. Check expire date on start bottle
9. Check condition of start bottle, check connections
10. Check condition of instrument panel

FUEL SYSTEM:

1. Check fuel tanks and straps for security and condition.
2. Check fuel valve for correct and free operation and signs of fuel leak
3. Check attachment of fuel lines to tanks for distortion or damage.
4. Check fuel venting
5. Remove gascolator fuel filter for inspection of contents and cleaning
6. Check fuel tanks for water

ELECTRICS:

1. Check all circuit breakers for security and operation.
2. Check all circuits for functioning.
3. Check all wiring at terminals for condition and security
4. Check battery leads and mounting for security and condition
5. Check radio, transponder and GPS antenna for security.

GENERAL:

1. Clean cockpit and aircraft
2. Check that articles such as seat and upholstery are secure and not likely to foul controls
3. Check condition of canopy
4. Carry out engine run up and taxi tests

100 HOUR INSPECTION

Repeat 50 hour inspection items, plus the following:

1. Lift up the rear seat in fuselage for further structural inspection.
2. Remove wheels, clean brake discs, lining and operating gear
3. Replace wheels if needed and check brakes
4. Check rudder cables for wear, especially in the vicinity of fairleads
5. Inspect control column and trim bearings for cleanliness and lubrication.
6. Check instrument lines, drain as required, and test for leaks

Reconnect and test pitot static instruments against suitable standards

7. Check that correct parameters is set in EIS
8. Swing compass and check compass for condition
9. Carry out 100 hour inspection on engine as specified in M-14PF hand book
10. Inspect propeller for condition of blades
11. Check spinner for tightness and freedom from cracks