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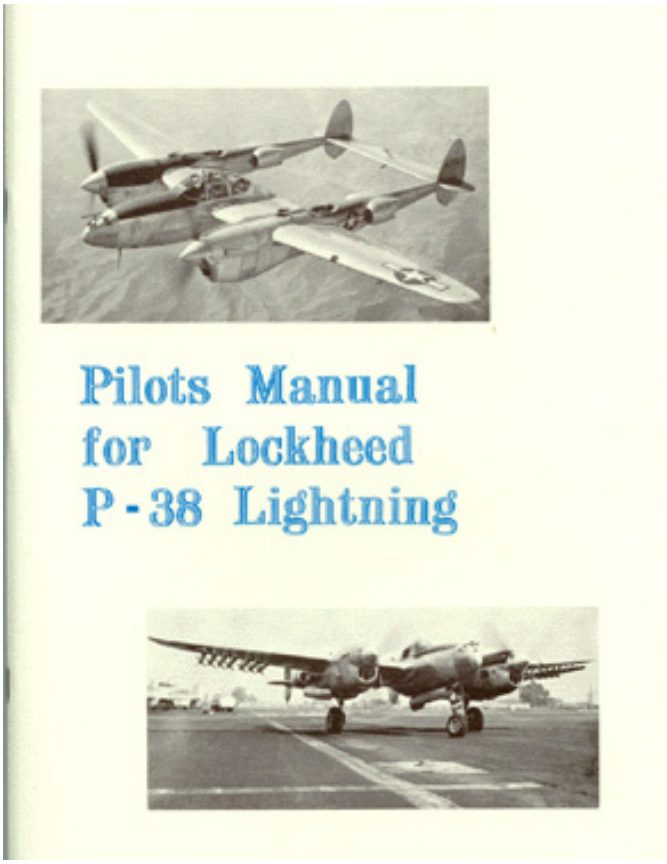
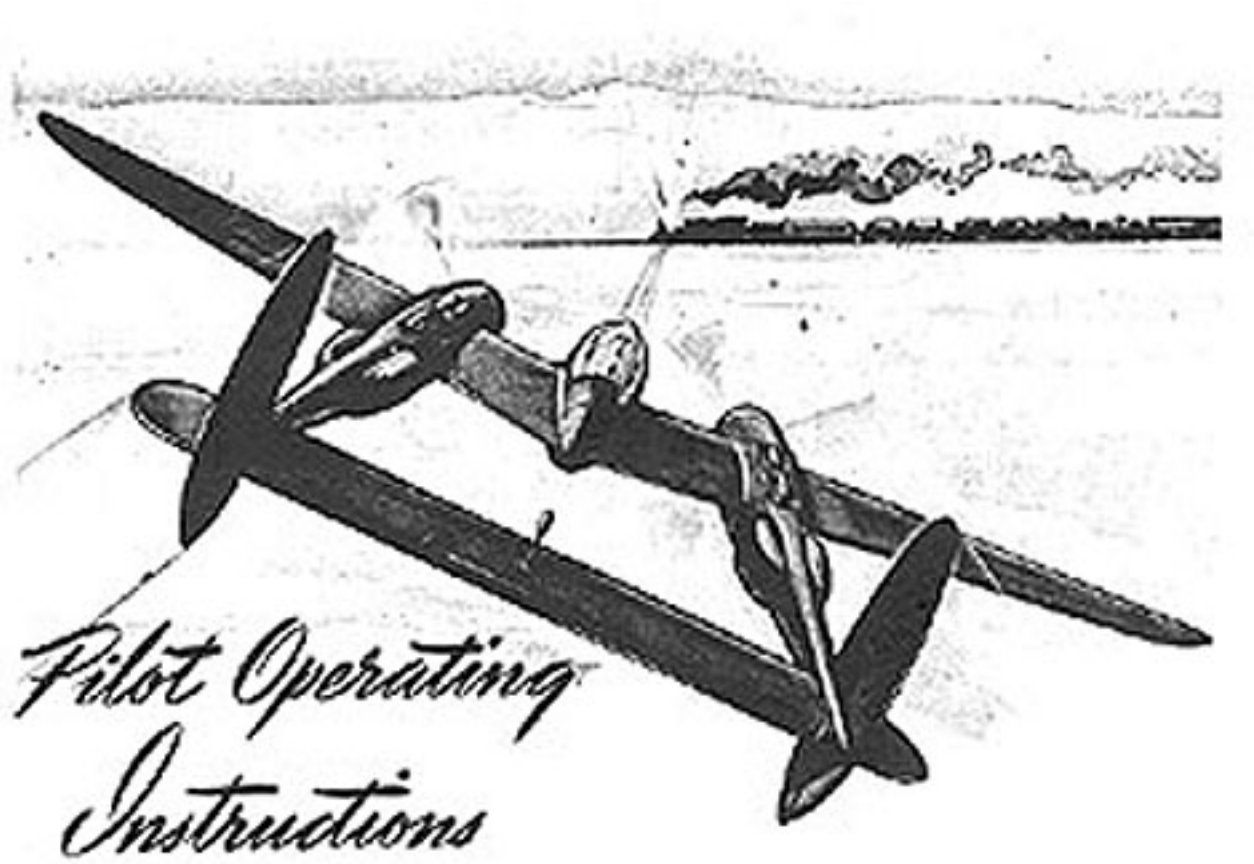
P-38 FLIGHT MANUAL



Dedicated to Laura, Jamie, Jaan, Zack, Stephen & family, and a special thank you to my family for all the love and support. God Bless.



PILOT OPERATING INSTRUCTIONS (Page 1 of 16 pages)

1. FLIGHT RESTRICTIONS

(1) Deleted.

(2) Continuous.inverted flight.

(3) Airspeed or accelerations in excess of those given on the DIVE LIMITS (No. la. see diagram which is posted in the cockpit of each airplane). Do not exceed 3.5 Ga negative acceleration.

CAUTION:

Extreme care must be given during acrobatic maneuvers which require a downward recovery. Acrobatics should not be attempted at altitudes below 10,000 feet.

(b) AIRSPEED LIMITATIONS

Condition Max. allowable airspeed (I.A.S.)

DIVING ..... See Diagram Ia. (Fig. 25)

Landing EXTENDED;..... 175 mph

Flaps 100% EXTENDED..... 150 mph

Flaps 50% EXTENDED ..... 250 mph

Landing Light EXTENDED ..... 140 mph

300-gal. drop tanks installed.....250 mph

WARNING:

Dangerous instability exists when the center of gravity is aft of 32% mac (32% gear up corresponds to 28.5% gear down). Under these tail heavy conditions, full down elevator will be required to prevent stalling the airplane if the airspeed is allowed to drop below 90 mph indicated with flaps down, power on$_9$ and landing gear up.

NOTE: Tail heavy conditions may be relieved by lowering the landing gear.

2. ON ENTERING PILOT'S COMPARTMENT

a. CHECK FOR ALL FLIGHTS.

(1) Battery switch OFF if battery cart is used. ON if cart is not used.

(2) Cross-feed switch OFF. (Cross-feed switch is replaced by a cross-feed position of the tank selector valves on later airplanes).

(3) Turn the tank selector valves to OUTER WING ON (or outer wing tank switches ON)

Check operation of outer wing tank booster pumps by checking the fuel pressure.

b. Check the condition of the low level warning light bulbs by pushing the test button on the side of the warning light box, or (on modified airplanes) press the bulbs into their sockets.

(4) Oxygen pressure 400 to 450 lbs/sq. in.

(5) Throttles 1/10 OPEN (3/4 inch)

(6) Propeller control INC RPM (Full forward)

(7) Propeller selector switches AUTO CONSTANT SPEED

(8) Propeller circuit breakers ON

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PILOT OPERATING INSTRUCTIONS (Page 2 of 16 pages)

(9) Propeller circuit breakers (fig. 4--5) ON

(10) Propeller feathering switches (fig. 4-13) NORMAL

(11) Mixture (fig. 4-6) IDLE CUTOFF

(12) Oil cooler flap switches (fig. 5-17) AUTOMATIC

(13) Generator switch (fig. 5-17 or 8-11) ON

(14) Coolant flap overide switches (fig. 5-13)

(15) Intercooler flaps (fig. 5-12) OPEN (if installed)

(16) Gun-sight light (fig. 5-10) operating and seat adjusted so that the sight reflection is easily visible.

(17) Inverter switch (fig. 5-9) (or compass switch on main switch box) ON

(18) Contactor heater ON if contactor is to be used during the flight

(19) Armament switch (on control column) OFF

(20) Fuel quantity (fig. 8-20 and 21) adequate. Check the fuel level in outer wing tanks by pressing the low level test button (fig. 12-4), or (on modified airplanes), by operating the low level test switch on the side of the warning light box).

(21) Turbo-supercharged warning lights functioning (if installed)

(22) Carburetor air filters (fig. 4-8) AS REQUIRED

> NOTE: The use of carburetor air filters reduces the critical altitude and range of the airplane and should be avoided in clear air.

(23) Clock and altimeter set

(24) SPECIAL CHECK FOR NIGHT FLYING - Test by operating

> (I) Landing lights (fig. 5-7) (not more than 5 sec. for test)

(2) Recognition lights (fig. 7-13) (not more than 10 secs. for test)

(3) Cockpit lights (fig. 5-11)

(4) Fluorescent light (fig. 5-5)

(5) Position lights (fig. 5-6)

(6) Spot light (fig. 4-1)

FUEL MANAGEMENT (SYSTEM)

GENERAL:

On unmodified airplanes fuel is supplied to each engine by an engine driven fuel pump and one master booster pump which draws fuel from either the main reserve or dropable tank depending on the setting of the selector valve. (An additional booster pump for the outer wing tank is installed on airplanes equipped with these tanks). On modified airplanes, fuel is supplied to each engine by an engine driven fuel pump and an individual booster pump for each tank. The dropable tanks on modified airplanes arc also pressurized to five to seven pounds per square inch.

PILOT OPERATING INSTRUCTIONS (Page 3 of 16 pages)

Normal Use

(I)

Warm up taken off and fly for the first fifteen minutes on reserve tanks. This is to provide space in the reserve tanks for the vapour return from the carburetors. Switch both engines to the left dropable tank until almost dry then shift to right dropable tank until almost dry. Determine hourly fuel consumption from the charts in Appendix II. Fuel gauges are not installed in the dropable tanks. Do not drop external tanks unless for increase range or for combat. Use up the fuel in the outer wing tanks (if inst) then use main tanks, and switch back to RESERVE for the remainder of the flight.

WARNING:

Always check the fuel level in the tank before trying to operate the engine from that tank. To check the level in the outer tank, press the low level test switch on the side of the warning light box. It is not possible to check the fuel level in the dropable tanks.

(2)

On modified airplanes the booster pumps should be operated during take-off) and landing to prevent engine failure which may result from engine-driven fuel pump failure. The booster pumps should also be operated during flight whenever necessary to maintain the required 16 to 18 lb/sq. in. fuel pressure. On modified airplanes the booster pump master switches should be on at all times. The speed control switch should be in the EMERGENCY position during take-off and landing to prevent engine failure which may result from engine-driven fuel pump failure. The booster pumps should also be operated on EMERGENCY whenever necessary during flight to maintain the desired fuel pressure of 16 to 18 lb/sq. in. The speed control switches have no effect on the dropable tank booster pumps. On modified airplanes the booster pump switches merely supply power to the booster pumps. The proper pump is turned on by contacts on the tank selector valve.

NOTE: Never exceed 250 mph indicated with 300 gallon dropable tanks installed.

(3)

To release drop tanks:

(a) Raise flaps and landing year.

(b) Turn tank selector valves to MAIN, RESERVE or OUTER WING.

(c) Move the arming switch to ARM or SAFE.

(d) Turn the selector switches ON for tank(s) to be dropped.

(e) Press the release button when flying at an angle not greater than 30.degrees from the horizontal.

(f) Full fuel tanks may be dropped without danger at airspeeds up to 400 mph. Empty 150 gallon tanks should be dropped only while flying at an airspeed of 160 mph or less. On late airplanes, dropable tanks are equipped with displacement struts which increase the safe dropping speed to 350 mph.

WARNING:

> EMPTY 300 GALLON TANKS ARE TO BE DROPPED ONLY IN AN EMERGENCY as the tanks may hit the airplane when released. To drop the tanks, it is necessary to slow the airplane down to 120 mph with landing gear and flaps up to avoid serious damage.

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b. LONG RANGE FERRY FLIGHT

Whenever flying with drop tanks, it is advisable to operate both engines from the LEFT drop tank until empty and then operate both engines from the RIGHT droppable tank. This procedure empties the left tank in the minimum time and, if necessary it can be released sooner by operating each engine from its own individual tank.

c. CR0SS FEED OPERATION

On early airplanes the left and right fuel systems are connected by an electrically operated "cross-feed" valve which makes it possible to operate either engine from any tank, except the outer wing tank'. Late airplanes have a cross-feed position on the tank selector valves. When prolonged single engine flight makes it necessary to use fuel from the dead engine side, or when operating both engines from one droppable tank, operate the fuel system as follows:

(a) Airplanes with four-way fuel tank selector valves.

I. Turn tank selector valve to the tank supply fuel.

2. Turn the cross-feed switch to CROSSFEED.

3. Turn other tank selector valve OFF.

(b) Airplanes with five-way tank selector valves.

I. Turn tank selector valve to the tank to supply fuel.

2. Turn other tank selector valve to CROSS-SECTI0N.

NOTE: It is not possible to cross-feed from the outer wing tanks.

CAUTION:

Do not attempt to use the booster pumps on modified airplanes during cross-feed, operation if there is a leak in the fuel lines to the dead engine. The booster pumps will pressurize the fuel lines, forcing fuel out through the leak.

3. STARTING ENGINES

NOTE: Engine fire extinguishers are NOT installed in this airplane. Strict adherence to the following instructions as to the mixture control positions will reduce the possibility of fire. If fire does occur, move the mixture control to idle cut off, and shut off tank selector valve, electric fuel pump and ignition to the effected engine. See pilot's check list.

Check for normal fuel pressure 16 to 18 lb/sq. in. with electric fuel pumps OFF.

Check for idling pressure of 9 lb/sq. in.

Set prop selector switch to FIXED PITCH, with 2300 RPM, 35 in Hg.

(10) Check magnetos, max. normal drop, 100 RPM after shifting from both to either left or right magneto.

With RPM at 2300

1. Check propeller control levers DEC. RPM then INC RPM (full forward)

2. Check propeller selector switches DEC. RPM then INC RPM, then return to AUTOMATIC CONSTANT SPEED.

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PILOT OPERATING INSTRUCTIONS (Page 5 of 16 pages)

3. With the generator switch ON, check the voltmeter .for approximately 28 volts and the ammeter for charge. Leave the generator ON.

4. Move the inter-cooler flap controls to OPEN and check operation of the turbo-chargers. by opening throttles individually to take-off power.

CAUTION:

Do not operate engines at take-off power for more than two or three seconds while on the ground.

e. Tvpe A-4 Automatic Pilot

1. Check vacuum 433 to 513 Hg.
2. Check automatic-pilot oil pressure 125 lb/sq. In.
3. Check the artificial horizon unit uncaged.
4. Match the directional gyro cards on the directional gyro.
5. Turn the automatic pilot control valve ON.
6. Turn the course setting knob, the elevator trim control knob, and the aileron trim knob to check operation of the units.

4. TURN AUTOMATIC PILOT CONTROL VALVE OFF BEFORE TAKE-OFF

a. Check the following: -

1. Top hatch - LOCKED IN PLACE. Side windows - cranked CLOSED. Side window ratchets - ON.

NOTE: Open side windows will cause buffeting of the tail section.

2. Propeller levers INC RPM (Full-forward)

3. Propeller selector switches AUTO CONSTANT SPEED.

4. Mixture - AUTO RICH.

5. Tank selector valves RESERVE ON.

6. Dive flaps UP.

7. Wing flaps – UP wing flap lever CLOSED. Up to 1/2 flaps may be used for short take-off run.

8. Flight controls free and proper movement.

NOTE: Look at the surfaces for this check to see that they move in the right direction.

9. Aileron control booster ON.

10. Inter-cooler flaps OPEN (if installed)

11. Droppable tanks prepared for immediate dropping.

12. Electric fuel pumps - ON

13. Rudder, elevator and aileron tabs - ZERO.

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PILOT OPERATING INSTRUCTIONS (Page 6 of 16 pages)

14. Taxi a few feet "straight" down the runway so that the nose wheel will be in line when take-off power is applied. Maximum performance take-offs require holding the airplane with brakes at the end of runway until power reaches the desired setting. Because of the tricycle landing gear, there is no tendency for the airplane to take-off by itself, and no feeling of lightness as take-off speed is reached. Start to ease the column back at about 70 mph, then at 90 or 100 lift the airplane in the air.

15. Hold brakes, open throttle to 46" hg. 3,000 RPM.

16. Release brakes, keep manifold pressure below 54" hg.

CAUTION:

Be prepared to reduce power immediately to prevent uncontrollable in case of failure of one engine during take-off.

17. Landing gear UP as soon as practical after leaving ground.

NOTE: Retract the landing gear immediately after the airplane is off the ground so that flight may be safely continued in the event of one engine failure after take-off.

18. Reduce manifold pressure to 43" Hg. at 2,600 RPM after clearing obstacles.

5. ENGINE FAILURE DURING TAKE OFF

1. If one engine fails during take-off and the aircraft has left the ground, but before the safe sing1e~engine airspeed (120 MPH) has been reached, close both throttles and LAND STRAIGHT AHEAD. Retract the landing if it is not possible on the runway.

b. If one engine fails after reaching the safe airspeed of 120 MPH, and after the landing gear has started up:

1. Reduce power enough to gain control, then apply power gradually, hold enough rudder to prevent the airplane from skidding and level the airplane.

2. Turn OFF electric fuel pump of dead engine.

3. Circle the field and land, DO NOT make turns into the dead engine unless trim

and speed have been established.

6. CLIMB

a. Mixture AUTO RICH.

b. lntercooler flaps OPEN.

c. Refer to the take-off, climb and landing chart in Appendix II, for best climbing speed at sea level is 160 mph.

d. On P-38H airplanes, carb. air temp.is critical in a high power climb between 15,000 and 25,000 feet. Above 25,000 feet turbo-supercharged overspeed is critical Excessive temps will cause detonation and very rough engine operation resulting loss of power and probable engine damage.

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PILOT OPERATING INSTRUCTIONS (Page 7 of 16 pages)

e. The following maximum manifold pressures are to be used for "War Emergency"

ONLY:

"Never exceed 60 in Hg. in a climb above 25,000 feet.

GENERAL FLYING CHARACTERISTICS

a. Due to the counter-rotating propellers, there is no noticeable torque effect in any two engine flying with this airplane. Rudder and aileron trim tab settings do not require adjustment as a result of changes in airspeed and power.

b. TO INCREASE POWER IN FLIGHT

1. Move throttles to the new manifold pressure.

2. Move propeller controls to the new RPM.

3. Move the throttles to the new manifold pressure.

c. TO DECREASE POWER IN FLIGHT

1. Move the throttles to the new manifold pressure.

2. Move prop controls to the new RPM.

3. Re-adjust the throttles

4. Move mixture controls to AUTO LEAN is permissible.

d. The turbo superchargers are controlled by the same levers which operate the throttles. Rated supercharger speed is 24000 rpm allowable for five minutes and overspeed is 26400 rpm. The warning lights start to flicker at 25,600 rpm and burn continuously at 26,400 rpm.

e. On P-38J aircraft the intercooler flap should be open for take-off and climbs and nearly closed at all other times. Carburetor air temperature should not be allowed to exceed 45 degrees cent.

f. The airplane is stable at all normal speeds. The airplane becomes slightly nose heavy when the flaps and landing gear are extended. Release of drop tanks causes no noticeable change. Two-engine

cruising below 170 mph i.a.s. is not recommended because the airplane requires more attention and ranges not increased.

STALLS

a. With power off., the airplane stalls at the following air speeds and gross weights noted.

	15,000 lbs	17,000 lbs	19.000 lbs
Flaps and landing gear up	94 mph	100 mph	105 mph
Flaps and landing gear DOWN	69 mph	74 mph	78 mph

b. As stalling speed is approached, the centre section stalls first with noticeable shaking of the airplane, however the ailerons remain effective.

c. In either power ON or power OFF stalls with flaps and landing gear up the airplane rushes straight forward in a well controlled stall. With flaps and landing gear down there appears to be a slight tendency for one wing to drop. There is however

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PILOT OPERATING INSTRUCTIONS (Page 8 of 16 pages)

c. (Cont'd)

no tendency to spin. Under these conditions, the nose drops slightly and as the speed increases, the wing will come up.

d. On airplanes equipped with rocket installation the stall characteristics are the same.

SPINS

a. Spin Characteristics

The spin is fast, but recovery is prompt and easy if the proper technique is used.

b. Recovery

The airplane can be brought out of the spin any time by kicking full rudder against the spin for a minimum of half a turn then easing forward the control column. The procedure is as follows:

1. Close throttles.

2. If flaps are down pull them up.

3. KICK FULL RUDDER AGAINST THE SPIN AS BRISKLY AS POSSIBLE, WAIT AT LEAST HALF A TURN BEFORE ATTEMPTING TO PUSH THE WHEEL FORWARD. Recovery is slower by one turn with flaps down. If the flaps are down or on their way up the rudder should be held against the spin for at least one full turn before pushing the column forward.

4. After half a turn, with rudder full over the control wheel may be eased forward as the rotation stops. Recovery can be accomplished in one-and-a-half turns under any condition except with flaps down when two turns will be required. The airplane will come out of the spin in a vertical dive and recovery from the dive should be made slowly in order to avoid a highspeed stall which may cause a spin in the opposite direction. Any attempt to push the wheel forward before kicking full opposite rudder will immediately increase the speed rotation and the acceleration to which the pilot is subjected. If this is encountered pull the wheel full back and hold full rudder against the spin for a minimum of half a turn. Then push the control column forward.

DIVE RECOVERY FLAPS

The airplane without these flaps becomes very nose heavy and starts to buffet above diagram dive speeds (Dia.2.). The dive recovery flaps which are installed under the wings between the booms and tile ailerons restore the lift to this portion of the wing and thus cause the uncontrollable nose heaviness to occur at a higher speed. The flaps also add some drag to the airplane which in conjunction with the higher allowable dive speed permits safer dives at a much steeper diving angle. The dive recovery flaps should be extended before starting the dive or immediately after the dive is started before a buffeting speed has been reached. If the airplane is buffeting before the dive recovery flaps are extended the buffeting will momentarily increase and then diminish. With these flaps extended, the nose heaviness is definitely reduced but the diving speed should never be allowed to exceed the placard by more than 15 or 20 mph. With the dive recovery flaps extended before entering the dive, angles of dive up to 45 degrees may be safely accomplished. Without dive recovery flaps extended the maximum angle for extending dives is 15 degrees. Diving characteristics are better with power off than power on.

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PILOT OPERATING INSTRUCTIONS (Page 9 of 16 pages)

APPROACH AND LANDING

General

Extreme tail down landings possible only with flaps up, may cause the fins to strike the runway.

1. With the landing gear DOWN and the flaps at MANEUVER, START the approach at 120 i.a.s. When the approach is assured put the flaps all the way down and come over the fence at 110 mph. and flare off to about 80 mph and wait for contact.

2. If, for some reason the flaps cannot be lowered, land a little faster and allow for more flare off and a flatter gliding angle.

b. NORMAL LANDING

1. Tank selector valves to MAIN or RESERVE whichever contains the most fuel.

2. Mixture control AUTO-RICH.

3. Propeller levers to about 2600 rpm position.

4. Electric fuel pumps ON.

4a Check landing gear warning horn switch for ON.

5. Landing gear DOWN (not over 175 mph).

6. Pump the brake pedals a few minutes to ensure that brakes are working.

7. Wing flaps DOWN (not over 150 mph).

NOTE: Lift the flap lever trigger through the quadrant notch to place lever to DOWN.

8. Inter-cooler flaps OPEN unless operating in extreme low temperatures.

9. Flaps UP after landing.

c. SINGLE APPROACH AND LANDING - CAUTION

Concentrate sharply on your approach because once you are fully extended the flaps and the landing

gear or descended below 500 ft. you cannot again circle the field and you must make a landing. If however the flaps are not fully extended and your elevation is still 500 feet or more and you want to go around again, proceed as follows before beginning to circle.

1. Apply as much power as can be held at the same time milk up retracting and landing gear accelerate to at least 160mph and raise the flaps. Do not make turns into the dead engine unless trim and speed have been established.

(Note from Stan Wood: It looks as though the original is wrong. It should be retract landing gear, milk up flaps, accelerate to at least 160mph and raise the flaps. The original makes no sense. If you pull flaps up all at once close to the ground there is a good chance of stalling into the ground.)

1. Turn aileron control booster OFF to conserve' hydraulic power for landing gear and flap operation.
2. Start approach allowing 1,000 feet above field for each two miles away.
3. Extend landing gear at 160 mph.

   NOTES: Allow more time for landing gear and flap extension when only one engine Is operating.

4. Extend flaps to MANEUVER position at 140 mph.

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PILOT OPERATING INSTRUCTIONS (Page 10 of 16 pages)

5. Reduce power carefully as needed.

6. Neutralize rudder trim tab.

7. Continue approach at not less than 120 mph.

8. Do not extend full flaps until certain the airplane will make the field.

9. Further information

10. At rated power 44 inches HG2600 rpm the airplane will barely hold altitude at any flap extension.

THINGS TO AVOID

Lowering of landing gear or flaps except when necessary for landing.

Excelerating throttle rapidly from reduced power to full power.

Low flat approaches with landing gear and flaps fully extended attempting to drag the airplane into the field with power. The technique should be developed to be always reducing power on the approach and avoid being forced to apply excessive power at low speeds.

TAKE-OFF IF LANDING IS NOT COMPLETED

Open throttles to take-off stop and after propeller rpm has stabilized push prop control forward to TAKE-OFF position.

Props forward

Throttles forward

Retract landing gear.

CAUTION:

Pull the airplane up in a climb to stay below 150 mph indicated airspeed until the flaps are retracted.

Retract flaps and proceed in normal take-off technique.

PILOT OPERATING INSTRUCTIONS (Page 11 of 16 pages)

EMERGENCY OPERATING INSTRUCTIONS

1. ENGINE FAILURE DURING FLIGHT

a. Failure of one engine

(I) PERFORMANCE - The airplane flies well on one engine. Using normal rated power, it will climb to about 26,500 feet, and can be flown at more than 255 mph (true speed) in level flight at 20,000 feet.

(2) FEATHERING EMERGENCY

(a) Reduce the power from the live engine if necessary to maintain directional control. This should not be necessary if the indicated airspeed is 125 mph or more.

(b) Apply all the power to the good engine that can be held, preventing yaw at all times.

(c) Hold 125 mph or more (at least 160 mph preferred).

(d) Release droppable fuel tanks, bombs, or chemical tanks immediately.

(e) Trim rudder tab slowly to take pressure off rudder pedal.

(f) Carefully more mixture control of bad engine to IDLE CUT-OFF.

(g) Carefully select propeller feathering switch, (fig. 4-13) of bad engine and feather propeller.

WARNING:

If the propeller does not feather, then attempt to feather it by holding the selector switch (figure 4-5) in the DEC RPM position, if the propeller still will not feather then it is desirable to fly at a low air speed (130 to 140 mph) to keep the propeller windmilling at the lowest possible rpm.

(h) Turn off electric fuel pump switch and fuel tank selector valve control of failed engine.

(i)Close coolant and oil cooler scoops of failed engine.

(j) If the left engine has failed an consequently the generator has stopped, take action indicated

under ELECTRICAL FAILURE, Section IV, paragraph 10. (this is not applicable to F-SB, P38L, and late P38J airplanes which have a generator on each engine.

(3) SINGLE ENGINE APPROACH AND LANDING

CAUTION:

Concentrate sharply on your approach - because once you have fully extended the flaps, and the landing gear or descended below 500 feet, you cannot again circle the field an you must make a landing. If, however, the flaps are not fully extended and your elevation is still 500 feet or more, and you want to go around again, proceed as folIows before beginning to circle:

1. Apply as much power as can be held, at the same time retracting the landing gear.

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PILOT OPERATING INSTRUCTIONS (Page 12 of 16 pages)

2. Accelerate to at least 160 mph and

3. Raise the flaps.

It is recommended that the inexperienced pilot practice single engine landing by completely closing one throttle and setting the corresponding propeller lever to the DECREASE RPM (full rear) position. With this procedure the throttles engine

NOTE: TURN'S CAN BE MADE.SAFELY IN EITHER DIRECTION AS LONG AS AIRSPEED IS HELD CONSTANT ABOVE CRITICAL SINGLE ENGINE SPEED, AND AIRPLANE PROPERLY TRIMMED.

1. Secure radio clearance for emergency landing.
2. Turn aileron control booster OFF to conserve hydraulic power for landing gear and flap operation.
3. Start approach allowing 1,000 feet above field for each two miles away.
4. Extend landing gear at 160 mph.

NOTE: Allow more time for landing gear and flap extension when only one engine is operating.

5. Extend flaps to MANEUVER position at l40 mph.
6. Reduce power carefully as needed.
7. Neutralize rudder tab.
8. Continue approach at not less than 120 mph.
9. Do not extend full flaps until certain the airplane will make the field

(4) FURTHER INFORMATION

(a) At rated power, 44" Hg. 2,600 rpm, the airplane will barely hold altitude with landing gear extended and flaps up.

(b) With landing gear extended the airplane will not hold altitude at any flap extension.

(c) Things to avoid:

1. Extension of landing gear or flaps except when necessary for landing.

2. Acceleration throttle rapidly from reduced power to full power.

3. Low flat approaches with landing gear and flaps fully extended attempting to drag the airplane into the field with power. The technique should be developed to be always

reducing power on the approach and avoid being forced to apply excessive power at low airspeeds.

(5) FEATHERING - PRACTICE.

(a) Close throttle.

(b) Mixture - IDLE CUT-OFF.

(c) Move propeller feathering switch to feathering position.

CAUTION:

On all airplanes, except F-5B, P-38L, and late P-38J airplanes which have a generator on each engine, shut down the right-hand engine so that the generator which is on the left engine will remain in operation.

(6). UNFEATHERING IN FLIGHT

PILOT OPERATING INSTRUCTIONS (Page 13 of 16 pages)

(a) Propeller control (fig. 4-4) DEC RPM (full rearward)

(b) Throttle 1/10 to 1/4 open.

(c) Return propeller feathering switch to NORMAL position.

(d) Lift the guard on the propeller selector switch to the feathered propeller.

NOTE: It is recommended that the above operation be performed immediately after featherin9 is completed so that the engine may be started quickly in case the live engine should fail during practice.

(e) Hold the propeller selector switch (fig. 4-5) in INC RPM until the engine is turning 600 to 800 rpm then place it in AUTO CONSTANT SPEED. Place mixture control in AUTO RICH. The engine should start.

(f) Warm up the engine before operating at full power.

(b) FAILURE OF BOTH ENGINES.

1. Drop external tanks or bombs.
2. Turn fuel selector valves OFF.
3. Set mixture to IDLE CUT-OFF.
4. Turn ignition OFF.
5. Turn battery switch OFF.
6. Release the cockpit canopy and roll down both side windows.
7. Extend flaps by use of hand pump if there is sufficient time.
8. Leave landin$_9$ gear up.
9. Make a normal approach at 8 or 10 mph over the stalling speed and set the airplane on the ground slightly before the stall is reached.

FIRE:

(a) There are no fire extinguishers installed in this airplane. If an engine fire occurs, shut off tank selector valve to that engine, turn boost pump OFF and move mixture control to IDLE CUT-OFF.

EMERGENCY EXIT:

Recommended Method:

Slow down as much as possible (below 200 mph) and trim the airplane in an approximately level attitude. If time permits head airplane towards an unpopulated area. Pull the emergency hatch release control (fig. 23-4) to release the top hatch, crank or push either side window down, crawl out and slide off the wing head first.

Alternate Method:

If it is still possible to control the airplane, turn the airplane upside down, unhook the safety belt and fall out.

Next

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PILOT OPERATING INSTRUCTIONS (Page 14 of 16 pages)

FLIGHT OPERATION CHARTS, TABLES, CURVES AND DIAGRAMS

FLIGHT PLANNING

The following outline may be used as a guide to assist personnel in the use of the FLIGHT OPERATION INSTRUCTION CHART for flight planning purposes.

(a) If the flight plan calls for a continuous flight where the desired cruising power and air speed are reasonably constant after take-off and climb to 5,000 feet, the fuel required and flight time may be computed as a "single section flight".

(1) Within the limits of the airplane, the fuel required and flying time for a given mission depends largely upon the speed desired. With all other factors remaining equal in the airplane) speed is obtained at a sacrifice of range) and range is obtained at a sacrifice of speed. The speed is usually determined after considering the urgency of the flight plotted against the range required. The time of take-off is adjusted so as to have the flight arrive at its destination at the predetermined time.

Fuel should be used in the following sequence:

I. Reserve tanks for first 15 minutes.

2. External tanks

3. Outer wing tanks (if installed).

4. Main tanks

5. Reserve tanks.

(2) Select the FLIGHT OPERATION INSTP~CTION CHART corresponding to the weight and external load items of the airplane. Locate the largest figure entered under gph (gallons per hour) in column 1 on the lower half of the chart. Multiply this figure by the number and/or fraction of hours desired for reserve fuel. Add the resulting figure to the number or gallons set forth in footnote No. 2., arid subtract the total from the amount of fuel in the airplane prior to starting the engines. The figure obtained as a result of this computation will represent the amount qf gasoline available and applicable for flight planning purposes on the "Range ii. Air Miles" section of the flight

OPERATION INSTRUCTION CHART

(3) Select a figure in the fuel column equal to, or the next entry less than, the available amount of fuel in the airplane as determined in paragraph 2,a, (2) above. Move horizontally to the right or left and select a figure equal to, or the next entry greater than the air miles (with no wind) to be flown. Operating values contained in the column number in which this figure appears, represents the highest cruising speed possible at the range desired; however, the airplane may be operated in accordance with values contained under OPERATING DATA in any column of a higher number with the flight plan being completed at a sacrifice of speed but at an increase in fuel economy.

(4) Using the same column number selected by application of instruction contained in the preceding paragraphs, read the gallons per hour given at the altitude to be flown and divide this figure into the number of gallons available for cruising as determined in paragraph (2) above. This will give the calculated flight duration in hours, which can then be converted into hours and minutes and deducted from the desired arrival time at destination in order to obtain the take-off time (without consideration for wind). To allow for wind, determine the calculated ground speed by dividing the flight duration iii hours into the range selected in paragraph (3) and calculate a new corrected ground speed with the aid of a navigator's triangle of velocities.

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(5) The airplane and engine Operating values listed below "Operating Data" in any column except are calculated to give constant miles per gallon at any altitude listed. Therefore, the airplane may be operated at any altitude and at the corresponding set of values given so long as they are in the same column listing the range desired.

CAUTION:

Ranges listed in column 1 under "mas. Cont. Power" are correct only at sea level and 12,000 feet.

(6) The flight plan may be readily changed at any time enroute, and the chart will show the balance of range at various cruising powers by following the "Instructions for Using Chart" printed on each page.

(7) In using the FLIGHT OPERATION INSTRUCTION CHARTS set the propeller control to give the desired rpm and open the throttle to give the desired indicated air speed. Use the manifold pressure only as an approximately value for reference.

(b) If the original flight plan calls for a mission requiring changes in power, speed, or gross load, in accordance with "GR.WT," increments shown in the series of "FLIGHT OPERATION INSTRUCTION CHARTS" provided, the total flight should be broken down into a series of individual short flights, each computed as outlined in paragraph a, in its entirety and then added together to make up the total flight and its requirements.

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PILOT OPERATING INSTRUCTIONS (Page 16 of 16 pages)

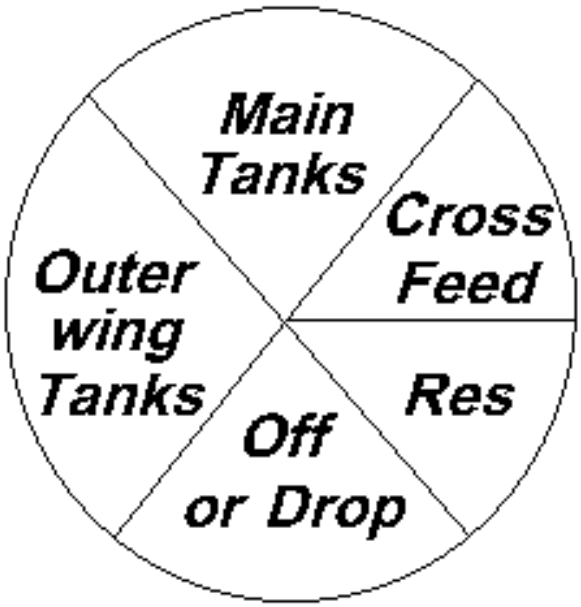
1. Name engine type and horsepower?
   Allison 1710 - 111 R.H. Rotation)
   1450 H.P.
   1710 - 113 L.H. Rotation)
2. Maximum RPM and boost for take-off?

   3,000 RPM 54" boost

3. What are the relative positions of the fuel selector switches?

   Left is the forward switch - right is the rear

4. Draw fuel selector switch and mark pointer position for each tank?



Stan Wood comments: The top of the selector switch is MAIN TANK. The bottom quadrant is OFF or DROP TANKS. The left quadrant is OUTER WING TANKS. The right top quadrant is CROSS FEED and the right bottom quadrant is RESERVE.

5. Explain the reason for the red knob beside the aircraft levers and describe how it is used?

   Solenoid for emergency raising of u/c or if selector fails to move then roll red knob counter clockwise at same time apply selector.

6. Explain the steps for the emergency lowering of the undercarriage?

   1. Aileron boosters off.

   2. Break doors on main system if possible.

   3. Move source selector to down position and pump wheels down.

7. Has the P.38 an emergency method for lowering flaps?

   No emergency system for flaps (some flap may be acquired by selecting back to main system and pumping).

8. What are desired operating ranges of oil temperature oil pressure, fuel pressure, glycol temperature?

   Oil temperature (75-90) min. 40

   Oil pressure (60-70 mm. 55 (idling 15)

   Fuel pressure (16-18 mm. 12 (idling 9) 24 - 25 on emergency

   Glycol temp. (100-120) desired

9. What are the positions of the electric pitch switches in relation to one another?

   Left switch is rear and right switch is forward

10. What two.positions can these switches be put in?

    Automatic and manual toggling

11. What position are they in normally?

    Automatic constant speed

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