FLIGHT MANUAL

for the powered sailplane STEMME S 10

Document No.: A40-10-011
Date of Issue: October 1, 1990

Pages identified by "LBA approved" are approved by the Lufthansa-Bundesamt, Federal Republic of Germany. These pages are printed on yellow and red paper. Red colour indicates the emergency procedures.

(Signature)

(Stamp)

17. Juni 1993 (Original date of approval)

Translation and conversion of technical data have been done by best knowledge and judgement. In any case the original version in the German language is authoritative.

Model: STEMME S 10
Type Certification Data Sheet: LBA No. 846 / FAA No. G 58 EU
Serial number: 10-
Registration:

This powered sailplane is to be operated in compliance with information and limitations contained in this manual.
Non-standard equipment or systems with effect to the contents of this manual, if installed, are entered in the table on page 1.
Deviations from the Basic Flight Manual for the Type:

The aircraft specified below is fitted, in accordance with the entries in the list, with equipment or systems installed as an alternative to the equipment of the standard version. Resulting additional text has been included in the Flight Manual under the specified revision numbers; the text passages relating to the standard version have been crossed out. The required modifications to the text are described in further detail in the associated LBA approved Service Bulletins.

The procedure of amending the Manual in the case of installation of alternative equipment is described in Section 9.2.

The licensed inspector certifies by his signature that this Flight Manual complies with the data specified in the following and with the associated aircraft.

<table>
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<tr>
<th>Affected Component</th>
<th>Art. No</th>
<th>SB-Number</th>
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</table>
0.1 Record of Amendments

Any revision of the present manual must be recorded in the following table. Exempted are:

- Updated weighing data (page 39),
- Data relating to the installation of alternative equipment (page 1)
- Data relating to the installation of supplemental or additional equipment (page 51)
- Deletion of inapplicable text passages pursuant to the Service Bulletin A31-10-008.

The list of amendments on this page and the list of effective pages on the next page are assigned to the serial number. The revision no. indicated in the headline of these pages does not change with the entries in the lists.

Revisions of approved sections must be endorsed by the Luftfahrt-Bundesamt, FRG. Information as to which amendments must be included in the present Manual can be seen from the current Record of Airworthiness Directives and Service Bulletins (see Maintenance Manual, Annex B, doc. no. A08-10-000).

The new or amended text will be marked on the revised page by a black vertical line on the right hand margin; and the Amendment Number and the date will be shown on the right hand side in the headline of the page. In text passages concerned by the installation of alternative equipment, the text for both versions is included in [ ]; the text not applicable to the serial number concerned must be crossed out. For further information please refer to Section 9.2.

The inspector certifies by his signature at the same time the correct transfer of the information specific to the serial number (deletion of inapplicable text passages).

<table>
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<th>Am. No.</th>
<th>Affected Sections</th>
<th>removed Pages</th>
<th>included Pages</th>
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* These pages may only be incorporated with the quoted amendment number if the alternative equipment item requiring the amendment is installed in the individual aircraft - please check the entries on page 1 for the corresponding SB - mandatory for U.S. import.
0.2 List of Effective Pages

This record is valid only for the Serial No. specified on the title page.

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0.3 Contents

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<td>Description of the Motor Glider and its Systems and Equipment</td>
<td>7</td>
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<tr>
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<td>8</td>
</tr>
<tr>
<td>Addenda</td>
<td>9</td>
</tr>
</tbody>
</table>
Section 1

1. General Information
   1.1 Introduction
   1.2 Certification
   1.3 Warnings, Cautions and Notes
   1.4 Description and technical Data
   1.5 3-View-Plan
1.1 Introduction

This flight manual was compiled to give pilots and instructors all necessary information for a safe, appropriate and performance-optimized operation of the motor glider.

The manual contains initially all the data that have to be made available to the pilot on the basis of JAR-22. It further contains a number of other data and operating hints which may be useful to the pilot from the manufacturer's point of view.

1.2 Basis for Certification

This motorglider with the works reference STEMME S10 has been approved by the Luftfahrt-Bundesamt in accordance with JAR-22, change 3, including Amendment 22/84/1.

The Type Certificate No. 846 has been issued on 31.12.1990.

Category of Airworthiness: "Utility"


1.3 Warnings, Cautions and Notes

Remarks in the manual of particular importance to flight safety and handling have been specially marked by use of one of the following terms:

"Warning" means that the non-observation of the corresponding procedure leads to an immediate or important degradation of the flight safety.

"Caution" means that the non-observation of the corresponding procedure leads to a minor or to a more or less long-term degradation of the flight safety.

"Note" draws attention on any special item not directly related to safety but which is important or unusual.
1.4 Description and Technical Data

The STEMME S10 is a two-seat high performance motor glider with an innovative propulsion concept and highly finished aerodynamic shape. The seats are arranged side-by-side (forward of the wing) and are equipped with dual controls.

The wing is mounted to the fuselage in the upper third. It consists of an inner wing with flaps and Schempp-Hirth air brakes and two outer wings with continuous ailerons.

The tailplane is designed as a "T"-type.

The two-wheel main undercarriage can be retracted electrically and contains hydraulic brakes.

The engine is mounted in the fuselage in a central steel tubing frame near the aircraft's Centre of Gravity. Engine power is transmitted via a prop shaft made of composites and a reduction gearbox to the jointed propeller in the fuselage nose. The propeller is folded in during soaring flight and covered by the movable nose cone (propeller cone).

One fuel tank is placed in each of the two outer sections of the inner wing.

Technical data:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
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<tr>
<td>wingspan</td>
<td>75.5 ft / 23.00 m</td>
</tr>
<tr>
<td>length of fuselage</td>
<td>27.6 ft / 8.42 m</td>
</tr>
<tr>
<td>height</td>
<td>5.74 ft / 1.75 m</td>
</tr>
<tr>
<td>aspect ratio</td>
<td>28.22</td>
</tr>
<tr>
<td>wing area</td>
<td>201.64 sq ft / 18.74 sq. mtr.</td>
</tr>
<tr>
<td>max. weight</td>
<td>1874 lb / 850 kilograms</td>
</tr>
<tr>
<td>max. wing loading</td>
<td>9.29 lb/sq ft / 45.36 kg/sq m.</td>
</tr>
<tr>
<td>wing profile</td>
<td>HQ 41/14.35</td>
</tr>
<tr>
<td>mean aerodynamic wing chord</td>
<td>2.86 ft / 0.873 m</td>
</tr>
<tr>
<td>engine</td>
<td>Limbach L2400 EB1.D</td>
</tr>
<tr>
<td>propeller</td>
<td>STEMME 10AP-N</td>
</tr>
<tr>
<td>gearbox ratio</td>
<td>i = 1.18</td>
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</table>
1.5 3-View Plan
Section 2

2. Limitations
2.1 Introduction
2.2 Airspeed
2.3 Airspeed Indicator Markings
2.4 Power-Plant
2.5 Power-Plant Markings
2.6 Weight
2.7 Centre of Gravity
2.8 Approved Manoeuvres
2.9 Manoeuvring Load Factors
2.10 Flight Crew
2.11 Kinds of Operation
2.12 Minimum Equipment List
2.13 Fuel
2.14 Other Limitations
2.15 Limitations Placards
2.1 Introduction

This section includes operating limitations, instrument markings and the information signs which are necessary for the safe operation of the motorglider, its engine, standard systems and standard equipment.

The operating limitations included in this section and in section 9 have been approved by the LBA.
2.2 Airspeed

The airspeed limitations and their importance for the use of the aircraft are shown as follows:

<table>
<thead>
<tr>
<th>Speed</th>
<th>(IAS)</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>(V_{NE}) Never exceed speed (maximum permissible airspeed in calm weather)</td>
<td>270 km/h&lt;br&gt;146 knots&lt;br&gt;169 mph</td>
<td>This speed must not be exceeded, and the control movement must not be more than (V_{Sr}).</td>
</tr>
<tr>
<td>(V_{RA}) Maximum airspeed in rough air</td>
<td>160 km/h&lt;br&gt;97 knots&lt;br&gt;112 mph</td>
<td>This speed must not be exceeded in strong turbulence. Strong turbulence is found in lee wave rotors.</td>
</tr>
<tr>
<td>(V_A) Calculated manoeuvring airspeed</td>
<td>160 km/h&lt;br&gt;97 knots&lt;br&gt;112 mph</td>
<td>Above this limit the controls must not be moved fully or abruptly, because the motor glider structure could be over-stressed under certain conditions.</td>
</tr>
<tr>
<td>(V_{PE}) Permissible maximum airspeed for operation of flaps positive position +5 deg., +10 deg. landing position L (+16 deg.)</td>
<td>160 km/h&lt;br&gt;97 knots&lt;br&gt;112 mph&lt;br&gt;140 km/h&lt;br&gt;76 knots&lt;br&gt;87 mph</td>
<td>These airspeeds may not be exceeded in the flap position indicated.</td>
</tr>
<tr>
<td>(V_{LO}) Permissible maximum airspeed for the operation of the undercarriage</td>
<td>160 km/h&lt;br&gt;97 knots&lt;br&gt;112 mph</td>
<td>In airspeeds in excess of this airspeed the undercarriage may not be lowered or raised.</td>
</tr>
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</table>

2.3 Airspeed Indicator Markings

The following table gives the airspeed indicator markings and the meaning of the colours.

<table>
<thead>
<tr>
<th>Marking</th>
<th>(IAS) Value or Range</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>White arc</td>
<td>85 – 180 km/h&lt;br&gt;46 – 97 knots&lt;br&gt;53 – 112 mph</td>
<td>Operating limit for positive flap operation. (Lower limit is speed (V_{LO}) with max. AUW in landing configuration. Upper limit is the maximum airspeed with positive flap position.)</td>
</tr>
<tr>
<td>Green arc</td>
<td>95 – 180 km/h&lt;br&gt;51 – 97 knots&lt;br&gt;59 – 112 mph</td>
<td>Normal operating range. (Lower limit is speed (1.1 V_S), at max. AUW and frontmost CoF position and flaps in neutral position; upper limit is the max. airspeed in rough air).</td>
</tr>
<tr>
<td>Yellow arc</td>
<td>180 – 270 km/h&lt;br&gt;97 – 146 knots&lt;br&gt;112 – 168 mph</td>
<td>During strong turbulence the aircraft must not be operated in this range and manoeuvres must be carried out with caution.</td>
</tr>
<tr>
<td>L</td>
<td>140 km/h&lt;br&gt;76 knots&lt;br&gt;67 mph</td>
<td>Max. permissible airspeed with flaps in landing position</td>
</tr>
<tr>
<td>Red line</td>
<td>270 km/h&lt;br&gt;146 knots&lt;br&gt;158 mph</td>
<td>Max. airspeed for all operating conditions.</td>
</tr>
<tr>
<td>Blue line</td>
<td>115 km/h&lt;br&gt;62 knots&lt;br&gt;71 mph</td>
<td>Best rate of climb (V_v)</td>
</tr>
<tr>
<td>Yellow triangle</td>
<td>110 km/h&lt;br&gt;59 knots&lt;br&gt;68 mph</td>
<td>Approach speed at max. AUW.</td>
</tr>
</tbody>
</table>
2.4 Power-Plant

engine manufacturer: LIMBACH
engine: L.2400 EBI.D
take off power: 92.5 HP / 69 kW
max. permissible take-off RPM 5 min: 3400 rpm
max. permissible permanent RPM: 3000 rpm
max. permissible cylinder head temp.: 482 deg. F / 250 deg. C
max. permissible oil temp.: 248 deg. F / 120 deg. C
oil pressure, minimum: 14.5 psi / 1 bar
max. permissible press.: 101.5 psi / 7 bar

lubricants and all other engine related data: refer to Operating and Maintenance Manual LIMBACH L2400 and series, edition 6/85.

propeller manufacturer: STEMME
propeller: 10 AP-N

2.5 Power-Plant Markings

The following table shows the markings of the engine instruments and the meaning of the colours used.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Red line = lower limit</th>
<th>Green arc = normal oper. range</th>
<th>Yellow arc = warning range</th>
<th>Red line = upper limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rev-Counter* [rpm]</td>
<td>-</td>
<td>1200 - 3000</td>
<td>3000 - 3400</td>
<td>3400</td>
</tr>
<tr>
<td>Oil temperature gauge</td>
<td>-</td>
<td>50 - 120</td>
<td>... 50</td>
<td>120</td>
</tr>
<tr>
<td>Oil temperature gauge</td>
<td>-</td>
<td>122 - 248</td>
<td>... 122</td>
<td>248</td>
</tr>
<tr>
<td>Cyl. head temp. gauge</td>
<td>-</td>
<td>150 - 250</td>
<td>... 150</td>
<td>250</td>
</tr>
<tr>
<td>Cyl. head temp. gauge</td>
<td>-</td>
<td>302 - 482</td>
<td>... 302</td>
<td>482</td>
</tr>
<tr>
<td>Oil pressure gauge [bar]</td>
<td>1</td>
<td>1 - 7</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>Oil pressure gauge [psi]</td>
<td>14.5</td>
<td>14.5 - 101.5</td>
<td>-</td>
<td>101.5</td>
</tr>
</tbody>
</table>

display in [deg. C]
display in [bar]
fuel gauge: "0" white line = empty
red point (beyond fullmark) = electrical system disconnected

* Remark: reading error ± 50 rpm
2.6 Masses (Weights)
maximum permissible take-off weight: 1874 lb. / 850 kg
maximum permissible landing weight: 1874 lb. / 850 kg
maximum mass of all non-lifting parts: 1256.5 lb. / 570 kg
maximum mass in luggage compartment: 48.5 lb. / 22 kg

2.7 Center of Gravity
The limits of the in-flight center of gravity are:
• forward limit: 10 in / 254 mm aft of reference plane
• rear limit: 16.5 in / 420 mm aft of reference plane
In this the reference plane is the vertical reference plane which contains the leading edge of the inner wing at given angle of the longitudinal axis (refer to maintenance manual).

2.8 Approved maneuvers
The motor glider is certificated in the "Utility" category (normal soaring flight).

2.9 Maneuvering Load Factors (Maximum G-loading)
The following maneuvering load factors (g) must not be exceeded:
up to a maneuvering speed of 97 kts / 180 km/h: positive 5.3 g; negative 2.65 g.
up to maximum air speed 146 kts / 270 km/h: positive 4.0 g; negative 1.5 g.

2.10 Flight Crew
The crew of the S10 consists of 2 persons; the lowest crew number is one person.
(For solo operations): When operated solo, the left seat is for the pilot in charge.

2.11 Kinds of Operation
• Flights according to VFR by day.
• Flights in IFR and/or icing conditions are not permitted
• Aerobatics and cloud flying are not permitted.
• For VFR-Night Flights a additional equipment is required within the provisions of the national law. Required base for VFR-Night Flights is the accomplishment of the Stemme SB A31-10-072.

Caution: For GERMANY, night flights are limited to the vicinity of active airfields that are approved for night flight operation (range of glide ratio).
2.12 Minimum Equipment List

1 airspeed indicator
1 altimeter
1 stall warning system
1 magnetic direction indicator
1 tachometer
1 engine elapsed time indicator
1 oil pressure indicator
1 oil temperature indicator
2 fuel quantity indicators
1 cylinder head temperature indicator
2 four-element straps
1 parachute or back-cushion (1.97 in / 50 mm compressed) per pilot
1 Canopy breakage tool

2.13 Fuel

<table>
<thead>
<tr>
<th>Total Capacity of Fuel Tanks (±5%)</th>
<th>2 times 11.9 U.S. gal / 45.0 l</th>
</tr>
</thead>
<tbody>
<tr>
<td>As Special Equipment (±5%)</td>
<td>2 times 15.8 U.S. gal / 60.0 l</td>
</tr>
<tr>
<td>Unusable Fuel Quantity</td>
<td>2 times 0.4 U.S. gal / 1.5 l</td>
</tr>
</tbody>
</table>

Permissible octane rating and fuel types:
- AVGAS 100 LL, aviation fuel
- MOGAS (or car fuel super grade, min. 96 OCT. (RON))

The engine manufacturer recommends that at temperatures in excess of 68 deg. F / 20 deg. C. only AVGAS 100LL/0CT. be used.

When stowing the aircraft for longer than one month it is recommended to drain the tank if MOGAS has been used. MOGAS or car fuel have varying compositions, and it is not known how this might affect the long term service life of the tanks.

2.14 Other Limitations

The only permitted colour for the aircraft exterior painting is white due to the necessity of protecting the structure from high temperatures caused by sunlight (approved up to 129°F). For coloured warning paintings the areas of the propeller dome and the wing tips or optional installed winglets are to be used.

For the glazing of the canopy the use of material of an accepted type is permitted only. The luminous transmittance value of these materials may not be less than 70 per cent and colours may not be falsified. These characteristics may not be reduced by the use of tinted canopies.

The luggage load must not exceed 22 lb. (10 kg) in each of the compartments at the sides of the cabin and 4.4 lb. (2 kg) in the centre compartment. Single pieces weighing more than 1.1 lb. must be fastened securely and must load the bottom of the luggage compartment on a sufficient area.
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Intentionally left blank
Section 3

3 Emergency Procedures

3.1 Introduction

3.2 Emergency Canopy Release

3.3 Emergency Bail out

3.4 Stalled Flight Recovery

3.5 Spin Recovery

3.6 Spiral Dive Recovery

3.7 Loss of Engine Power (Carburettor Icing)

3.8 Fire

   a) on the ground
   b) during take-off
   c) during flight

3.9 Other Emergencies
3.1 Introduction

This section contains a checklist and a description of the recommended procedures in emergencies.

3.2 Emergency Release of Canopy

- canopy lock - open left and right levers
- pull red emergency canopy release knob (centre of instrument console)
- The canopy will be pushed upwards by a gas spring. If necessary - push manually

Warning:

The rear canopy lock must be locked when canopy is jettisoned! It functions such that the canopy is only lifted at the front and is torn away by wind forces.

3.3 Bailing out

- release central lock of straps after canopy jettison
- bail out sideways, if possible pushing away from underneath wing to avoid collision with tail plane.

3.4 Stalled Flight Recovery

- move stick forward
- level the wings with ailerons and rudder

3.5 Spin Recovery

- apply rudder opposite to the turn
- move stick forward until turning stops
- centralise rudder
- pull out of dive

Note:

With a rear CofG position the spinning is accompanied by pitching movements.

3.6 Spiral Dive Recovery

- stop the rotation with aileron and rudder together
- pull out of dive (observe airspeed)
3.7 Engine failure

- check fuel contents
- when using right hand tank: is electrical fuel pump switched ON and the right hand fuel cock OPEN?
- Operate the switch "Backup Fuel Pumps" on the right face of the instrument panel.
- carburetor icing: has as yet not been observed as cause for loss of engine power.

Caution: When re-starting engine in flight: Propeller may turn despite non-running engine because both are separated by the centrifugal clutch. Check the rev-counter for indicated engine revolutions.

3.8 Fire

- during flight: close both fuel cocks. Main switch off. Wide-open throttle to empty fuel lines. Immediately prepare for outlanding. Descend with airbrakes fully deployed.
- on the ground: close both fuel cocks.
- on take-off: close both fuel cocks. Abort take-off.

3.9 Other Emergencies

Undercarriage Malfunction and Emergency Deployment:
The undercarriage down condition is confirmed by "GREEN" of the undercarriage indicators. If this is not the case:

- check fuse (next to switch) and press in if necessary. If this is not successful:
- lower undercarriage mechanically. For this purpose two levers are found on the cockpit wall between the pilot's heads.

Caution: For an unimpeded emergency lowering the following sequence has to be adhered to strictly!

- Main landing gear lever in "Neutral" position
- pull lever with no. 1 (right hand in direction of flight) forcefully; wait for locking kick - right undercarriage leg is lowered.
- pull lever with no. 2 (left hand in direction of flight) forcefully; wait for locking kick - left undercarriage leg is lowered.
- The lowered condition is to be confirmed by observers on the ground.

Caution: A retraction of the landing gear is not possible after an emergency deployment.

Repair of defect: see maintenance manual.

Information with regard to cause: During movement of the undercarriage the appropriate control light flashes "RED" - one light allocated to each undercarriage leg (left and right).

Breakdown of Electrical System:

Main switch OFF. Land immediately on the nearest airfield. Reduce the engine power to a minimum. Lower the undercarriage by emergency landing gear operation.
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- when using right hand tank: is electrical fuel pump switched ON and the right hand fuel cock OPEN?
- Operate the switch "Backup Fuel Pumps" on the right face of the instrument panel.
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Section 4

4 Normal Operating Procedures

4.1 Introduction

4.2 Rigging and De-rigging

4.3 Daily Inspection

4.4 Pre-flight Inspection

4.5 Normal Operating Procedures and Recommended Airspeeds

4.5.1 Procedure to Start Engine, Warming-up and Remarks for Taxiing

4.5.2 Take-off and Climbing Flight

4.5.3 Cruising / Cross-country Flight (including procedures for the shutting down and re-starting of the engine in flight)

4.5.4 Approach

4.5.5 Landing

4.5.6 Flight at High Altitude

4.5.7 Flight in Rain

4.5.8 Aerobatics
4.1 Introduction

This section provides a checklist as well as a description of the normal operating procedures. Normal operating procedures in connection with additional equipment are described in section 9.

4.2 Rigging and De-rigging

- Clean and grease all bolts and bushings as well as the control connections.
- Place fuselage on lowered undercarriage. Examine locking of folding struts of the undercarriage legs. Put flap lever in position "L".
- Remove side cowlings and the cover between the wings.
- Rest inner wing on the fuselage. Take care not to jam fuel lines and connecting cables.
- Insert wing pins with operating lever (on-board tools) against the stop in the bushings of the inner wing and secure.
- Connect the control rods for flaps, ailerons and air brakes on both sides by means of the locking pin being fastened unloosable to the respective rod, secure with the spring pin against unintentional opening.
- Connect wing tank quick connectors to the fuselage mounted fuel lines. To guarantee good sealing, the connecting elements must be clean.
- Insert plug for the electrical connector of the fuel sender unit into the bushing in the wing root rib; lock bayonet connector.
- Push left wing into the spar pocket of the inner wing leaving 5 cm unengaged.
- Connect aileron push rods and secure the push wedge of the quick connector with a spring pin through the control pinhole. If position lights are fitted, plug in connectors.
- Push outer wing in further and observe the engagement of the wing pin in the bushings of the inner wing. When bolts are snugly fitted to the bushings, insert the main bolt in direction of flight using the rigging tool and push until the safety pin is flush with the opening in the main bolt. Extract the rigging tool. The safety pin, which is sticking out on the upper side of the wing will then insert itself under spring load and fits flush with the upper side of the wing to secure the main bolt of the outer wing.
- Proceed in same manner when rigging right hand outer wing.
- The elevator is provided with an automatic connector. It is pushed from the front on to the fuselage centering bolts until the front fitting tongue fits into the receptacle opening. Then unlock the receptacle (rigging tool), push the elevator
downwards into the fitting until the spring bolt is freed. The spring bolt must engage. It must not stick out over the outer contours of the fin. Only then the connection is secure. Additionally the proper fitting of the elevator is to be checked by pushing the front upwards.

- Fit cowlings. Following this, engage the bowden cables for the cooling air intakes.
- Fit pressure sender unit into the opening of the propeller cone, twisting it slightly.

Grease the opening from time to time with a thin coating of vaseline (to seal systems from each other).

**Warning:**

If this sender unit is missing, the air speed indicator will show substantially less below 54 kts / 100 km/h (up to 50%)!
4.3 Daily Inspection

Before commencing flight duties the responsible pilot has to carry out a visual inspection of the S10 in the following order:

Firstly switch off ignition and main switch.

Engine:

- remove cowling
- check oil contents (min: lower mark, max: upper mark); on flights in excess of 8 hours: at least middle position.
- visual inspection of the engine; foreign objects in cooling air intakes?
- Inspection of all fuel lines of engine and wing connection area for leakage. The check shall be performed with fuel pressure. For the test switch ON Master switch (with Ignition switch OFF, landing gear DOWN), electrical fuel pump (RH fuel tank) ON, Check with fuel cocks LH and RH tanks OPEN and CLOSED.
- fit cowling
- examine cooling air flap function by operating the propeller dome (forwards and backwards)
- fuel tank vent opening unobstructed (underside of outer wing connection)?
- visual inspection of fuel contents through filler. cap
- drain fuel system by pressing both drainers in the undercarriage well:
  - remove as much fuel as is necessary to make sure that possible
  - dirt and water has been removed. For this both main cocks must
  - be opened.
- drained fuel is to be collected in a vessel and examined for water and dirt.

Caution: For complete drainage of the tanks the aircraft must be kept level for a few hours before and during the drainage.

Check that drainers close properly again and do not leak. If they leak there is a possibility of dirt in the fuel.

Draining of fuel increases the danger of fire. Make sure before engine start up that immediate fire risk does not exist.

Wing connector area:

- Wing pins secured
- controls connected and safetied ailerons, flaps, air brakes
- controls free of obstructions
- fuel lines and electrics connected
- foreign body inspection

Propeller / Propeller Cone:

- visual inspection of central element and prop blades
- prop blades can be moved freely from inner stop to outer stop (beyond normal operating position)
- prop blades free of damage, protecting strip on prop nose in good condition
- extend blades by hand and examine seat of blades.
Undercarriage:
  • air pressure (main wheels 45 - 48 p.s.i. / 3.1 - 3.3 bar, tailwheel 38 - 44 p.s.i. / 2.6 - 3.0 bar)
  • both undercarriage indicators "GREEN"?
  • inspect mounting of spindles on folding struts
  • examine elements for emergency undercarriage release
  • examine end switches for foreign objects and dirt
  • Brake fluid: Check quantity. Brake fluid reservoir is located in the landing-gear bay, cabin rear wall.

Wing:
  • condition, unobstructed movement and play of aileron, flaps and air brakes.
  • Safetiied outer wings (safety bolt must be flush with wing contours).

Elevator and Rudder:
  • Examine rudder for unobstructed movement and examine elevator for proper rigging.
  • Front arresting bolt (colored red) must be flush with fin leading edge.

Fuselage:
  • Examine for damage.
  • Examine pressure sender units at the front on propeller dome and statics on rear fuselage.

Cockpit:
  • Canopy emergency release locked (arresting bolt in marked position on central canopy mounting?)
  • Clean canopy. Examine for foreign objects.

4.4 Preflight Inspection
  • Has daily inspection been carried out?
  • Examine oil and fuel contents.

Checks before engine start up:
  • rudder pedals and seat back adjusted to pilot size.
  • If available, are parachutes properly donned. Shoulder and lap belts secured.
  • Canopy locked (left, right and top rear).
  • Propeller dome pushed forward and locked.
  • Fuel cocks: left and right wing tank "OPEN"
  • Fuel contents gauges, fuel tank left and fuel tank right: if a fuel gauge is not connected, the indicator will be on the right red marking.
  • control check.
  • Altimeter adjusted.
4.5 Normal Operating Procedures and Recommended Airspeeds

4.5.1 Procedure for Engine Start-up, Warming up and Recommendations for Taxying

Starting Up

- With cold engine Choke "ON"
- Throttle in idling position (pulled)
- Propeller area free of persons and obstacles
- Master switch "ON"
- Engine master switch "ON"
- Electrical fuel pump (right fuel tank) "ON". Pump noise o.k. (clicking with reducing frequency if fuel cock "OPEN")

- Operate starter with switch until propeller blades are folded out and turn regularly. Only then ignition switch "ON".
- As soon as engine fires, release starter switch. If engine has not fired after 10 seconds, repeat operation.

Caution:

Switching on of ignition **before** folding out of propeller blades results in unnecessary loading of the propulsion system

- Adjust engine revolutions to between 1,500 and 2,000 rpm (reduce choke until engine fires smoothly, then choke "OFF")
- Check oil pressure

Warning:

If the lowest required engine oil pressure is not indicated within 10 seconds, stop engine immediately!

- Check extinguishing of alternator charging light

If engine does not fire up after operating the starter five times, there is a possibility of too much petrol in the cylinders.

In this case Choke "OFF". Throttle fully forward and operate starter. When propeller folds out, ignition switch "ON" and operate starter until engine fires. Stop this procedure after 15 seconds the latest, wait one minute and repeat start up attempt.

Should this method be without success, remove the sparking plugs to dry out.

Note:

The construction of the propulsion system does not permit turning over of the engine by hand.

A **warm engine** is to be started without choke and with some throttle.
Warming up and Power Check

- operate wheel brakes and pull elevator back
- check engine fuel pump: electrical fuel pump (right hand tank) "OFF" and right fuel cock "OFF". After 2-3 minutes there should be no drop in engine rpm.
- warm up engine with 1500 - 2000 rpm
- wait for oil temperature to reach 122 deg. F / 50 deg. C
- check revolutions under full throttle (3250 rpm)
- check cylinder head temperatures (switch over) and oil pressure
- electrical fuel pump "ON" and right fuel cock "ON"

Taxying

- observe taxing area
- seating position as well as wing geometry do not allow the crew to observe the outer wing further then the leading edge sweep-back. This blind spot must be considered absolutely during taxing.
- when taxing slowly operate wheel brakes carefully.
- depending on surface conditions and because of the large moment of inertia the function of the tailwheel steering is delayed.
- to avoid damage of the propeller, taxi on surface with lose stones and gravel with low revolution.

4.5.2 Take-off and Climb

Checks before take off

- check engine revolution under full throttle (3250 rpm).
- choke "OFF"
- canopy locked
- trim neutral
- fuel cocks both "OPEN"
- electrical fuel pump "ON"
- check engine control instruments
- flaps pos. + 5 (deg.)
- air brakes locked

Caution: Always check open fuel cocks carefully. When fuel cocks are closed, the engine will run on for about 1 - 3 minutes. Closed fuel cocks may lead to a loss of engine power in the take off phase.

Caution: Because of the special fuel system both fuel tanks must contain a fuel quantity sufficient for take off.

Caution: Before taxiing from taxi-hold position to take off position, pay attention that the parking brake is deactivated (lever is in OFF position respectively parking brake unlocked). The parking brake shall not be used on the runway anymore. To release the parking brake turn rotary handle to OFF position respectively unlock the brake lever, use brake lever simultaneously if required.
Warning: It is urged with emphasis not to take off during rain or with wet wings! (See also Section 4.5.7)

Take-off and Climb

- Line up aircraft with runway. Operate throttle smoothly and not jerkily. Keep elevator back at this stage. If on rough runways pitch oscillations occur, keep the elevator steady in a neutral position. In general no counter-measures should be made.

- Lift tailwheel at about 40 kts / 75 km/h by slight pushing. Lift off at 46 kts / 85 km/h. Gain airspeed in horizontal flight up to 59-62 kts / 110-115 km/h and transition to climbing flight.

- During climb observe the oil temperature and cylinder head temperature. If the limits are reached (248 deg. F and 482 deg. F / 120 deg. C. and 250 deg. C.) reduce the climb rate and climb on with higher airspeed.

- The best rate of climb (\(v_c\)) is at 62 kts (71.5 mph / 115 km/h).

- Retract undercarriage at a safe height. The undercarriage is retracted when both lights are extinguished. During retraction of undercarriage both lights flash “RED”. Check automatic circuit breaker (on left-hand side of landing gear switch), press button if necessary. Main landing gear lever in position “Retract”.

4.5.3 Cruising Flight (including inflight engine stop/start procedures)

Horizontal and Cruising Flight (powered flight)

- recommended cruising RPM 2,000-3,000 rpm

- at 3,000 rpm the resultant cruising speed is 89 kts/165km/h

- Fuel can continue to be drawn from both fuel tanks or either the left or right hand tank. When fuel is taken from both tanks it is to be noted that the fuel is not drawn evenly. When switching over to the left hand fuel tank the fuel pump should be switched off, because this tank is serviced by the mechanical engine fuel pump. When switching over to the right hand fuel tank, switch on the fuel pump.

Warning: If the electrical fuel pump is not switched on during fuel consumption out of the right hand tank only, the engine will stop immediately.

Change-over of flight conditions (powered or gliding flight)

General:

Because of the special propulsion concept the flight characteristics of the STEMME S10 alter only very minimal when the configuration is changed from powered to gliding flight or vice-versa.

Regardless of the high reliability one should not depend solely on the propulsion system. Principally the aircraft should be flown during gliding flight with the same safety strategy with regard to outlandings as if no propulsion system were available.
Changeover from powered flight to gliding flight

0 reduce air speed appx. 48 kts / 90 km/h
0 ignition "OFF"
0 engine master switch "OFF"
0 pull propeller brake within 1 minute after ignition "OFF" until propeller stops

Warning:

Long windmilling of the propeller will overheat and damage the clutch. While windmilling the airspeed should never exceed 75 kts / 140 km/h.

0 position propeller: after the automatic folding in action of the propeller, pull the positioning lever smoothly but not too fast. The propeller is positioned when lever has been pulled to the stop.

When the positioning lever is pulled too fast the propeller may turn beyond the permissible position. The propeller cone can not then be retracted. In this case repeat positioning operation.

0 pull back and lock propeller cone
0 switch off unused electrical consumers
0 switch avionics to additional battery, if fitted

Caution:

Particularly on long gliding flights it is important to keep only absolutely necessary electrical consumers. When the main battery is exhausted, the undercarriage may not be lowered electrically and an engine re-start is not possible.

Changeover from gliding flight to powered flight

0 airspeed less than 75 kts / 140 km/h
0 open and lock propeller cone
0 master switch "ON"
0 engine master switch "ON"
0 with cold engine choke "ON"
0 throttle in idling position (pulled)
0 open fuel cock
0 when selecting right hand tank, electrical fuel pump "ON"
0 operate starter with switch until propeller blades are extended and turn evenly. Only then ignition switch "ON"

As soon as engine fires, release ignition switch. If engine has not fired after 10 seconds, ignition "OFF" and repeat procedure.

Caution:

After the engine has fired up, check cylinder head temperatures after a time with reference to the power setting. In case the opening of the cooling air ducts fails, there is the danger that the engine will overheat with subsequent failure.
4.5.4 Approach

- The landing approach can be carried out in gliding configuration or with engine idling and both tanks switched on.
- The approach must be set up in such a manner that the runway can be reached without engine power.
- Lower the undercarriage on the downwind leg (takes about 30 seconds) and wait for "GREEN" of the check lights. When the airbrakes are deployed, a horn can be heard and all check lights flash red if the undercarriage has not been lowered.
- Flap position "L" (+16 deg.)
- Approach speed 59 kts / 110 km/h.

**Warning:** Before landing check parking brake lever to be in OFF position respectively brake lever to be unlocked. A landing with parking brake set results in uncontrollable braking and in worst case in a locking of the wheels.

**Caution:** In turbulent conditions and strong wind approach with flap position +10 deg. or +5 deg. to warrant better effectiveness of the ailerons. Increase approach speed by 10%.

**Warning:** In rain increase approach speed by 10 % ! (see chapter 4.5.7).

4.5.5 Landing

- Control glide angle by means of the airbrakes.
- Do not round out too low (high undercarriage). Reduce airspeed in horizontal flight to the minimum flying speed, pull the stick and put down with main undercarriage and tail wheel simultaneously.
- Hold stick pulled after ground contact. Leave airbrakes extended. Operate wheel brakes according to situation. Operate rudder with caution.

After reaching the parking position:

- Parking brake SET (turn lever to ON position and operate brake afterwards) respectively LOCK brake lever
- avionics switch "OFF"
- engine (for cooling down) idle for app. 1 min.
- ignition "OFF"
- electrical fuel pump "OFF"
- engine master switch "OFF"
- master switch "OFF"
- When parking for longer periods on inclined ground use wheel chocks.
4.5.6 Flight at High Altitudes

Because the indicated airspeed (IAS) is dependent on air pressure and therefore subject to the reducing air density found at altitude the maximum airspeed permissible of 146 kts / 270 km/h true airspeed (TAS) is reduced in high altitude flights according to the ICAO standard atmosphere definition as follows:

<table>
<thead>
<tr>
<th>altitude (f / m above sea level)</th>
<th>Vne (IAS kts / km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 9.800 / 3.000</td>
<td>140 / 260</td>
</tr>
<tr>
<td>13.000 / 4.000</td>
<td>129 / 240</td>
</tr>
<tr>
<td>19.600 / 6.000</td>
<td>116 / 215</td>
</tr>
<tr>
<td>26.000 / 8.000</td>
<td>102 / 190</td>
</tr>
<tr>
<td>32.800 / 10.000</td>
<td>89 / 165</td>
</tr>
<tr>
<td>39.300 / 12.000</td>
<td>75 / 140</td>
</tr>
</tbody>
</table>

4.5.7 Flight in Rain

During flight in rain the stalling speed increases by up to 10%. Accordingly the approach speed for landing has to be increased by up to 10%.

The take-off run can increase by up to 50%. A soft surface of the runway will further increase the take off run. The climb rate can be reduced by up to 50%. For these reasons it is strongly advised not to fly with wet wings and/or during rain.

4.5.8 Aerobatics

Aerobatics are not permitted.
Section 5

5 Performance
5.1 Introduction
5.2 LBA-accepted Data
5.2.1 Airspeed Indicator Errors in the Speed Indicator System
5.2.2 Stalling Speeds
5.2.3 Take off Distances
5.3 Additional Information
5.3.1 Performance in Powered Flight
5.3.2 Demonstrated Cross Wind Components
5.3.3 Speed Polars
5.3.4 Noise Levels
5.1 Introduction

This section contains LBA-recognized values concerning indicating errors or the ASI system, stalling speeds and take off run distances, as well as other values and notes which do not require LBA acceptance.

The data in the tables were obtained during test flights with the motor glider and engine in good condition based on average pilot ability.

5.2 LBA-accepted Data

5.2.1 Indicating Errors in the ASI System

\[
V_{IAS} = \text{Indicated Air-Speed: Vom Fahrtmesser angezeigte Fluggeschwindigkeit}
\]

\[
V_{CAS} = \text{Calibrated Air-Speed: Geeichte Flughgeschwindigkeit}
\]
5.2.2 Stalling Speeds

The stalling speeds of the S10 are dependent on its present configuration: engine "ON/OFF", engine revolutions, flap position, undercarriage "UP/DOWN", total all-up weight - therefore a variety of factors which can be combined.

With flap positions 0 deg. or positive and with 1874 lb / 850 kg AUW the stalling speeds are found in between the following marker values (in IAS):

42 kts when landing approach in gliding configuration
(77 km/h)
- engine switched off (gliding)
- flap in position "L"
- undercarriage lowered
- air brakes deployed

47 kts when landing approach with running engine
(87 km/h)
- engine idling
- flap position 0 deg.
- air brakes deployed
- undercarriage lowered

Caution:

The S10 is equipped with an acoustic stall warning system which operates only during powered flight. During gliding flight the stall is indicated by aerodynamic characteristics of the aircraft.

Warning:

If the electrical voltage falls below 11.5 V, through a battery charging defect, the stall warning will not work correctly. In this case the airspeed must be monitored and the flight terminated immediately.
5.2.3 Take off Runs

Take off runs and take off distance (dry, flat grass surface)

<table>
<thead>
<tr>
<th>Pressure altitude above sea level (ft)</th>
<th>Temperature (deg F) (deg C)</th>
<th>Take off run (ft)</th>
<th>Take off distance to 50 ft/15 m altitude (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0 0</td>
<td>630 192</td>
<td>1109 338</td>
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<td></td>
<td>32 -15</td>
<td>735 224</td>
<td>1223 394</td>
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<td>59 15</td>
<td>850 259</td>
<td>1456 456</td>
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<td>86 30</td>
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<td>1773 522</td>
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<td></td>
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<td>59 15</td>
<td>1375 418</td>
<td>2214 736</td>
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<tr>
<td></td>
<td>86 30</td>
<td>1570 478</td>
<td>2762 842</td>
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</tbody>
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Take off run and distance (hard, dry surface)

<table>
<thead>
<tr>
<th>Pressure altitude above sea level (ft)</th>
<th>Temperature (deg F) (deg C)</th>
<th>Take off run (ft)</th>
<th>Take off distance to 50 ft/15 m altitude (ft)</th>
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<tr>
<td>0</td>
<td>0 0</td>
<td>555 170</td>
<td>988 301</td>
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<td>59 15</td>
<td>748 228</td>
<td>1329 405</td>
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<td>5 -15</td>
<td>653 199</td>
<td>1150 353</td>
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<td>86 30</td>
<td>1007 307</td>
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<td>5 -15</td>
<td>900 275</td>
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<td>86 30</td>
<td>1385 422</td>
<td>2451 747</td>
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Warning

It is strongly urged not to take off during rain or with wet wings!

See also chapter 4.5.7
5.3 Additional Information (not LBA-approved)

5.3.1 Performance in Powered Flight

Cruising speed 89 kts / 165 km/h at 3.000 rpm with propeller with fixed pitch

climb rate 590 ft/pm / 3.0 m/s at 3400 rpm
fuel consumption 3.3 gal/h / 15 l/h at 3000 rpm
All values at sea level and 59 deg. F / 15 deg. C.

5.3.2 Demonstrated Crosswind Component

Taxying, take off and landing are possible up to a cross wind component of 16 kts / 30 km/h.

5.3.3 Speed Polars
5.3.4 Noise Values

Fly-over noise measurements according to chapter VI of the "Laermenschutzforderungen fuer Luftfahrzeuge (LSL)" (Noise Protection Requirements for Aircraft) dated 1.1.1989, published in the "Bundesanzeiger Jahrgang 41, Nr. 41a dated 28.2.1989" (Federal Gazette, year 41).

Measured noise level: 57.6 dB (A)
Section 6

6 Load Plan and Centre of Gravity
6.1 Introduction
6.2 Weight and Centre of Gravity Table / Permissible Payload
6.1 Introduction

This section shows the range of payload within which the aircraft may be operated safely.

6.2 Weight and Centre of Gravity Table

The following table shows the maximum and minimum payload in the cockpit (crew and baggage) and the permissible "total payload". The difference between the two values is the permissible fuel quantity.

The data of the table are calculated on the basis of the most recent weighing report. The information and diagrams necessary for this are found in the maintenance manual.

This table is only valid for the aircraft with the works number shown on the title page of this handbook.

<table>
<thead>
<tr>
<th>Date of last weighing Inspector</th>
<th>Empty mass</th>
<th>Empty mass CoG aft of reference plane minimal</th>
<th>Payload cockpit (crew and baggage) maximal</th>
<th>Total payload = payload cockpit plus fuel quantity</th>
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<tbody>
<tr>
<td></td>
<td>[kg] [lb]</td>
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</table>

1) With pilot weight (including parachute) between 121.5 and 154.0 lb / 55 and 70 kg the ballast weight of 13.2 lb / 6 kg (supplied by the manufacture) must be fitted in front of the right hand rudder pedal.

2) Is calculated each time during the most recent weighing according to the calculating rule of the maintenance manual. In each case max. pilot mass 396 lb / 180 kg.

3) Not in excess of 242 lb / 110 kg per seat pilot mass (including parachute).
Intentionally left blank
Section 7

7 Description of the Motor Glider and its Systems and Equipment
7.1 Introduction
7.2 Operating Elements
7.3 Instrumentation
7.4 Air Brakes
7.5 Baggage Compartment
7.6 Power-Plant System
7.7 Fuel System
7.8 Electrical System
7.1 Introduction

This section provides description and operation advice of the motorglider and its systems and equipment. Refer to section 9, Supplements, for details of optional systems and equipment.

7.2 Cockpit Controls

Each seat has a control stick and rudder pedals, and a brake and flap lever on the left hand side.

Canopy lock: One operating lever on left and one on right side of the canopy frame, as well as one at rear top (whose function is the retention of the canopy for the first phase of the emergency canopy release).

Emergency canopy jettison: in addition to the side locking levers there is a pull lever in the control segment of the instrument panel.

The brake for the main landing gear brake is operated with the hand lever fitted to the LH control stick. Separate lever/rotary handle for parking brake valve on the floor panel console in front of the LH control stick respectively lock LH brake lever with a pin to set parking brake. The same system for the RH stick is available as an option.

The tail wheel is steered by the rudder pedals.

Trim, throttle and mixture lever are placed on a console between the seats.

The fuel cocks are fitted next to each other on a console between the seat backs.

The operating elements for the propeller are combined in the lower middle area of the instrument panel:

- lever to open and close the propeller cone
- lever to brake the propeller after switching off engine
- lever to position the propeller

Ventilation:

- Cabin: ventilation nozzle in the lower middle area (foot) of the instrument panel.
- Canopy: knob in the control segment of the instrument panel.

7.3 Instrumentation

The instrument panel is divided into three faces:

- in the left face the flight control instruments are fitted: ASI with indicating range of minimum 27 kts / 50 km/h up to 162 kts / 300 km/h, altimeter, magnetic compass and optional equipment.
- the center face is used for navigational instrumentation and further optional equipment.
in the right zone the instruments for engine and on-board electrics are fitted.

7.4 Air Brakes

Double paddle Schempp-Hirth air brakes on the upper surface of the inner wing.

The over-centre-lock for the operating mechanism is found in the fuselage centre section.

7.5 Baggage Compartment

- Lower left and lower right baggage compartment behind seat back: load max. 22 lb / 10 kg. each compartment.
- Upper baggage compartment: payload max. 4.4 lb / 2 kg. No hard items and no loose items exceeding a weight of 1.1 lb / 0.5 kg unless they are secured.

7.6 Power-Plant

The engine is a "Limbach" L2400 EBL.D (4-cylinder boxer, four stroke, single magneto ignition, twin carburettor). Viewed from the engine power take off, the propulsion elements consist of:

- centrifugal clutch with overload protection
- highly elastic clutch, splined sliding joint, propeller shaft, flexible coupling
- one-step high performance belt reduction gearbox
- jointed propeller STEMME 10 AP-N.
1. Retractable propeller
   1.61 diameter in operating position. Extending by centrifugal forces, retracting by readjusting springs; the central body is of aluminium, blades are of fibre composite.

2. Gear
   Fivefold high-performance V-belt, gear reduction: 1.18; quiet operation, fail-safe.

3. Flexible disk
   for compensation of angle errors and angular movements.

4. Drive shaft
   Carbon fibre composite, mass: 2 kg, diameter: 65 mm, length: 1.9 m, first critical bending frequency: > 5,200 RPM.

5. Splined sliding joint
   for compensation of axial movements.

6. Highly elastic clutch
   for damping of torque oscillations and for reducing the torsional proper frequencies.

7. Bivalent centrifugal clutch
   with servo effects. It damps starting shocks which could be critical for the extension of the propeller, protects against overload, and allows a decoupled slow down of the retractive propeller after turning off the engine.

8. Engine
   4 cylinders, 4 phase flat engine, single magneto ignition, cooled by ram air.

7.7 Fuel System

The fuel system consists of two independent fuel tank systems with one container at each outer area of the inner wing, both have a fuel cock, water separator and filter. These have been constructed and fitted in such a way that fuel delivery and pressure are available for the proper working of the engine in all normal operating conditions. The left hand fuel tank is operated by the mechanical engine fuel pump and the right hand tank by the electrical fuel pump.

Each fuel pump can only supply fuel out of the fuel tank it is connected to. When both systems are in operation, the drawing down of fuel is not evenly balanced.

[One backup fuel pump (electrically driven) is located parallel to each of the two main pumps. They are operated with one common switch labelled “Backup Fuel Pump” located on the right face of the instrument panel. The circuit breaker (10 Amp.) is found directly above the switch.]
Diagram of fuel system

filter neck

sender unit

quick release coupling

fuel tank

ventilation

left wing

fine filter

course filter
	right wing

water separator

drainer

bulkhead

mechanical fuel pump on engine

fire protective sleeving

carburettor

electrically driven fuel pumps (I...III)
7.8 Electrical System

The electrical system is supplied by a master battery and a generator. The master battery is placed in the cockpit underneath the right hand control covering.

**Master Switch**: Disconnects all power supply from the main bus bar.

If main electric circuit is lost, the avionics are automatically switched over to the back-up battery (if fitted).

**Lesser Ranking Switches**

- Engine master switch / gliding operations: switches the electrical engine equipment (starter, instruments etc.) on master battery and generator "ON" / "OFF". Suggestion: "OFF" during gliding flight, otherwise current drain.
- switch for the electric engine starter
- ignition switch "ON" / "OFF"
- avionics: switches all electrically operated control and navigation equipment "ON" / "OFF".
- during starter operations, the avionics are switched off (or over to the back up battery if fitted).
- Undercarriage switch:
  - upper position: RETRACT
  - lower position: LOWER
  - center position: circuit disconnected from electrical system.
- ACL (Anti-Collision Lights) only when engine master switch "ON"
- Position lights, only when engine master switch "ON"

**Back-up battery**

mounting position: left hand foot well

use: preferred supply of avionics during gliding flight. With this, unintentional discharging of the master battery during gliding flight is prevented and the charge is secured for engine re-start.

Switching: by switch-over from master to back-up battery with switch labeled "AVIONICS SUPPLY".

Charging: through generator or externally (max. charge voltage 14.7 V.)

All electrical circuits and consumers are protected with circuit breakers (primary circuits of relays with fuses only).
7.8 Electrical System

The electrical system is supplied by a master battery and a generator. The master battery is placed in the cockpit underneath the right hand control covering.

**Master Switch:** Disconnects all power supply from the main bus bar.

If main electric circuit is lost, the avionics are automatically switched over to the back-up battery (if fitted).

**Lesser Ranking Switches**

- Engine master switch / gliding operations: switches the electrical engine equipment (starter, instruments etc.) on master battery and generator "ON" / "OFF". Suggestion: "OFF" during gliding flight, otherwise current drain.
- Switch for the electric engine starter
- Ignition switch "ON" / "OFF"
- Avionics: switches all electrically operated control and navigation equipment "ON" / "OFF".
- During starter operations, the avionics are switched off (or over to the back-up battery if fitted).
- Undercarriage switch:
  - Upper position: retract
  - Lower position: lower
  - Centre position: circuit disconnected from electrical system. This is suggested for cruising flight and parking because no stand-by current is then used.

- ACL (Anti-Collision Lights) only when engine master switch "ON"
- Position lights, only when engine master switch "ON"

**Back-up Battery**

Mounting position: right hand foot well

Use:
- Preferred supply of avionics during gliding flight. With this, unintentional discharging of the master battery during gliding flight is prevented and the charge is secured for engine re-start.

Switching:
- By switch over from master to back-up battery with switch labelled "AVIONICS SUPPLY".

Charging:
- Through generator or externally (max. charge voltage 14.7 V.)

All electrical circuits and consumers are protected with fuses.
Section 8

8 Handling, Servicing and Maintenance
8.1 Introduction
8.2 Service Intervals for the Motor Glider
8.3 Modifications or Repairs to the Motor Glider
8.4 Handling on Ground / Road Transport
8.5 Cleaning and Service
8.1 Introduction

In this section the suggested procedures for the proper handling of the aircraft on the ground as well as servicing are described. Additionally, certain inspection and maintenance regulations are shown, which must be adhered to if the motor glider is to operate with regard to performance and reliability as if new. It is suggested to keep to the lubrication plan whilst observing special preventative service operations in view of particular climatic and operating conditions.

8.2 Service Intervals for the Motor Glider

Engine

see maintenance manual engine: shortest interval 25 h

Propeller and Propulsion System:

see maintenance manual: shortest interval 50 h

8.3 Modifications or Repairs to Motor Glider

see maintenance manual

8.4 Handling on Ground / Road Transport

- tie down: screw in eyelets under inner wing ends and tie down vertically
- pushing backwards: guide on fin and only push on inner wing.
- road transport: see manual for trailer.

8.5 Cleaning and Servicing

It is suggested not to leave the aircraft outside unnecessarily.

Even after a few short weeks the polyester paint can dry out and crack.

The surface and other parts require regular servicing. Detailed suggestions are found in the maintenance manual.
9. Supplements

9.1 Introduction

9.2 Alternative Equipment

9.3 Supplemental and Additional Equipment, List of inserted Supplements
9.1 Introduction

This section contains the appropriate supplements if various optional equipment and systems which are not constituent parts of the standard version are installed in the powered sailplane associated to this Flight Manual. With these supplements, the pilot has available the additional information and instructions required for safe and efficient operation.

The installation of optional equipment is always based on a Service Bulletin. The pertinent supplemental information will be issued in the form of a Flight Manual insert and in the case of a retrofit will be supplied together with the retrofit kit. The insert is to be filed following the cover page of Section 9.3.

For information on amendments or supplements to the Manuals in the case of optional equipment or systems please refer also to the Service Bulletin A31-10-008.

The accomplishment of any SB having an effect on the Flight Manual is to be certified prior to the next flight in the aircraft's log book and in the record of accomplished SBs/ADs by a licensed inspector. This signature also covers a review of the Flight Manual.

9.2 Alternative Equipment

Special attention is to be paid to the case of equipment and systems which are not installed in addition to but as an alternative to the standard version and thus have an influence on the standard text of the Flight Manual (Sections 1 to 8). Here the rule applies that associated instructions and information are added to the corresponding passage of the standard text, with the original text (if any) and the amended text appearing in square brackets each. A reference number following the closed bracket is identical with the current revision number, the letter following the reference number indicates whether the text passage applies to the standard version ("s") or to the alternative version ("a") (example: [...]).

All text passages in brackets which do not correspond to the aircraft's design configuration described on page 1 (standard version, if no entries) must be deleted.

If this procedure cannot or shall not be applied (Section 3/Emergency Procedures and amendments to illustrations), the STEMME Company will keep ready "special versions" of the pages concerned, identified with the corresponding SB number. In the case of an overall revision, all versions of a page will be newly edited; the version applicable to the aircraft concerned is to be inserted.
9.3 Supplemental and Additional Equipment, List of inserted Supplements

Supplemental and additional equipment have no influence on the contents of Sections 1 through 8 of the Flight Manual. They may, however, require additional instructions, which have been inserted in the present Flight Manual following this page and entered in the list below.


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