OPERATION DOCUMENT
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N123AX
Piper SARATOGA II HP (PA-32R-301)
HANDLING NOTES

1. ENGINE OPERATIONS
Recommended starting procedures and checklists are supplied in the aeroplane
Note: Oil capacity is 12 qts. Minimum for flight is 10 qts.

MIXTURE CONTROL
The primary instrument to check for correct fuel mixture is the **EGT Gauge.**
The fuel flow indicator is used as a cross check of the **EGT** and for any indication of fuel Pressure variations. As it is only a pressure gauge, the fuel flow indicator cannot be used for accurate fuel flow indication.

ON CLIMB
The mixture may be leaned to 6 divisions (ISO degrees) richer than peak on the EGT.
It is not recommended that the mixture be leaned to establish the peak during climb. However, if you monitor the EGT after you reduce to climb power (25/25) after take-off, the reading approximates 6 divisions richer than peak. You may then lean progressively to maintain this EGT reading during a prolonged climb.

ON CRUISE
The mixture should be leaned to 2 divisions (50 degrees) richer than peak on the EGT.

ON DESCENT
The mixture should be richened progressively to maintain 2 divisions (50 degrees) richer than peak on the EGT.

PRE.LANDING
The mixture should be full rich before landing, in case of a go-round.

2. FUEL SYSTEM AND MANAGEMENT
The total useable capacity is **386 litres (102 US gal.),** or **193 litres each side (51 US gal.).** The Piper Saratoga SP has two interconnected fuel cells in each wing with a filler cap over each outboard cell. There are two fuel pumps, one engine driven and the other electric. The pilot controls the electric pump. The electric "boost" pump should always be used for take-off, for landing when changing tanks, and when in-flight fuel supply problems are suspected.

There is a fuel gauge in each wing over the inboard tank for the purpose of indicating fuel quantities from **5 to 35 US Gals**. during ground checking.
There are three drain points in the fuel system, one in each inboard wing tank and one in the fuel strainer located under the fuselage in the vicinity of the wing spar. Depressing a lever located behind the co-pilot’s seat drains the strainer sump. The fuel tank selector should be cycled for about two seconds in each position (left- off- right) during draining.

The drained fuel should be collected for inspection.
The Saratoga cannot draw fuel from both tanks simultaneously. It is therefore good practice to ensure that fuel can be drawn from both tanks before either runs dry. A good method is to **start, taxi and climb on one tank**, then change tanks **at top of climb**. If the second tank does not supply fuel, change back to the first tank and return to the departure airport.

Fuel - On fullest tank.

3. FLYING OPERATIONS

TAKE-OFF
Set the Mixture **rich**. Propeller **full fine,** Fuel pump **on**, flaps **up.**
Open the throttle slowly In full power (approx 2700 rpm). Check oil and fuel pressure. Backpressure should be applied to achieve a positive rotation at 75 - 80 kts. Allow the airspeed to increase then retract landing gear when the aircraft has a positive rate of climb
(The maximum gear retraction speed is 110 kts)

CLIMB
Reduce the throttle then set the propeller to climb power. (25/25)
(25"manifold pressure 2500rprn) Boost pump off at desired height.(not below 300').
Recommended minimum enroute climb airspeed is 110kts for efficient engine cooling.

CRUISE
The mixture should be leaned to 50 degrees richer than peak on the EGT.
Recommended cruise power setting is: **2400 RPM and maximum 22.2" MAP.**
Turbulence penetration speeds are: Fully loaded - 134 kts. Empty- 105 kts.
Estimate the appropriate speed for your load condition.

DESCENT
Avoid sudden large power reductions, which cause shock cooling of the engine. The mixture should be progressively richened to maintain two divisions (50 degrees) richer than peak. Throttle should be progressively retarded to prevent MP from rising above cruise setting. Start the descent early and try to maintain a **rate of about 200 fpm (5 mins per 1000 Feet).**

LANDING
Try to maintain at least 15" MP during approach.
Mixture rich in case of a go-round,
Landing Gear down. (Maximum gear extension speed is 132 kts)
Gear will automatically extend at about 103 kts. If this happens, select the gear down position

Pre Landing Checks
Brakes - Parking brakes oft
Undercarriage - Down and checked. (Three Green Lights)
Mixture - Full rich
Instruments - Checked
Switches - Checked
Harnesses - Secure

Late Final Checks
Mixture - Full rich
Prop - Full Fine
Three Green Lights

Final approach speed is 80 kts with full flap. Landing should be made on the main wheels first. Maintain backpressure on the yoke to lower the nose wheel gently. Limit the use of brakes to that, which is necessary for safety.

GO-AROUND
Check Propeller **full fine**, apply **full power smoothly** and **retract landing gear.**
When a positive rate of climb has been established gradually remove flap and accelerate to the desired climb speed. Set climb power. (25/25). Boost pump off above 300'.

Best rate of climb speed - Gear down flaps up - 80 kts
Gear up flaps up - 91 kts
Best angle of climb speed - Gear down flaps up 76 kts
Gear up flaps up - 80 kts
Enroute climb - 110kts

AFTER LANDING
Boost pump off. Identify and retract wing flaps after leaving the runway.

4. FUEL CONSUMPTION
A good rule of thumb is to allow 60 litres per hour in cruise plus 15 minutes at 60 litres per hour for each taxi and climb cycle.
Fuel tank selection should be changed at least every hour to maintain balance.

5. WEIGHT AND BALANCE
With full fuel the Saratoga is a four seater. Any greater load than four 77 kg POB requires less than full tanks. Consult the loading charts carefully.
Beware of a C of G condition forward of the loading envelope.

6. LANDING GEAR.
In the event of an **engine failure** the best glide speed is 80 kts. At about 103 kts the landing gear will automatically extend. It is therefore imperative that for optimum glide performance the emergency gear lever is moved to the override engaged position.
In this position the gear **will not** extend unless selected down.

A pitot tube protruding from the left side of the fuselage controls the automatic gear

extender. Any obstruction in this tube will cause the automatic gear extender to operate. ***Don't throw things out the storm window!***

The landing gear in the Saratoga is held in the retracted position by hydraulic pressure. Loss of hydraulic pressure will cause the wheels to fall into the down and locked position. (The nose wheel is spring loaded)
Emergency gear extension simply involves releasing hydraulic pressure.

Normal gear operation requires electrical power. Without it, gear cannot be retracted.

Instrument panel light, when turned on, automatically dim the "3 greens", so that in daylight, they cannot easily be identified. Always ensure that panel lights are off for daytime operation.

7. EMERGENCY LANDING GEAR EXTENSION

If 3 greens do not illuminate do the following:

1. Leave - **Gear selected down.**
2. Check - **Master Switch is on.**
3. Check - **Circuit Breakers are in**.
4. Check - **Panel Lights are off.**
5. Check - **Bulbs in the "three greens" by swapping them around.**
(They pull out easily by hand).

If all of the above are unsuccessful:

6. Check - **Airspeed below 92 kts**
7. Check - **Gear selector is down.**
8. Engage - **Emergency over ride lever.**

If still unsuccessful:

9. Hold the emergency gear lever in "Emergency down" position

If still unsuccessful, as a last resort and at a safe height,

10. Repeat step 9 while fish-tailing the aeroplane with rudder control.

NOTE:
In the event of alternator failure, battery power should be conserved and a landing made without undue delay.

If the battery is flat the landing gear will have to be extended by the emergency method and the gear position indicator lights (Three greens) will therefore not illuminate.

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FINAL NOTE

With the exception of take-off power
At no time should the manifold pressure in inches exceed the rpm in hundreds

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