**PILOT OPERATING HANDBOOK (draft)**

**KOLB FIRESTAR II, Tandem**



Registration No: 19-8829

**Serial No: FSQ5-3-00079**

**BUILT BY STEVE GATES, 2018**

**SPECIFICATIONS**

MAX TAKEOFF WT 330 kg EMPTY WEIGHT 177 kg (incl unusable fuel)

MAX USEFUL LOAD 153 kg

CG LIMITS (DATUM - wing leading edge)

* Most Forward: 311 mm Aft of wing LE
* Most Aft: 544 mm Aft of wing LE

AIRSPEED (indicated)

* Never Exceed, Vne 90 mph
* Maneuvering, Va 75 mph
* Stall, Vs 27 mph (at full forward CG, engine idling)
* Best Glide Ratio, Vg \_\_\_\_
* Best Rate of Climb, Vy \_\_\_\_
* Best Angle of Climb, Vx \_\_\_\_
* Cruise 80 mph (70% power) 5,000 rpm
* Max Demonstrated Crosswind \_\_\_\_

AIRFRAME

* No of Seats 1-2
* Wingspan 27 ft Length 22.5 ft

POWERPLANT/GEARBOX

* Manufacturer, model Rotax 503 DCDI, electric start, oil injection
* Serial No 5766750 T.B.O. 300 hrs
* Power (max rated) 50 hp @ 6,500 rpm
* Fuel grades 91 RON min. automotive, EN Regular-Premium, AVGAS 100LL
* Fuel consumption (@ Fuel density 0.72 Kg/L)

|  |  |  |  |
| --- | --- | --- | --- |
| **Engine power** | **Speed** | **Specific fuel consumption** | **Fuel consumption** |
| % | hp | kW | rpm | g/kWh | L/kWh | L/h |
| 100 | 50 | 37.3 | 6500 | 500 | 0.694 | 25.9 |
| 85 | 42.5 | 31.7 | 5500 | 545 | 0.757 | 24.0 |
| 70 | 35 | 26.1 | 5000 | 600 | 0.833 | 21.8 |
| 50 | 25 | 18.7 | 4700 | 775 | 1.076 | 20.1 |

* Tot fuel capacity 2x5 gal = 37.8 L, Useable fuel \_\_\_\_ L
* Oil grade Super two-stroke oil, Castrol Activ 2T or TTS
* Fuel-oil ratio 50:1 (injected)
* CHT (spark plug seat) Normal 180-220 C (350-430 F) Max 250 C (480 F)
* EGT Normal 460-580 C (860-1,000 F) Max 650 C (1,200 F)
* Engine speeds: Idle 2,000 rpm

Continuous 6,500 rpm

Max 6,800 rpm (do not exceed)

* Gearbox Type ‘B’, 2.58:1 reduction Oil: 85W-140EP

PROPELLER

* Manufacturer Aerofibre/Bolly Model Brolga
* Number of blades 3 Material Composite
* Diameter 62 ins Pitch \_\_\_\_\_\_
* Full throttle static \_\_\_\_ RPM

PERFORMANCE

* Distance to Take-off & climb to 50 ft \_\_\_\_\_
* Distance to Land over 50 ft obstacle to stop \_\_\_\_\_
* Structural Limits +4 G -2G
* Wing loading 5.9 lb/sq ft Power loading 14.5 lb/hp

PARACHUTE

* BRS model VLS800 (800 lb aircraft), min safe deployment 75m AGL

**NORMAL PROCEDURES**

DAILY CHECKS

* **Magnetos – OFF**
* No water or contaminants in fuel/fuel filter
* Fuel vent tube unblocked
* Carb rubber socket & other rubber items for cracks & security
* Carb float chamber for water & dirt
* Air filters secure/lockwired
* Oil injection tank & hoses for leaks
* Ignition coils, wiring, spark plug leads
* Engine mounts & electric starter secure, cooling fan belt tight
* Throttle, Choke & oil pump cables secure & function
* Impulse fuel pump, impulse hose and all fuel tubing secure, not leaking, chafing or kinked
* 12V Batterysecure
* Electric functions – EFIS, electric pump, strobe, 12V aux socket, radio PTT switch & headset
* Seatbelts secure, undamaged
* Documents in aircraft:
	+ Pilot Operating Handbook
	+ Weight & Balance w/equipment list
	+ Repair & Alteration form
	+ Aircraft Logbook & Engine Logbook (available)
* Gearbox drain & level plugs safety wired
* Spark plugs & wires secure
* **VERIFY MAGS OFF** - Rotate/rock prop by hand – check unusual noises & bearings slop
* Propeller undamaged, bolts secure
* Exhaust, springs/lockwires & temp probes secure
* Wing struts pins & bolts secure, safety pins all ends, no cracks or corrosion.
* Wing drag struts bolts secure, no cracks or corrosion.
* Wings & fabric undamaged
* Aileron control linkages secure, free & correct, hinges secure/lockwire
* Elevator control cables secure, free & correct
* Rudder control cables secure, free & correct
* Brakes free, and locking when depressed
* Tail boom tube attachment to aft fuselage – no cracks, kinks or corrosion
* Horizontal stabiliser, fabric & hinges secure/lockwire
* Vertical stabiliser fabric & hinges secure/lockwire
* Empennage guy wires tight & undamaged/corroded. Bolts secure (Bottom w/safety pin).
* Tailwheel, pivot & rudder connection
* Main wheels secure, inflated, brake cables & end fittings secure
* Pitot tube secure & unblocked. Static port (under instrument panel) unblocked.

PREFLIGHT CHECKS

* Weight & Balance
* **Magnetos – OFF**
* Fuel quantity/mixture (premixed and/or injected), contaminants, fuel caps secure
* Oil injection quantity
* Air filters secure/lockwired, remove covers
* Spark plug leads
* Impulse fuel pump, impulse hose and all fuel tubing secure, not leaking, chafing or kinked
* Gearbox leaks
* Propeller undamaged
* Exhaust, springs/lockwires & temp probes secure, remove exhaust plug
* Wing struts pins & bolts secure, safety pins all ends
* Wing drag struts bolts secure
* Wings & fabric undamaged
* Tail boom tube attachment to aft fuselage – no cracks, kinks or corrosion
* Horizontal stabiliser, fabric & hinges secure/lockwire
* Vertical stabiliser fabric & hinges secure/lockwire
* Empennage guy wires tight & undamaged/corroded. Bolts secure (Bottom w/safety pin).
* Tailwheel, pivot & rudder connection
* Pitot tube cover removed & Static port unblocked
* Ballistic parachute safety pin removed
* Wing tie-downs removed and secured

PRE-TAKEOFF CHECKS & ENGINE START

* Flight controls free & correct
* Circuit breakers (panel) **IN**
* Master switch **ON**
* Electric fuel pump **ON**
* Choke **ON**
* Magnetos **ON**
* Throttle **IDLE**
* Brakes **ON**
* **CLEAR PROP** - Engine start then throttle to **LOW**, Choke **OFF**
* Engine warm-up - 2,000 rpm for 2 mins, then 2,500 rpm until normal CHT temp: 180-220C (350-430F)
* EFIS **ON**
* Instruments settings/readings - Altimeter, Compass, GPS, OAT
* Gauges – CHT & EGT normal, Battery charging (Note: If not charging, check circuit breaker red L.E.D. in Electric junction box under rear seat. If lighted, then wait 30 sec for auto re-set)
* Radio/intercom **ON**
* Strobe **ON**
* Magnetos **CHECK** at 3,000 – 3,500 rpm (300 rpm max. allowable drop for either. **WARNING**: If no drop, then magneto grounding or timing may be FAULTY)
* Full throttle response briefly to 6,500 rpm
* Seatbelts **SECURE**

TAKE-OFF & CLIMB

* Brakes **OFF**
* Throttle **FULL 6,500 rpm** (to avoid lean mixture),
* Liftoff 40 mph (TBC)
* Climb 50 mph (TBC)

Note: Any exceedance of engine speed, CHT or EGT - enter in logbook value and duration

IN-FLIGHT & DESCENT

* Do not exceed max rpm
* Avoid lean condition with high rpm and low throttle opening, causing high temps.
* Electric fuel pump **OFF**

LANDING

* Seat belts **SECURE**
* Electric fuel pump **ON**
* Approach airspeed 40mph
* Avoid lean condition with high rpm and low throttle opening, causing high temps.
* Brakes **OFF**

SHUTDOWN

* Run engine at 3,000 rpm for 2 mins, then 2,000 rpm short idle
* Electric fuel pump **OFF**
* Choke **ON** momentarily, then Mags **OFF**
* Radio **OFF**
* Engine Hobbs time **RECORD**
* EFIS, Strobe & Master **OFF**
* Ballistic Recovery chute safety pin **INSTALL**
* Pitot cover, fuel vent line cover, carb covers, plug exhaust **INSTALL**

**EMERGENCY PROCEDURES**

ENGINE FAILURES

During Takeoff Roll

* Throttle **IDLE**
* Brakes **APPLY**
* Magnetos **OFF**
* Master **OFF**

After Takeoff

* Airspeed \_\_\_\_ mph (Vg)
* Electric fuel pump **OFF**
* Magnetos **OFF**
* Land STRAIGHT AHEAD
* Master **OFF**

In flight & Engine Restart (may be futile – set up for landing before attempting this)

* Airspeed \_\_\_\_ mph (Vg)
* Prepare for landing
* Choke **ON** (if engine not warm)
* Electric Fuel pump **ON**
* Starter **START**
* Choke **OFF**
* **If restart not successful:**
	+ Fuel pump **OFF**
	+ Magnetos **OFF**
	+ Land OR deploy Ballistic parachute
	+ Master **OFF**

CARBURETTOR ICING

* Reduce throttle and/or throttle up/down to attempt to dislodge ice
* Descend to warmer air

FIRE

On ground:

* Electric Fuel pump **OFF**
* Magnetos **OFF**
* Master **OFF**

In-flight:

* Fuel pump **OFF**
* Magnetos **OFF**??
* Master **OFF**
* Maximise airspeed in glide to attempt to extinguish flames
* Land OR deploy Ballistic parachute (pull red trigger handle in front of joystick)

SPIN RECOVERY (inadvertent)

* Ailerons **NEUTRAL**
* Throttle **IDLE**
* Rudder **FULL OPPOSITE DIRECTION OF SPIN**
* Elevator **DOWN BRISKLY ENOUGH TO BREAK STALL**
* **Hold inputs** until rotation stops
* Recover **NEUTRALISE RUDDER, ELEVATOR UP FOR GENTLE RECOVERY**

**ENGINE PRESERVATION**

ENGINE STOPPAGE 1-4 WEEKS

* With warm engine, idle at increased idle speed
* Shut down engine
* Remove air filters & inject approx. 3cc preservation oil or equivalent into each carburetor
* Restart engine and run at increased idle speed for 10-15 seconds
* Shut down engine
* Close all engine openings (exhaust, vent tube, air filters) against moisture and contaminants

ENGINE STOPPAGE 4 WEEKS – 1 YEAR

* With warm engine, idle at increased idle speed
* Remove air filters & inject approx. 6cc preservation oil or equivalent into each carburetor
* Shut down engine
* Remove plugs & inject approx. 6cc preservation oil or equivalent into each cylinder, and slowly turn crankshaft 2-3 turns by hand to lubricate top end parts.
* Lubricate all carburettor linkages
* Close all engine openings (exhaust, vent tube, air filters) against moisture and contaminants
* Spray all external steel parts with engine oil

**TROUBLESHOOTING**

|  |  |
| --- | --- |
| Problem | Check/Remedy |
| Fuel issues | Check fuel supply, fittings, filter, float chamber |
| Ignition issues | Try new plugs |
| Engine runs with mags off | Possibly due to overheating: let engine cool down at idle at approx. 2,000 rpm.Check mags inadvertently grounded (chafed wiring, etc)  |
| Knocking under load | Octane rating of fuel too low: use fuel with higher Octane rating.Fuel starvation/lean mixture: check fuel supply |
| Other | Recommend Rotax assistance: Bert Flood Imports, Lilydale, VIC. Ph: 03 9735-5655 |