MOTORFALKE SF25B

FLIGHT MANUAL

Certified translation of German Flight Manual – Bravet 555

Contents

SPORTAVIA PUTZER

5377 Dahlem – Schmidtheim

Dahlemer Binz Aerodrome

Tel: 024447-2777278

Telex 83 36 02

This Flight Manual has been translated from the original factory manual and is to be used as a guide only and will not be used as the approved flight manual. The original manual is to be kept on-board during flight.

The translator an editor accept no responsibility or liability for the contents of this manual.

SF25B Falke

Serial Number

It is the responsibility of the motorglider pilot or operator that all operating instructions are strictly adhered to, as well as the incorporation of any subsequent revisions issued by the manufacturer or commissioner

1. Performance Specifications and Limitations

1.1 Power Plant

Engine Capacity	1500cc
Maximum rated engine speed	3500 rpm
Take-off RPM (5 min max)	3200 rpm/45hp
Maximum continuous rpm.	3100 rpm/42hp

1.2 Fuel

Avgas	80/87 or 91/96
Gas station premium fuel (optional)	97
Total fuel capacity	32 ltr

1.3 Oil

Summer	SAE40 Valvoline HD 20/40BN
Winter	SAE20 Shell Rotel Esso Extra HD BP Energol HD

Oil capacity	2.5 ltr
Minimum capacity for all operations	1.5 ltr
Oil pressure range	1 – 4 bar
Minimum oil pressure	0.5 bar
Oil Temperature:	
Minimum value before take-off	45C
In icing conditions	70C
Maximum value for all operations	115C

1.4 Propeller

A choice of any three of the following tight 2-blade wooden propellers are compatible:

HOCOF-H2/P11-150 65 7,8L
HOCOF-H2/P11-150 70 7,8L
HO 111 – 150 B 70

1.5 Engine Indications

Tachometer Normal operating range (Green Arc) Caution range (Yellow Arc) Maximum operating speed (Red Arc)	 800 – 3100 rpm 3100 – 3500 rpm 3500 rpm
Oil Pressure Indicator Normal operating range (Green Arc) Maximum oil pressure (Red Line)	 1 – 4 bar 4 bar
Oil temperature Indicator Normal operating range (Green Arc) Minimum value (Red Line) Maximum temperature (Red Line)	 45C – 115C 45C 115C

1.6 Airspeeds

Never exceed speed (Vne)	190 km/h
Maximum manoeuvring speed (Va)	150 km/h
Maximum speed with spoilers extended	190 km/h
Maximum speed for air start	100 km/h
Airspeed Indications Red Line Yellow Line (Caution range) Green Line (Normal operations range)	 190 km/h 150-190 km/h 70 – 190 km/h

1.7 Break Threshold of the Winch Cable

Winch Launch	Max. 500kg

1.8 Airworthiness Rating (N after *AAAM1)

Aero –towing possible if bracket installed. Simple aerobatic manoeuvres such as spinning, loops, lazy eights and chandelles are permissible as long as no negative loads (G's) are pulled. Certain high load figures are not permitted.

1.9 Weights

Empty weight	345 kg
Payload	195 kg
Gross weight	540 kg
Gross weight of non load-bearing parts	395 kg

*AAM – Airworthiness Advancements for Motor gliders.

1.10 Balance, Centre of Gravity in Flight

Reference datum	(RD) 2,00m before wing leading edge at rib 0 (0,52m along the plane of symmetry)
Centre of Gravity	Located at wing chord rib 6 (2,20m along the horizontal plane of symmetry)
Maximum forward C.o.G.	2,188m behind (RD)
Maximum aft C.o.G.	2,379m behind (RD)

1.11 Signs and Markings

Besides the fire warning signs and the data signs, the following signs are displayed:

1. On the inner left-side wall above the spoiler lever:

"Spoilers activated through full application of brakes"

2. On the left side wall at the height of the trim wheel"

"Nose – down – Trim – Nose-up"

3. On the instrument panel by the individual levers"

"Air – Pull – Closed"

"Ignition – On – Off"

4. Fuel selector cock

"Closed – Open"

5. Next to the emergency canopy release handle:

"Pull front and top handle. Push canopy away to right"

6. On the fuselage, next to the fuel cap:

"32ltr AvGas 80/70 or 91/96 MoGas (optional)

7. Tyre pressure above main wheel: ***"2,1 bar"***

   Tyre pressure above tail wheel : ***"2.5 bar"***

Operating Instructions

1.12 General

The FALKE is a self-launching motor glider.

Any one of the following ratings is required to pilot the FALKE:

- Standard motor gliders licence
- Private Pilots Licence (PPL) with a rating for motor gliders
- Glider licence KI,II with a conversion rating for motor gliders

1.13 Prior Knowledge

A prior understanding and knowledge of engine and aircraft before flying the FALKE is essential. It is advised that the operating instructions be studied and you become familiarized with all aspects pertaining to the engine and aircraft.

1.14 Airworthiness Test

An airworthiness test concerning the airframe and power-plant is required prior to undertaking the initial flight and after each engine overhaul. The following aspects should be given special attention:

- Airframe workmanship, fitting and safety of the main bolt.
- Safety of aileron connection hinges on the trailing edges.
- Connection of brake pads.
- Fastening of the tray table on both sides beneath the cross beam.
- Proper fitting and condition of the outrigger wheels on both wings.
- Connection and operation of both aileron deflection rods on the wing tips.
- Security and tightness of the front locking nut on the horizontal stabilizer.
- Safety of the elevator connection hinges on the horizontal stabilizer.
- The trimming installation on the rudder.

- Control manoeuvrability: Freedom of movement and angle of deflection of each control surface. Each rudder pedal must be capable of being fully deflected from the pilot’s seat.
- Elevator – moves in the correct sense. Test rudder fittings and side hinges to ensure flight stability and safety of operations.
- Tyre pressure on the main wheel, tail wheel and outrigger wheels.

1.15 Power-Plant

Refer also to engine manual.

- Monitoring of fuel tank contents
- Oil level control i.e. fill to top line
- Cowling – Remove top section and ensure that all hinges and fastenings are secure and control cables are in order.
- Cowling – Replace top section and ensure tight and secure fitting and proper positioning. Observe all DZUS regulations.

1.15.1 Starting the Engine

Refer also to engine manual.

As a safety precaution when starting, a designated person should stand to the left and in front of the engine and observe that the propeller area is free from obstruction.

In the event of a propeller related accident, a declaration of all details and persons involved, including witnesses, must be made to the appropriate authorities.

1.15.1.1 Cold Start

- Fuel selector cock open
- Magneto on
- Choke closed
- Throttle a crack open
- Canopy closed
- Park brake on

Before engaging the starter and only once the pilot is certain that the prop area is free from any possible interference, he is to call out loud ***"Prop Clear"*** and engage starter.

- Engage starter

A cold engine may require the starter to be engaged for several strokes before the engine fires and starts running off its own power.

Once the engine is running, set choke to half open ***immediately*** to prevent a rich mixture cut. Even if the engine does not fire after 2-3 rotations, open the choke to assist starting.

If the engine does not fire after 10 – 12 rotations as a result of the throttle being to far opened, it is likely that the engine will become flooded.

Remedy: Disengage starter, open throttle fully, choke open, counter-rotate propeller through 8 – 12 rotations. Then retry starting engine with throttle open but immediately bring throttle back to idle once the engine fires.

1.15.1.2 Warm Start

- Fuel selector cock open
- Magneto on
- Choke open
- Throttle closed
- Canopy closed
- Park brake on
- ***"Prop Clear"***
- Engage starter

1.15.1.3 Hand Start

This is a two man operation which requires one person outside the aircraft to swing the propeller and another competent person at the controls.

Set engine controls as per normal start with he exception that the magneto be switched off accompanied by a call of ***"Mags Off"***.

The person swinging the propeller should position himself at a safe distance from the propeller. Rotate the propeller with 1 or 2 hands through the ignition stroke (A click should be heard as an indication) in such a manner that he is able to immediately distance himself from the propeller should the engine fire. Initially turn the propeller a couple of times with the magneto off. After the person swinging the propeller calls ***"Contact",*** switch the magneto on accompanied by a call of ***"Mags On".*** Swing the propeller as before and be prepared to clear the propeller area immediately the engine fires.

1.15.2 Engine Warm Up

A cold engine must be allowed to run at 1800 – 2000rpm before take-off. If one has a considerable distance to taxi before take-off , the engine may be warmed partly during taxi. Once the engine is warm (45C minimum oil temperature), apply brakes and hold elevator back. Slowly advance the throttle towards full power. Tachometer reading should be 2400 – 2450rpm. Simultaneously monitor oil pressure and temperature while advancing power. Allow engine to run at this setting for 20 – 30 seconds then return to idle.

1.16 Taxiing

With the FALKE it is possible to taxi without assistance due to the outrigger wheels on the wings. Tail-wheel steering is assisted through being coupled to the rudder. A minimum turning radius of 12 – 15m is possible. The aircraft can be brought to an immediate stop with the use of the block brake on the main wheel.

1.17 Take-Off and Climb Out

(Caution!!! Refer to 2.11 – Flight in rain)

Start check complete. Refer to checklist in cockpit.

Take-off distance required: 200 – 250m

1.17.1 Before Take-Off Checks

Controls	**Checked**
Ballast	**Checked**
Straps	**Secured**
Instruments	**Set**
Trim	**Neutral**
Canopy	**Locked**
Brakes	**Checked**
Temperature	**+45C**
Fuel	**Checked and On**
Electrics	**Checked and CB**
Carb Heat	**Off**
Choke	**Open**
Take-Off Clearance	**Obtained**
Strobe	**On**
Transponder	**Activated**

Smoothly advance throttle to full (4 sec). Trim neutral with trim indicator centred. Allow the aircraft to accelerate while keeping the

control stick neutral. Check rpm is registered on tachometer. Rotate at IAS 65 – 70 kmh and lift off at 80 – 85 kmh. Climb-out at 80 – 90 kmh, tachometer 2600rpm.

Continue climb-out straight ahead until 200 – 300m AGL so that a forced landing after take-off remains possible at all times. Power can be slightly reduced after reaching 50 – 80m AGL.

Engine cooling should be considered sooner rather than later especially on hot days before allowing the engine temperature to exceed limit. Oil temperature should be monitored regularly on extended climbs. If the temperature gauge approaches its upper limit, lower the nose attitude to increase speed and airflow to assist engine cooling. Understandably prolonged climbs with full power are limited under extremely hot conditions.

1.18 Level Flight

It is possible to maintain level flight with the engine running between 80kmh – idle power – to full power at 150 – 160kmh and 3200rpm. Cruise flight is possible at 120 -140kmh and 2500 – 3000rpm. (See Engine Manual).

1.19 Landing

Both powered and glide approaches are possible. Approach IAS of 80 – 85 kmh, aim for an overshoot, control glide angle with spoilers. In extreme cases the glide angle can be increased with the assistance of a side-slip although use of spoilers should suffice in most cases. A sink rate of 3 – 3.5 m/s will be established with extended spoilers at an approach speed of 80kmh.

After round out the FALKE will settle on the tail wheel and thereafter on the main wheel at 65 – 70 kmh. The landing run cab be shorted with the use of the block brake and can be achieved in about 100m.

1.20 Switching the engine on and off during flight

Before cutting the engine in flight, cool the engine at low power settings while maintaining level flight i.e. 1 – 2 min. Close the throttle, ignition off, IAS not higher than 70 – 75kmh. While the engine is shutting down, raise the nose to reduce speed to 65 – 70kmh. Advance throttle to full as propeller makes its final rotation. If necessary bring the propeller into the horizontal position by engaging the starter motor momentarily.

Before starting increase speed to at least IAS 80 – 90kmh. Throttle and mixture set as per hot or cold start depending on duration for which

engine was shutdown. Engage the starter. The engine should start running without any difficulties. If the engine has cooled significantly before in-flight restart, fly at a low power setting for a while, (min 45C) before applying full power.

At IAS 130 -150kmh depending on engine temperature, the engine will fire and run after a single application of the starter. Simultaneously open choke and throttle 1/3 open. The height loss is about 150 -180m.

1.21 Power-off Gliding

Recommended speed is 70 – 90kmh. At 70kmh the sink is about 1m/sec. The FALKE is a low wing aircraft. At speeds below 70kmh or less, there is a tendency for the airflow over the wing root section to become turbulent. This increases drag and reduces performance. Therefore when gliding and especially during turns, ensure that the aircraft is flying clean and pulling minimal loads.

1.22 Slow Flying and Stalling

The stalling speed with power as well as without lies at +/- 60kmh. At this speed the airflow begins to break free from the wings trailing edge although the ailerons and rudder still remain effective. Maintaining back pressure beyond this point with a forward C of G will cause a nose down pitching movement. With an aft C of G stalled flight is possible while maintaining full back pressure on the control stick. Ailerons and rudder remain effective.

Releasing the back pressure will quickly restore the aircraft to a normal flying attitude. Wing-drop occur rarely. If a stall is induced with a high power setting and a high nose attitude a stall speed lower than in actual fact is indicated. This is a result of a pitot tube lying within the propellers slipstream. In a banked stall while turning, the FALKE tends to roll out of the turn thereby assisting the recovery to a level flying attitude.

The stalling characteristics of the power-off stall are similar to those of the power-on stall.

1.23 Aerobatics

The FALKE is certified for simple aerobatics. The following aerobatic manoeuvres may be performed: Spinning, Loops, Steep turns, Lazy eights, Chandelles as well as a combination of the above provided no negative loads arise.

Spinning with forward C of G becomes difficult, albeit impossible. With a central or aft C of G the aircraft will roll by pulling back and crossing controls. The rolling motion can be stopped by centralizing controls.

The following entry speeds are recommended for the remaining manoeuvres:

Looping	130 - 140 kmh
Steep Turns	120 -140 kmh
Lazy Eights	100 -120 kmh

The entry speed for power-of looping and steep turns should be somewhat higher i.e. 140 -150 kmh. while 120kmh is adequate for Lazy Eights. Obviously aerobatics may only be performed by persons holding the applicable aerobatic rating.

1.24 Flight in Rain

CAUTION!!!!

The wing of the FALKE has a sail profile and is sensitive to rain. The airflow over the wing is affected by rain thus decreasing the maximum rate of climb.

While the minimum flying speed for a dry wing is 60 – 65kmh, this increases to 75 – 80 kmh for a wet wing. At the same time while maintaining “wing-level” flight with dry wings presents no problem, a wet wing surface may increase the tendency for the aircraft to bank laterally. Therefore in rain it is imperative that the speed be kept above 80kmh during all phases of flight including rotating on take-off only at 80kmh. 100kmh is recommended for climb-out as well as the approach phase. Steep turns and other high load manoeuvres should be avoided.

In the event of the wing being covered in snow and ice, it is vital that any such deposits be removed and the wing be perfectly laminar before take-off. Likewise, this also applies to the rest of the airframe.

1.25 Winch Launch

Winch launch is only possible with the engine switched off and the propeller in the horizontal position. The winch launch can be accomplished without any special techniques. (See Breaking Strain of the Winch Cable – Flight Manual).

1.26 Flight without Out-Rigger Wheels

The FALKE can also be flown without out-rigger wheels. During take-off a second person is required to run alongside the wing while the aircraft is controlled through aileron input. On landing it is possible to bring the aircraft to a near standstill while still maintaining lateral control with ailerons.

Taxiing with engine power is possible if a second person assists alongside the wing. When the aircraft is pushed and manoeuvred by hand along the ground a person is required to walk and assist alongside the rudder.

1.27 Engine Safety

The FALKE's engine has undergone minor technical advancements since its testing phase thereby making it in many ways similar to normal aspirated aircraft engine. It incorporates simple ignition instead of duel ignition thereby making it simpler and more affordable. One must take this factor into consideration when calculating necessary engine out safety measures – safe glide heights, as well as flying in such a manner as to reach a forced landing field should such an emergency arise.

1.28 Attachment of the parachute static-line.

Parachute static-line attachments exist on the structural support bar above the seatback rest as well as to the right of the right seat. On the left seat there is one to the left of the seat back (Yellow markings).

1.29 Emergency Exit Procedures

Pull upper latch and front emergency release knob. Then push canopy out and away to the right.

1.30 Introduction to Flight

Before undertaking one's first flight in the FALKE it is strongly recommended that the aircraft "Flight and Operations Manual" be studied thoroughly. In any case it is recommended that one undertakes a few introductory flights with a competent pilot who is experienced on type before going solo. Several solo flights should be made before carrying passengers. Motor glider pilots with little or no experience of power driven aircraft should make conscious effort to familiarise themselves with the servicing and maintenance procedures of the engine as well as starting procedures.

Performance Figures

1.31 General

The following performance figures are calculated from the PFL design test. These can be achieved by a competent pilot and the aircraft and engine being in good working order.

Maximum Gross Weight	**540kg**
Lift off speed under zero wind	**70kmh**

conditions	
Climb-out Speed	**85kmh**

1.32 Climb performance

Climb performance at sea level at gross weight: ***Rate of Climb – 2m/s.***

1.33 Speeds

Vno	**150kmh**
Max Cont RPM	**3100rpm**
Approach Speed: Vref	**85kmh**
Rotation Speed: Vr	**65kmh**

1.34 Ceiling

Service ceiling (0,5m/s rate of climb)	**4500msl**
Absolute Centre of Gravity Ceiling	**5000msl**
Do not exceed 12000ft without oxygen	

1.35 Range & Endurance in Zero Wind Conditions

Economic cruise	**+/- 360km**	**Endurance**	**+/- 4 hours**
Max continuous power	**+/- 300km**	**Endurance**	**+/- 2.75 hours**

1.36 Gliding Performance without power

Rate of descent at best glide speed (70kmh : 1m/s	**Glide Ratio 1:20**

Mass and Balance

N.B. The pilot is responsible that the aircraft is correctly loaded and within limits.

1.37 Admissible positions of the Centre of Gravity after repairs

Care must be taken that the C of G does not fall outside acceptable limits after installing additional equipment or applying a surface coat etc. If not, then balancing weights are to be introduced. In all the above it is mandatory that a designated inspector updates ansd certifies the mass and balance data of the aircraft.

The following empty weight Centre of Gravity positions apply:

Empty Weight KG	**340**	**350**	**360**	**370**
C of G range (mm)	**2351 - 2433**	**2346-2431**	**2342-2430**	**2330 - 2428**

Reference Datum: (RD) 2,00m before wing leading edge at rib 0.

(0,52m along the plane of symmetry)

Centre of Gravity: Located at wing chord rib 6

(2,20m along the horizontal plane of symmetry)

If these CG limitations are complied with the permissible in-flight limitations in the context of the indicated loading plan are also ensured.

The C of G position has a large effect on the flight characteristics. This is why adherence to the CG limits is vital.

The following CG limits have been determined:

Max. Forward CG	**2.188m behind datum**
Max. Aft CG	**2.379m behind datum**

1.38 Loading Plan

Note: Ensure that the max take-off weight inclusive of fuel and baggage as indicated on the information placard is not exceeded. The weight of fuel with full tanks is approximately 23kg.

Weight in pilot seat (incl. Parachute)	**Max: 180kg combined weight for both seats**
	Min: 60kg

1.39 Minimum Equipment

According to manufacturers specifications the following minimum equipment is mandatory:

1. Airspeed indicator
2. Altimeter
3. Compass
4. Tachometer
5. Oil Temperature gauge
6. Oil Pressure gauge
7. Fuel Tank quantity indicator
8. Four-piece safety harness on both seats
9. Flight manual (to be kept on board during flight)
10. VHF Radio

A Hobbs Meter is standard. If this is not supplied it is recommended that the engine runtime be recorded in the flight folio.

Operations Manual

1 Assembling and Dismantling the Motorglider

If the FALKE is assembled and dismantled regularly, it is worthwhile obtaining fuselage support wheels. With these it is easier to manoeuvre the fuselage in confined spaces as well as short road distances. The attachments for the fuselage support wheels are built into the fuselage frame. When the wings are detached standing struts without wheels can be obtained to support the fuselage.

1.1 Assembly

Before assembling the components all assembly parts are to be cleaned of any dust or surface debris. Bearings and moving parts are to be greased and oiled sufficiently. This practice is especially important after road transport in an open trailer or when assembling the aircraft in an open hangar. It is good practice to set out the airframe parts in an orderly fashion in sequence of assembly and their respective positions relative to the fuselage along the hangar floor, thereby having everything immediately close at hand when assembling the components.

To begin with the left wing is lifted and held by three men; one man on the wing tip and two at the root while a fourth person holds the fuselage, taking care not to damage or displace rudder cables, elevator connection rods and seat belts. Then the aft anchor fitting is aligned and locked with the appropriate fuselage-wing locking bolt. The man holding the wing tip must then be directed forwards until the wing root lies flush with the fuselage. The front wing spar can then be bolted and locked into position. The assembly of the right wing is carried out in the same manner. Caution, however, must be taken to ensure that the fuselage is not tilted to either side but remains perfectly perpendicular to the ground. This is to ensure that the correct dihedral on both sides is obtained. The height of the right wing tip must be adjusted so that both main spars slide into one another. It is recommended that someone climbs into the cockpit for this and directs the two men at the wing tips until the threads of the main spars are perfectly aligned. The main bolt is then inserted and secured with a locking pin. Subsequently, the aileron connection rods are fitted as well as the spoiler push-pull rods. Once this mainframe work has been completed the exterior sheet metal can be fastened onto the under-side of the wing spar.

Next the tail unit is assembled. Beginning with the rudder, the inner fittings are aligned with the protruding latches on the trailing edge of the tail fin. The rudder is secured into position by two tight fitting bolts while holding the rudder in the “fully deflected” position. Next the horizontal tail unit is fitted and locked with a special nut that is secured with a split pin. The control column needs to be connected to the elevator activation rods and securing it with the appropriate locking pin. Finally the trim tab is connected to the trim cable but before fastening ensure that full “nose-down” trim is set on the trimmer in the cockpit.

1.2 Dismantling

Dismantling the FALKE takes place in somewhat the reverse order to assembling it. One conveniently begins with completely disassembling the horizontal tail unit followed by the remaining sections. Prior to removing the main wings caution must be taken to first release the aileron connections as well as undoing the spoiler activation cord. The main bolt holding the wing spars together can be removed with ease if two men support the weight of each wing at the wing tips. The wing can then be removed from the fuselage by firstly gently moving the wing tip backwards until the main fitting is almost free. The wing tip is brought forward and the wing can be pulled out laterally.

1.3 Refuelling and oiling.

Normal motor car “Super” or “AVGAS” (80/87 octane) fuel is acceptable. Refuelling is to take place via a deer leather filter. Pay extra attention to cleanliness!! Cover the fuel tank opening with an umbrella when refuelling in the rain. Do not smoke in the proximity of the fuel tanks or approach the aircraft or fuel bowser with an open flame. The oil level should be checked 1 – 2 hours after extended flights and can be measured with reference to the top line on the dipstick.

1.4 Operation of the brake

The brake operates as a hand brake. The brake is attached to the spoiler extension lever and is automatically activated when moving the lever through to its fully extended position.

1.5 Transporting

When transporting the FALKE on a trailer, the carrying surface should not be shorter than 4,5 m so as to sufficiently support the wings and guard against possible damage when encountering rough terrain. When transporting the FALKE in rain without a waterproof cover ensure that water cannot penetrate into any susceptible openings (spoiler-slats, cockpit etc.). In the event of the wings becoming saturated by rain, allow the wings to dry in a warm space with the trailing edges facing

downwards. When transporting the fully assembled mainframe the elevator control lock should be inserted to ensure that the elevator is not over stressed when encountering uneven terrain.

1.6 Jacking

The FALKE can be temporarily jacked upon its two steps.

1.7 Propeller removal

The propeller can be removed by unscrewing the 6 bolts which hold the propeller flange against the front pressure plate. The propeller flange is secured onto the cone of the propeller shaft by a central nut and may only be taken off by the engine manufacturer. When removing the propeller the spinner is to be removed first and the 6 hexagon bolts should be loosened. The propeller can then be pulled forward off the propeller shaft. When fastening the propeller again the bolts can be tightened with a torque wrench (torque 1.5m.kg). As a simple check for correct tightness the blade tips should not move beyond 1 – 2 mm longitudinally. Unwanted free play can be corrected by adjusting the screws. Subsequently the spinner is fastened on and secured. If the blade surface has been damaged (ground contact, transport damage etc.) it should be sent to the manufacturing firm for assessment. Furthermore, in the event of a “prop strike” the crankshaft may also be damaged which in addition would then warrant an engine inspection.

2 Maintenance

2.1 General Maintenance, Cleaning and Servicing

Regular cleaning and maintenance of the aircraft and particularly the engine is the first prerequisite for ensuring continued service reliability. Maintenance is to be carried out regularly depending on use and weather conditions. The following general rule applies to all nut and bolt fittings. If nuts can only be undone with great difficulty immediately investigate the extent of damage to the thread as wall as possible cause of the stress having been placed on them. In such an event the bolts or screws are to be assed and replaced as necessary.

2.2 Mandatory Maintenance Procedures

2.2.1 Pre-Flight Checks

Special attention is to be given to the motor glider pre-flight checks before the first flight of the day particularly if this occurs just after the aircraft has been assembled. (See Flight Manual)

2.2.2 Propeller Check

The propeller is to be checked for nicks, cracks or any other damage. All nuts must be tightly wound and secured by polyester nuts. The propeller is to be cleaned periodically for insect and grass residue.

2.2.3 Tacho-Counter Hourly Service Indications

The power plant is to have a mandatory periodic inspection (MPI) after completion of the engine hours as indicated in the engine manual. Additionally, the exhaust system is to be checked for any incipient signs of cracks after 25 hours flight time or 100 starts.

Servicing the cylinders is to be carried out after every 25 hours flight time or 100 starts. During all service intervals, components and elements tested during pre-flight inspections should also be thoroughly re-examined i.e. Rudder freedom of movement, condition of airframe, tyre pressure and tread etc. An important step at this stage is to clean and carry out the lubrication of all control surfaces according to the lubrication plan.

Special attention is to be given to the lower section of the rudder since it is easily contaminated by surface debris, the extent to which depends upon the runway surface used for take-off and landings. All rigid and swivel ball-bearings are already internally greased and require no special maintenance. If they become very dirty they can be washed out

and greased with ball-bearing grease or Vaseline. The tension on the rudder cables is produced by the return springs on the pedals. If the spring tension slackens too much the springs should be replaced.

If the aircraft components are stored separately care is to be taken that the surface supports are not too sparsely spaced when components are jacked. Regarding the main wing specifically, a support comes beneath the wing root, a second into the area of rib 15 where the ailerons begin. Adequate ventilation must be insured if the aircraft is stored for any length of time period. When jacking the tail unit it must be insured that the surfaces are supported at a focal point since these could possibly warp or bend with time.

The installation of the instruments is to be checked occasionally, particularly for ageing of the hose lines and damage or loose seals on the connection fittings.

2.2.4 Annual Inspection and Overhaul

As with all gliders and power-driven aircraft, an annual inspection is necessary for the extension of its airworthy licence. The annual overhaul and inspection must be booked timeously with an AMO. The entire airplane must be thoroughly overhauled before it can be certified. Stressed induced wear or damage on the components, as well as surface skin damages, must be repaired. The hinges on the flight control surfaces are customarily replaced by new ones. He entire control system is to be checked for freedom of movement. Additionally the degree of rudder deflection is to be adequate and in equal proportion towards either side. As far as overhaul work of the engine is concerned, refer specifically to the engine manual. Special attention is to be directed towards the lining of the air baffles since cracks can develop as a result of constant vibration.

During mandatory 100 starts or 25 hour service, the gacolater and fuel filters should be cleaned.

2.3 Daily Inspections

These are dedicated to ensuring the FALKE is safe to fly before each flight. After unexpected incidents (accidents during road transport, hard landings on rough surfaces) susceptible sections of the air[plane are to be examined for any signs of damage. Particular attention is to be paid to all vital fittings on which surface cracks have appeared which in some instances could suggest a deeper overstressing.

2.4 Repairs

Larger repairs to the fuselage or spars must be undertaken by the manufacturer or an approved licensed maintenance organisation. Smaller repairs on the wooden components can be undertaken privately after consulting with an aircraft maintenance engineer.

2.5 Undercarriage

The FALKE has a mono-wheel design with a 6.00 – 6 tyre. The hub is lined with ball-bearings and is essentially maintenance free. The main wheel has a tyre pressure of 2.1bar. The tail wheel has a tyre size of 210 X 65 and a tyre pressure of 2.0bar. It also runs on ball-bearings. The outrigger wheels on the wings are 200 X 50 and have a tyre pressure of 2.5bar.

3 Equipment

The required equipment is specified in the flight manual. The complete equipment can be seen on the equipment list which is provided in the logbook with each FALKE.

3.1 Lubrication Plan

Lubrication points as follows:

1	Guide roller for hoist start cable
2	Spoiler hinge
3	Spoiler drive mechanism: 3 joints + 1 pulley
4	Aileron bell crank X 2
5	Rudder control pedals X 4 + cable latch X 2
6	Cowling latch X 3
7	Torsion bar, 2 connection points
8	Brake actuating levers + 2 tie-down rope connections + 2 rudder deflection springs
9	Lower rudder hinges + 2 tie-down rope connections + 2 rudder deflection springs
10	Rudder mounts
	Clean and grease with each assembly
	Take apart and grease at each annual overhaul or so far as possible until each complete overhaul
	Grease and oil all running parts as necessary

4 Measurements and specifications

4.1 Wing – Fuselage – Tail Unit Data

Horizontal wing dihedral	
Horizontal stabilizer	
Vertical profile – crossbeam upper edge	
Plan view	
Rudder deflections	

4.2 Weighing

When determining the centre of gravity the motor glider is to be assembled so that the wing spar is marred horizontally to the fuselage at rib 0 (2,20m along the horizontal plane of symmetry). From this position a second measurement is made to the leading edge of the main wing at rib 0 (0.2m along the horizontal plane of symmetry). Precisely 2.00m before this point (measurement “a”) lies the reference datum (RD) from which all subsequent measurements are made. The measurement X1 and X2 are made to the centre of the front and rear wheel respectively. G1 and G2 are obtained by resting the two wheels on scales from which the respective masses can be weighed.

From the formula: X1 = (G1 x X1) + (G2 x X2) – (Gave X Xav)

G1 + G2 – Gav

We can derive the position of the empty weight centre of gravity to the reference datum (RD).

Weights to be measured in kg. Units.

Distance to be measured in cm. Units

Pilot station: Xpi = 188cm

Fuel station: Xav + 285cm Gav = fuel contents in litres x 0.73

If the tank is empty then the members Gkr x Xkr are omitted from the equation.

The centre of gravity (CG) must be situated between the following for and aft limits:

Empty Weight (Kgs)	C of G range (mm) behind Datum
340	**2351 - 2433**
350	**2346 - 2431**
360	**2342 - 2430**
370	**2330 - 2428**