This motorglider Flight Manual is FAA approved for U.S. registered motorgliders in accordance with the provisions of FAR 14 CFR Section 21.29, and is required by the FAA Type Certification Data Sheet No. G23CE.

Variant: **S6-RT**

Serial number: __________

Type Certificate: **FAA G23CE**

Registration: __________
This motorglider may only be operated in correspondence to the instructions and operating limitations specified in this Flight Manual.

CONTACT

STEMME AG
Flugplatzstraße F2, Nr. 6-7
D-15344 Strausberg

Phone: +49.3341.3612-0
E-mail: info@stemme.de
Web: www.stemme.com

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0.0 Documentation of Revisions

All revisions to this Flight Manual must be documented in the following table. Exceptions to this are:

- current values needed for the determination of the aircraft's center-of-gravity (CG) (chapter 6.3)
- update of the installed equipment list (chapter 6.5)
- updates in the list of supplements (chapter 9.2)

A revision of the Flight Manual is approved on basis of accomplished validation process stating the FAA project number or the revision is countersigned directly by Design Organization DOA EASA.21J.250. In the continuing table only the last approved revision is countersigned.

New or corrected text sections of the revised page(s) will be marked by a vertical line on the outer side of the page. The newest revision number of all revisions on the page is mentioned in the footnote-section of the page, along with the date of the newest revision.

Compliance with the new revisions to the operations manual and the corresponding aircraft is documented by the signature of the correcting person in the table below.

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0.1 List of Effective Pages and Chapters

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<td>8-13</td>
<td>02</td>
<td>26.09.2108</td>
<td></td>
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<tr>
<td>8-14</td>
<td>02</td>
<td>26.09.2108</td>
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</table>

<table>
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<tr>
<th>Page</th>
<th>FAA appr.</th>
<th>Rev.-No.</th>
<th>Date of Issue or Revision</th>
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</thead>
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<td>9-4</td>
<td>00</td>
<td>18.11.2011</td>
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0.2 Table of Contents

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Section 2 – Operating Limitations
Section 3 – Emergency Procedures
Section 4 – Normal Operating Procedures
Section 5 – Flight Performance
Section 6 – Weight and Balance
Section 7 – Description of the Aircraft and its Systems and Equipment
Section 8 – Handling, Servicing and Maintenance
Section 9 – Supplements
Section 1 – General

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1.1 Introduction

This Flight Manual has been created to provide pilots and flight instructors with all information necessary for safe, practical and optimized operations of the aircraft Stemme TSA-M, model “S6-RT” (Retractable Landing Gear).

The Flight Manual contains all information for the pilot required by EASA CS-22. Additionally, it contains further data and details considered by the manufacturer to be useful to the pilot.

The operating instructions for the engine - model ROTAX 914 F2- and for the propeller - model MTV-7-A/170-051 - are available in separate manuals.
1.2 Basis for Certification

The aircraft model STEMME S6-RT is based on the type STEMME TSA-M, which has been type certified (type certificate nr. EASA.A.143) by EASA on November 22, 2008, in Cologne, Germany.

The variant STEMME S6-RT has been certified in correspondence to the “Certification Specifications for Sailplanes and Powered Sailplanes CS-22” of EASA, published as EASA Decision ED 2003/13/RM on November 14, 2003.

Certified category of airworthiness is "Utility".

The noise certification is based on ICAO Annex 16 – Chapter X – propeller-driven aircraft.
1.3 Warnings, Cautions and Notes

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

**Warning**: Implies that non-observation of corresponding procedure leads to immediate or significant degradation of flight safety.

**Caution**: Implies that non-observation of the corresponding procedure leads to a minor – yet possibly long-term – degradation of flight safety.

**Note**: Draws attention to any special item not directly related to safety but which is important or unusual.
### 1.4 Dimensions and Specifications

#### Specifications

<table>
<thead>
<tr>
<th>Section</th>
<th>Design</th>
<th>Front section: carbon fiber composites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuselage Design</td>
<td><strong>Midsection</strong>: steel tube framework with glass fiber composite fairing</td>
<td>Rear section with integrated vertical fin: carbon fiber composites</td>
</tr>
<tr>
<td>Length</td>
<td>27.95 ft / 8.52 m</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>8.04 ft / 2.45 m</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>3.97 ft / 1.21 m</td>
<td></td>
</tr>
<tr>
<td>Wings Design</td>
<td><strong>threepart, Spar</strong>: carbon fiber composites <strong>Shell</strong>: carbon fiber composites sandwich structure</td>
<td></td>
</tr>
<tr>
<td>Span</td>
<td>59.05 ft / 18.00 m</td>
<td></td>
</tr>
<tr>
<td>Wing Area</td>
<td>187.51 ft² / 17.42 m</td>
<td></td>
</tr>
<tr>
<td>Aspect Ratio</td>
<td>18.62</td>
<td></td>
</tr>
<tr>
<td>Dihedral</td>
<td>2°</td>
<td></td>
</tr>
<tr>
<td>Wing Airfoil</td>
<td>DU (changes with wingspan)</td>
<td></td>
</tr>
<tr>
<td>Landing Gear</td>
<td>Retractable tricycle Landing Gear with doors, operated hydraulically, front wheel steering</td>
<td></td>
</tr>
<tr>
<td>Wheel track</td>
<td>6.20 ft / 1.89 m</td>
<td></td>
</tr>
<tr>
<td>Wheel base</td>
<td>6.46 ft / 1.97 m</td>
<td></td>
</tr>
<tr>
<td>Airbrakes Design</td>
<td>Schempp-Hirth-style Airbrakes at outer wing</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>4.905 ft / 1.495 m</td>
<td></td>
</tr>
<tr>
<td>Horizontal Stabilizer Design</td>
<td>Carbon fiber composite bars and sandwich structure</td>
<td></td>
</tr>
<tr>
<td>Stabilizer Span</td>
<td>10.73 ft / 3.20 m</td>
<td></td>
</tr>
<tr>
<td>Stabilizer Area</td>
<td>18.73 ft² / 1.74 m</td>
<td></td>
</tr>
<tr>
<td>Airfoil</td>
<td>DU</td>
<td></td>
</tr>
<tr>
<td>Masses</td>
<td>Max. Takeoff Mass (MTOM)</td>
<td>1984 lb / 900 kg</td>
</tr>
<tr>
<td>Max. Wing Loading</td>
<td>10.6 lb/ft² / 51.66 kg/m²</td>
<td></td>
</tr>
<tr>
<td>Max. Mass of non-lifting Parts</td>
<td>1367 lb / 620 kg</td>
<td></td>
</tr>
<tr>
<td>Acceptable Range of in-flight CG-Location</td>
<td>8.82 in to 16.10 in / 224 mm to 409 mm</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>--------------------------------------</td>
<td></td>
</tr>
</tbody>
</table>

**Engine**

- **Design**: 4-Cylinder 4-Stroke Otto-engine in opposed cylinder design, Turbocharger with electronic Manifold Air Pressure (MAP) control, integrated reduction gear
- **Model**: Rotax 914 F2
- **Max. Takeoff Power**: 113.3 HP / 84.5 kW at 5800 RPM (Takeoff RPM limited to 5600 RPM)
- **Max. Continuous Power**: 98.4 HP / 73.4 kW at 5500 RPM
- **Fuel Consumption at Max. Continuous Power (100%)**: 7.0 US gal/h / 26.6 l/h
- **Fuel Consumption at 75% Power**: 5.4 US gal/h / 20.4 l/h
- **Fuel Consumption at 55% Power**: 3.4 US gal/h / 13.0 l/h
- **Transmission Ratio of Reduction Gear**: i=2.428

**Propeller**

- **Design**: Electrically adjustable 3-Blade Constant Speed Propeller
- **Model**: MTV-7-A/170-051 with Constant Speed Control Unit
- **Diameter**: 5.58 ft / 1.70 m

**Front Drive**

- **Design**: Gear in Magnesium-Casing, mounted elastically on rubber elements
- **Model**: STEMME 050.251
- **Transmission Ratio**: i=1.100

**Fuel Tanks**

- **Design**: Integral tanks located in the forward section of the inner wing
- **Capacity**: 17.2 US gal / 65 l in right-hand inner-wing (optionally 17.2 US gal / 65 l in left-hand inner-wing)
- **Unusable Fuel**: 0.55 US gal / 2.1 l in right-hand wing-tank (optionally 0.3 US gal/ 1 l in left-hand wing-tank)
Illustration 1-1: Aircraft Three View Model STEMME "S6-RT"
1.6 Terminology and Abbreviations

1.6.1 Speeds

IAS  Indicated Airspeed
TAS  True Airspeed
CAS  Calibrated Airspeed, corrected for installation and instrument errors

$V_A$  Maneuvering Speed, no full or sudden deflection of the flight controls is allowed above this speed

$V_C$  Design Cruising Speed, only in calm air

$V_{FE}$  Maximum Flap Extended Speed

$V_H$  Maximum Cruise Speed

$V_{NE}$  Never Exceed Speed

$V_{RA}$  Maximum Speed in Rough Air

$V_{S0}$  Stalling Speed in landing configuration

$V_{S1}$  Stalling Speed in given configuration

$V_X$  Speed for best angle of climb

$V_Y$  Speed for best rate of climb

$V_{LO}$  Maximum Speed for extended Landing Gear respectively for extending the Landing Gear

1.6.2 Meteorological Terminology

ISA  International Standard Atmosphere

Temperature at sea level: 59 °F / 15 °C

Air Pressure at sea level: 29.92 inHg / 1013.25 hPa

Temperature gradient in Troposphere:

-0.36 °F / 100 ft / -0.65 °C / 100 m

OAT  Outside Air Temperature

MSL  Mean Sea Level

QNH  Air Pressure corrected to MSL using ISA

QFE  Air Pressure at Reference Airfield
## 1.6.3 Mass and Balance

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP</td>
<td>Reference Plane, an imaginary vertical plane which forms the origin for all center of gravity calculations.</td>
</tr>
<tr>
<td>MAC</td>
<td>Mean Aerodynamic Chord</td>
</tr>
<tr>
<td>MTOM</td>
<td>Maximum Takeoff Mass</td>
</tr>
<tr>
<td>Empty Mass</td>
<td>Mass of the aircraft including unusable fuel, all operating fluids and max. amount of oil. It does not contain useful load and trip fuel and fuel reserves.</td>
</tr>
<tr>
<td>Center of Gravity</td>
<td>Imaginary point, at which gravity acts on the aircraft.</td>
</tr>
<tr>
<td>Lever</td>
<td>Horizontal distance between the Center of Gravity of a body and the reference plane.</td>
</tr>
<tr>
<td>Moment</td>
<td>Product of Mass and Lever of a body.</td>
</tr>
<tr>
<td>unusable fuel</td>
<td>The quantity of fuel that cannot be safely used in flight.</td>
</tr>
<tr>
<td>Useable fuel</td>
<td>Amount of fuel which is useable for the flight.</td>
</tr>
<tr>
<td>Useful load</td>
<td>Difference between empty mass and the maximum takeoff mass.</td>
</tr>
<tr>
<td>NLP</td>
<td>Non Lifting Parts</td>
</tr>
</tbody>
</table>

## 1.6.4 Abbreviations for Aircraft and Powerplant

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C</td>
<td>Aircraft</td>
</tr>
<tr>
<td>XPDR</td>
<td>Transponder</td>
</tr>
<tr>
<td>MCP</td>
<td>Maximum Continuous Power</td>
</tr>
<tr>
<td>MTOP</td>
<td>Maximum Takeoff Power</td>
</tr>
<tr>
<td>CD</td>
<td>Constant Depression</td>
</tr>
<tr>
<td>TCU</td>
<td>Turbo Control Unit</td>
</tr>
<tr>
<td>CHT</td>
<td>Cylinder Head Temperature</td>
</tr>
<tr>
<td>S/N</td>
<td>Serial Number</td>
</tr>
<tr>
<td>MAP</td>
<td>Manifold Air Pressure</td>
</tr>
<tr>
<td>RLG</td>
<td>Retractable Landing Gear</td>
</tr>
</tbody>
</table>
1.6.5 Miscellaneous

AFM Aircraft Flight Manual
AC Alternating Current
DC Direct Current
RWY Runway
STBY Standby
COM Communication
GFC Glass fiber composites
CFC Carbon fiber composites
VFR Visual Flight Rules
NVFR Night-time Visual Flight Rules
EASA European Aviation Safety Agency
SB Service Bulletin
LBA German Aviation Authority („Luftfahrt-Bundesamt“)
CS Certification Specification/ Constant Speed (Propeller)
MOGAS Regular higher octane car gasoline (Motor Gasoline)
LDG Landing
T/O Takeoff
AVGAS Gasoline for Aircraft (Aviation Gasoline)
# 1.7 Units and Conversion Factors

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Imperial Unit</td>
</tr>
<tr>
<td><strong>Distance</strong></td>
<td></td>
</tr>
<tr>
<td>1 [in]</td>
<td>= 25.4 [mm]</td>
</tr>
<tr>
<td>1 [ft]</td>
<td>= 0.3048 [m]</td>
</tr>
<tr>
<td>1 [NM]</td>
<td>= 1.852 [km]</td>
</tr>
<tr>
<td><strong>Speed</strong></td>
<td></td>
</tr>
<tr>
<td>1 [kts]</td>
<td>= 1.852 [km/h]</td>
</tr>
<tr>
<td>1 [fpm]</td>
<td>= 0.00508 [m/s]</td>
</tr>
<tr>
<td>1 [mph]</td>
<td>= 1.609 [km/h]</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td></td>
</tr>
<tr>
<td>1 [lbs]</td>
<td>= 0.454 [kg]</td>
</tr>
<tr>
<td><strong>Volume</strong></td>
<td></td>
</tr>
<tr>
<td>1 [US gal]</td>
<td>= 3.7854 [l]</td>
</tr>
<tr>
<td>1 [qts]</td>
<td>= 0.9464 [l]</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td></td>
</tr>
<tr>
<td>1 [°F]</td>
<td>= (°F – 32)/1.8 [°C]</td>
</tr>
<tr>
<td><strong>Pressure</strong></td>
<td></td>
</tr>
<tr>
<td>1 [psi]</td>
<td>= 68.95/1000 [bar]</td>
</tr>
<tr>
<td>1 [inHg]</td>
<td>= 33.86 [hPa] = [mbar]</td>
</tr>
<tr>
<td><strong>Revolution Speed</strong></td>
<td></td>
</tr>
<tr>
<td>1 [RPM]</td>
<td>= 1 [RPM]</td>
</tr>
<tr>
<td><strong>Force</strong></td>
<td></td>
</tr>
<tr>
<td>1 [lbf]</td>
<td>= 4.448 [N]</td>
</tr>
</tbody>
</table>
1.8 References

The following list of references mentions documents and manuals which have been used to gain information from aircraft components from other manufacturers.

However, the information and limitations presented in this Flight Manual is deemed binding, which may differ from manufacturer information.

The Operating and Maintenance Manuals of the following manufacturers are part of this Flight Manual. They are not subject to revision of Stemme company, but the revision of Rotax and/or Muehlbauer.

Engine and Engine Instruments:
Manufacturer: BRP-Powertrain GmbH & Co. KG
Welser Strasse 32
A – 4623 Gunskirchen
Austria
Telephone: +43-(0)7246 601-0
Fax: +43-(0)7246 6370
Internet: www.rotax-aircraft-engines.com

Constant-Speed-Propeller:
Manufacturer: mt-Propeller Entwicklung GmbH
Aiport Straubing-Wallmuehle
D – 94348 Atting
Germany
Telephone: +49-(0)9429-9409-0
Fax: +49-(0)9429-8432
Internet: www.mt-propeller.com
# Section 2 – Operating Limitations

## 2.1 Introduction

## 2.2 Airspeeds

## 2.3 Airspeed Indicator Markings

## 2.4 Limitations for Propulsion System and Operating Fluids

### 2.4.1 Engine Limitations

### 2.4.2 Operating Fluids

## 2.5 Engine Instrument Markings

## 2.6 Markings on other Instruments

## 2.7 Masses

## 2.8 Center of Gravity (CG)

## 2.9 Permitted Maneuvers

## 2.10 Maneuver Load Factors

## 2.11 Operating Altitude

## 2.12 Flight Crew

## 2.13 Permitted Modes of Operation

## 2.14 Minimum Equipment

## 2.15 Fuel

## 2.16 Lubricant and Coolant

### 2.16.1 Lubricant

### 2.16.2 Coolant

## 2.17 Additional Limitations

### 2.17.1 Maximum demonstrated Crosswind Component

### 2.17.2 Electronic Equipment

### 2.17.3 Smoking in the aircraft

## 2.18 Placards for Operating Limitations
2.1 Introduction

This section describes the operating limitations, instrument markings and placards. These need to be followed for a safe operation of the aircraft, its engine and its standard equipment.
2.2 Airspeeds

The airspeed limitations and their importance to flight operations are listed below:

<table>
<thead>
<tr>
<th>Speed</th>
<th>(IAS)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>vNE</td>
<td>145 kts / 270 km/h</td>
<td>This speed may NEVER be exceeded. This airspeed decreases with altitude (refer also to chapt. 4.7.7 Flights at High Altitude). When flying at this speed, the flight controls are not allowed to be moved more than 1/3 of their maximum deflection.</td>
</tr>
<tr>
<td>vA / vRA</td>
<td>102 kts / 190 km/h</td>
<td>Above this speed, the flight controls are not allowed to be moved to their maximum deflection. In strong turbulence the pilot may not fly faster than this airspeed. Strong turbulence exists in lee wave rotors, thunderstorms and similar weather conditions.</td>
</tr>
<tr>
<td>vFE</td>
<td>102 kts / 190 km/h</td>
<td>These speeds must not be exceeded with the flaps extended to the given setting.</td>
</tr>
<tr>
<td>vLO</td>
<td>75 kts / 140 km/h</td>
<td>This speed must not be exceeded with Landing Gear extended! The Landing Gear may not be extended above this airspeed!</td>
</tr>
</tbody>
</table>
2.3 **Airspeed Indicator Markings**  

The following table defines the airspeed indicator markings and their meaning.

<table>
<thead>
<tr>
<th>Marking</th>
<th>IAS (Value/Range)</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Arc</td>
<td>47 to 102 kts / 87 to 190 km/h</td>
<td>Operating range for positive flap settings. (The lower limit is 1.1 $V_{S0}$ at MTOM in landing configuration (LDG 2). The upper limit is the maximum speed for flaps set to TO / LDG 1).</td>
</tr>
<tr>
<td>Green Arc</td>
<td>53 to 102 kts / 99 to 190 km/h</td>
<td>Normal operating range. (The lower limit is 1.1 $V_{S1}$ at MTOM and most forward CG-location with flaps set in the neutral position. The upper limit is the maximum airspeed in strong turbulence.)</td>
</tr>
<tr>
<td>Yellow Arc</td>
<td>102 to 145 kts / 190 to 270 km/h</td>
<td>The airplane may not be flown in this range in strong turbulence. Maneuvers may only be flown carefully.</td>
</tr>
<tr>
<td>Red Line</td>
<td>145 kts / 270 km/h</td>
<td>Maximum speed for all permitted modes of operation.</td>
</tr>
<tr>
<td>Blue Line</td>
<td>68 kts / 125 km/h</td>
<td>Airspeed for best rate of climb ($v_Y$)</td>
</tr>
<tr>
<td>Yellow Triangle</td>
<td>60 kts / 110 km/h</td>
<td>Reference speed for approach Speed MTOM</td>
</tr>
<tr>
<td>White Triangle to the outside and Letter &quot;L&quot;</td>
<td>75 kts / 140 km/h</td>
<td>Maximum speed for flaps set to LDG 2 and with Landing Gear extended $v_{LO}$.</td>
</tr>
</tbody>
</table>
### 2.4 Limitations for Propulsion System and Operating Fluids

#### 2.4.1 Engine Limitations

<table>
<thead>
<tr>
<th>Engine Limitations</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a) Engine Manufacturer</strong></td>
<td>BRP-Powertrain GmbH &amp; Co. KG Gunskirchen, Austria</td>
</tr>
<tr>
<td><strong>b) Engine Model</strong></td>
<td>ROTAX 914 F2</td>
</tr>
<tr>
<td><strong>c) Type Certificate</strong></td>
<td>FAA E00058NE of 18. December 2003</td>
</tr>
<tr>
<td><strong>d) Maximum RPM during T/O (max. for 5 minutes):</strong></td>
<td>5600 RPM (5800 RPM allowed for max. 1 min)</td>
</tr>
<tr>
<td><strong>e) Maximum Continuous RPM</strong></td>
<td>5500 RPM</td>
</tr>
<tr>
<td><strong>f) Idle RPM:</strong></td>
<td>1200 to 1400 RPM</td>
</tr>
<tr>
<td><strong>g) Max. T/O-Power (ISA):</strong></td>
<td>113.3 HP / 84.5 kW at 5800 RPM (Takeoff RPM limited to 5600 RPM by const. speed propeller control)</td>
</tr>
<tr>
<td><strong>h) Max. Continuous Power:</strong></td>
<td>98.4 HP / 73.4 kW at 5500 RPM</td>
</tr>
<tr>
<td><strong>i) Max. altitude with Constant Power:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>T/O-Power</strong></td>
<td>to max. 8000 ft / 2450 m MSL</td>
</tr>
<tr>
<td><strong>Continuous Power</strong></td>
<td>to max. 16000 ft / 4875 m MSL</td>
</tr>
<tr>
<td><strong>j) Max. Cylinder Head Temperature (CHT):</strong></td>
<td>122 °F / 50 °C 275 °F / 135 °C</td>
</tr>
<tr>
<td><strong>k) Fuel Pressure:</strong></td>
<td>Air Box Pressure</td>
</tr>
<tr>
<td><strong>minimum</strong></td>
<td>+ 1.5 x 10⁻¹ bar / 2.1 psi</td>
</tr>
<tr>
<td><strong>normal</strong></td>
<td>+ 2.5 x 10⁻¹ bar / 3.6 psi</td>
</tr>
<tr>
<td><strong>maximum</strong></td>
<td>+ 3.5 x 10⁻¹ bar / 5.1 psi</td>
</tr>
<tr>
<td><strong>l) Manifold Air Pressure:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>max. T/O-Power</strong></td>
<td>40.5 inHg / 1.37 bar (acc. to ROTAX)</td>
</tr>
<tr>
<td><strong>max. Continuous Power</strong></td>
<td>36.0 inHg / 1.22 bar (acc. to ROTAX)</td>
</tr>
</tbody>
</table>

#### Propeller

<table>
<thead>
<tr>
<th>Propeller Limitations</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a) Propeller Manufacturer:</strong></td>
<td>MT-Propeller Gerd Muehlbauer GmbH D-94348 Atting, Germany</td>
</tr>
<tr>
<td><strong>b) Propeller Model:</strong></td>
<td>MTV-7-A/170-51</td>
</tr>
<tr>
<td><strong>c) Control Unit:</strong></td>
<td>P120-A</td>
</tr>
</tbody>
</table>
### 2.4.2 Operating Fluids

#### Fuel

| a) Type of Fuel | MOGAS (unleaded higher-octane gasoline), or AVGAS 100LL |

#### Lubricants

<table>
<thead>
<tr>
<th>a) Oil Temperature</th>
<th>minimum: 122 °F / 50 °C, maximum: 266 °F / 130 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Oil Pressure</td>
<td>minimum: 1.5 bar / 21.8 psi, maximum: 7.0 bar / 101.5 psi (only briefly allowed, when starting cold engine), normal: 1.5 to 5.0 bar / 21.8 to 72.5 psi</td>
</tr>
<tr>
<td>c) Amount of Oil</td>
<td>minimum: 0.5 US gal / 2 l, maximum: 0.8 US gal / 3 l, max. permitted Oil Consumption: 0.02 US gal/h / 0.06 l/h</td>
</tr>
</tbody>
</table>

#### Coolant

| a) Coolant | Conventional coolant on the basis of ethylene glycol mixtures (mixture of 50% water, 50% ethylene glycol). For recommended coolants refer to Service Instruction SI-914-019 by ROTAX |
| b) Amount of Coolant | minimum: 0.63 US gal / 2.4 l, maximum: 0.66 US gal / 2.5 l |
### 2.5 Engine Instrument Markings

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Indicating Range</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Red Line</td>
<td>Green Arc</td>
<td>Yellow Arc</td>
<td>Red Line</td>
</tr>
<tr>
<td></td>
<td>(Lower Limit)</td>
<td>(Normal Operating Range)</td>
<td>(Upper Warning Range)</td>
<td>(Upper Limit)</td>
</tr>
<tr>
<td>Tachometer [RPM]</td>
<td>-</td>
<td>1400 - 5500</td>
<td>5500 - 5600 *</td>
<td>5600 *</td>
</tr>
<tr>
<td>Oil Temperature [°F]</td>
<td>122</td>
<td>122 - 266</td>
<td>-</td>
<td>266</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>50 - 130</td>
<td>-</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>122 - 266</td>
<td>-</td>
<td>-</td>
<td>266</td>
</tr>
<tr>
<td></td>
<td>50 - 130</td>
<td>-</td>
<td>-</td>
<td>130</td>
</tr>
<tr>
<td>CHT [°F]</td>
<td>-</td>
<td>122 - 275</td>
<td>-</td>
<td>275</td>
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<td></td>
<td>-</td>
<td>50 - 135</td>
<td>-</td>
<td>135</td>
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<tr>
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<td>122 - 275</td>
<td>-</td>
<td>-</td>
<td>275</td>
</tr>
<tr>
<td></td>
<td>50 - 135</td>
<td>-</td>
<td>-</td>
<td>135</td>
</tr>
<tr>
<td>Oil Pressure [bar]</td>
<td>-</td>
<td>1.5 – 5</td>
<td>5 - 7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>21.8 – 72.5</td>
<td>72.5 – 101.5</td>
<td>101.5</td>
</tr>
<tr>
<td></td>
<td>1.5 – 5</td>
<td>21.8 – 72.5</td>
<td>72.5 – 101.5</td>
<td>101.5</td>
</tr>
<tr>
<td>Manifold Air Pressure [inHg]</td>
<td>-</td>
<td>-</td>
<td>36.0 - 40.5</td>
<td>40.5</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>36.0 - 40.5</td>
<td>40.5</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>1.22 - 1.37</td>
<td>1.37</td>
</tr>
</tbody>
</table>

* A short time overspeed up to max. 5800 RPM (max. allowed engine RPM of engine manufacturer) is allowed for max. 1 minute.
## 2.6 Markings on other Instruments

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Indicating Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Red Line (Lower Limit)</td>
</tr>
<tr>
<td>Voltmeter [V]</td>
<td>11.5</td>
</tr>
<tr>
<td>Ammeter [A]</td>
<td>-</td>
</tr>
</tbody>
</table>
2.7 Masses

- Maximum Takeoff Mass: 1984 lbs / 900 kg
- Maximum Landing Mass: 1984 lbs / 900 kg
- Maximum NLP: 1367 lbs / 620 kg
- Maximum load in Rear Baggage Compartment: 44 lbs / 20 kg

**Warning:** Exceeding the mass limits can cause the A/C to be overstressed and might cause a significant reduction in flight performance and flight qualities!

**Warning:** Exceeding the maximum load in the Rear Baggage Compartments might cause a CG movement behind the permitted most rearward in-flight CG. This causes a significant endangering of flight safety!
2.8 Center of Gravity (CG)

More details for determining the CG in the empty configuration are described in section 6 of this operation manual. They can also be found in the Maintenance Manual of the STEMME S6-RT (refer to STEMME Doc.-No.: P500-006.000, chapter 08).

All distances need for determining the CG are measured from the reference plane (RP). This plane is vertical to the wing leading edge near the wing root. For orientation of the plane, refer to section 6.

Location-Limits for the Center-of-Gravity

The in-flight CG must be kept within the following limits when flying:

1. Most forward in-flight CG-Limit:
   - $x = 8.82$ in / 224 mm behind RP
2. Most rearward in-flight CG-Limit:
   - $x = 16.10$ in / 409 mm behind RP

These values are valid for landing gear retracted as well as extended and for all mass configurations.

Warning: Operating the aircraft outside the permitted limits for the CG reduces the aircraft’s stability or controllability. This is NOT permitted!

How to properly determine the CG-location for flight is described in section 6.
2.9 Permitted Maneuvers

The STEMME S6-RT aircraft is certified according to EASA CS-22 in the category: “Utility“.

This certification includes the following maneuvers:

1. All regular, not designed for aerobatic maneuvers.
2. Maneuvers with a maximum bank angle of 60°.

**Caution:** Aerobatics, including intentional spins and flights in clouds are NOT permitted.
When flying the permitted maneuvers, the following maximum load factors are only allowed:

<table>
<thead>
<tr>
<th>Positive</th>
<th>at $v_A$</th>
<th>at $v_{NE}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5,3</td>
<td>4,0</td>
</tr>
<tr>
<td>Negative</td>
<td>-2,65</td>
<td>-1,5</td>
</tr>
<tr>
<td>Airbrakes extended</td>
<td>3,5</td>
<td>3,5</td>
</tr>
<tr>
<td></td>
<td>-1,5</td>
<td>-1,5</td>
</tr>
</tbody>
</table>

**Warning:** Increasing the maneuver load factors past the allowed limits causes the aircraft structure to be overloaded!

**Caution:** Maneuvers with an intentional negative load are not permitted! This can cause an engine failure and leakage of operating fluids.
2.11 Operating Altitude

The maximum demonstrated operating altitude with the engine running is at 16000 ft / 4875 m MSL. At higher altitudes an unproblematic engine operation as well as restart of the engine cannot be guaranteed.
2.12 Flight Crew

Maximum Number of Crew Members: 2
Minimum Number of Crew Members: 1 Pilot – If the A/C has all necessary equipment (additional airspeed indicator and wheel-brake on the right-hand side) it may be flown from the left seat or the right seat.

Caution: Keep the minimum load in mind. It may be needed to carry ballast mass in the aircraft to reach the minimum load (also refer to page 2.22).
2.13 Permitted Modes of Operation

Permitted modes of operation are:

1. VFR-day
2. No Aerobatics, no maneuvers with negative load factors

Caution: Flights into known icing conditions or into thunderstorm conditions are not permitted!
2.14 Minimum Equipment

The following table lists the aircraft’s minimum equipment which is required by EASA CS-22 and by operational considerations. This minimum equipment must be functioning properly.

**Minimum Equipment: Flight and Navigational Instruments**
- Altimeter 0 - 20000 ft / 0 - 30000 ft / 0 - 10000 m
- Airspeed Indicator 0 - 200 kts / 0 - 350 km/h
- Magnetic Compass
- Electric Trim Indicator

**Minimum Equipment: Engine Instruments**
- Fuel Gauge
- Oil Temperature Gauge
- Fuel Pressure Warning Light
- Oil Pressure Gauge
- Cylinder Head Temperature (CHT) Gauge
- Manifold Air Pressure (MAP) Gauge
- Ammeter
- Voltmeter
- Tachometer
- Generator Caution Light
- Engine Hours Meter

**additional operational minimum equipment:**
- Seatbelts for each seat
- Flight Manual
- Stall Warning
- Fire Warning
- Indicator lights for Retractable Landing Gear
- Landing Gear Warning

---

**Note:** Additional minimum equipment might be required by different nations, depending on the mode of operation. This might, for example, vary with the route of a flight.

The permitted equipment is listed in section 6.
2.15 Fuel

- Fuel to be used: MOGAS (unleaded gasoline according to EN 228, min. RON 95) or AVGAS 100LL

- Standard tank, with auxiliary tank (integral tanks in left and right wing)
  - Tank Capacity (right): 17.2 US gal / 65 l
  - Tank Capacity (left, optional): 17.2 US gal / 65 l
  - Unusable Fuel (right): 0.55 US gal / 2.1 l
  - Unusable Fuel (left): 0.3 US gal / 1 l

AVGAS contains lead, which deposits at the valve lip and in the combustion chamber. According to ROTAX, AVGAS may only be used when vapor bubbles form or when other fuel is not available (refer to ROTAX SI-914-019, latest Revision).

**Caution:** Only use fuels which are appropriate for the local climate conditions.
2.16 Lubricant and Coolant

2.16.1 Lubricant

To lubricate the engine and the attached gears, use only regular automotive oils with additives for gears. Do NOT use alloyed or unalloyed aircraft engine oil!

Caution: If AVGAS is used, do NOT use fully synthetic oil!

Note: Only use oils according to the API-specifications. Only oils of the type “SF“ or “SG“ with gear additives ”GL4“ or “GL5“ are permitted!

Note: Because it is stable in high temperatures and causes little residue, partially synthetic and fully synthetic oils are preferred. These should be for 4-stroke high performance engines.

Select the viscosity of the lubricating oil with the table presented below. Take into account the local climatic conditions. The use of multi-grade oils is recommended because of the lesser influence of temperature.
**Illustration 2-1: Table of Lubricants**

**Oil Capacity:**
- maximum Oil Capacity: 0.8 US gal / 3 l
- minimum Oil Capacity: 0.5 US gal / 2 l
- max. permitted Oil Consumption: 0.02 US gal/h / 0.06 l/h

**2.16.2 Coolant**

The manufacturer recommends conventional coolants on the basis of an ethylene glycol mixture. For recommended coolants refer to latest Revision of Service Instruction “Selection of suitable Operating Fluids for ROTAX Engine Type 912 and 914 (Series)”, SI-914-019 by ROTAX. The coolant should be used with a mixture ratio of 1:1.

Waterless coolants are NOT recommended by the manufacturer. With the same operating conditions they cause higher engine temperatures.

**Warning:** High risk of being burned! Do NOT open the lid of the cooling system’s filling jar when the motor is warm. The system is pressurized. There is a high risk of being burned by boiling splashes of water!
Caution: Low-grade coolant or contaminated coolant can cause deposits in the cooling system. This might lead to bad cooling performance!

Caution: Because of the possible deposits and the fire danger do NOT use pure anti-freeze concentrate. Pure anti-freeze solidifies at -18 °C!

Coolant Capacity:

- maximum Coolant Capacity: 0.66 US gal / 2.5 l
- minimum Coolant Capacity: 0.63 US gal / 2.4 l
- max. Capacity of Expansion Reservoir: 0.05 US gal / 0.2 l
- min. Capacity of Expansion Reservoir: 0.03 US gal / 0.1 l
2.17 Additional Limitations

2.17.1 Maximum demonstrated Crosswind Component

The maximum demonstrated crosswind component is:

- 16 kts / 30 km/h

Warning: Takeoffs and landings in conditions with higher crosswind components may cause uncontrollable flight conditions.

2.17.2 Electronic Equipment

Do NOT use or turn on other electronic equipment except the equipment which is installed in the airplane. Other equipment may cause interference with the aircraft's avionics.

Examples of non-allowed equipment are:

- Mobile phones
- Radio remote controls
- Devices using cathode ray tubes or similar equipment

2.17.3 Smoking in the aircraft

Smoking is NOT allowed in the aircraft!
2.18 Placards for Operating Limitations

The following section describes placards for operating limitations and their position in the cockpit.

**Note:** Additional placards and their positions are mentioned in the maintenance manual.

*Illustration 2-2: Position of Placards on the Instrument Panel and Canopy Frame*
**Certificated for:**

- Never Exceed Speed: \( V_{NE} \) 145 kts
- Maneuvering Speed: \( V_{A} \) 102 kts
- Maximum Speeds
  - Rough Air: \( V_{RA} \) 102 kts
  - with Landing Gear extended: \( V_{LO} \) 75 kts
  - Flaps extended
    - pos. Flaps: TO / LDG 1: \( V_{FE} \) 102 kts
    - LDG 2: \( V_{FE} \) 75 kts

**Empty Mass:**

**Max. Takeoff Mass:** 1984 lbs

**Min. Seat Load:** lbs, otherwise ballast

**Max. Cockpit Load:** lbs

**Note:** Check load before every flight!

**Change in the cockpit load with load in the baggage compartment:**

\[
L_{MCL\ New} = L_{MCL} + L \times 2,2
\]

<table>
<thead>
<tr>
<th>baggages mass [lbs]</th>
<th>Increase of min. cockpit load by: [lbs]</th>
</tr>
</thead>
<tbody>
<tr>
<td>44 (max.)</td>
<td>97</td>
</tr>
<tr>
<td>33</td>
<td>73</td>
</tr>
<tr>
<td>22</td>
<td>49</td>
</tr>
<tr>
<td>11</td>
<td>24</td>
</tr>
</tbody>
</table>

1. On the left Canopy frame (arranged side by side)

**Illustration 2-3: Placards 1**
Baggage
max. 44 lbs

1. Mounted on the inside of the hatch to the rear fuselage section

2. Mounted on the instrument panel
   (near the airspeed indicator, not required if these markings are on the airspeed indicator)

Fuel Diff Pressure
2.5 +/- 1.0

3. Mounted on the instrument panel next to the Fuel Pressure Difference Gauge

4. Mounted below the fuel gauges left / right

### $V_{NE}$ (IAS)

<table>
<thead>
<tr>
<th>ft MSL</th>
<th>[kts]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>145</td>
</tr>
<tr>
<td>6500</td>
<td>145</td>
</tr>
<tr>
<td>10000</td>
<td>138</td>
</tr>
<tr>
<td>13000</td>
<td>132</td>
</tr>
<tr>
<td>16500</td>
<td>124</td>
</tr>
<tr>
<td>19500</td>
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<tr>
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<td>105</td>
</tr>
<tr>
<td>33000</td>
<td>92</td>
</tr>
<tr>
<td>39500</td>
<td>81</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ft MSL</th>
<th>[mph]</th>
</tr>
</thead>
<tbody>
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<td>0</td>
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<tr>
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<td>19500</td>
<td>137</td>
</tr>
<tr>
<td>26000</td>
<td>121</td>
</tr>
<tr>
<td>33000</td>
<td>106</td>
</tr>
<tr>
<td>39500</td>
<td>93</td>
</tr>
</tbody>
</table>

Illustration 2-4: Placards 2
Section 3 – Emergency Procedures

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3.1 Introduction

This section provides checklists and recommended procedures to manage emergencies that may occur. When all mandatory procedures for pre-flight inspections and maintenance are observed, a malfunction of the engine or important equipment is very unlikely.

To manage an occurring problem, the emergency procedures described here are recommended.

It is not possible to incorporate all types and combinations of possible emergencies into this Flight Manual, therefore a good knowledge of the design and handling of the aircraft and experience of solving problems are essential.
### 3.2 Defined Airspeeds for Emergency Procedures

<table>
<thead>
<tr>
<th>Emergency</th>
<th>Airspeed (IAS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Failure during takeoff</td>
<td></td>
</tr>
<tr>
<td>• Flaps set to TO / LDG 1</td>
<td>60 kts / 110 km/h</td>
</tr>
<tr>
<td>Airspeed for the best glide angle</td>
<td></td>
</tr>
<tr>
<td>• Flaps set to NEUTRAL</td>
<td></td>
</tr>
<tr>
<td>• Landing Gear OUT (extended)</td>
<td>60 kts / 110 km/h</td>
</tr>
<tr>
<td>• Landing Gear IN (retracted)</td>
<td>68 kts / 125 km/h</td>
</tr>
<tr>
<td>Approach speed for safety landing</td>
<td></td>
</tr>
<tr>
<td>• Flaps set to TO / LDG 1, engine running</td>
<td>60 kts / 110 km/h</td>
</tr>
<tr>
<td>Approach speed for emergency landing / engine malfunction</td>
<td></td>
</tr>
<tr>
<td>• Flaps set to TO / LDG 1</td>
<td>60 kts / 110 km/h</td>
</tr>
</tbody>
</table>
3.3 Canopy Jettison

Jettison the canopy as follows:

1. Red emergency handle PULL strongly (center of instrument console)

2. The canopy is pushed upwards by a gas spring.
   If necessary push by hand.

Warning: The rear canopy lock (Roeger hook) must remain engaged when the canopy is jettisoned! This causes the canopy to be lifted only at the front end and to be torn away by the airstream.
3.4 Bail-Out

After the canopy is jettisoned:

1. Central lock of the seat belts OPEN
2. Bail-out over the side Drop below the wing to avoid collision with the tail unit.

Note: The fixed side parts of the cockpit are made of a strong structure without sharp edges. Use the side parts to pull out and brace.
3.5 Stall Recovery

3.5.1 Powered Configuration

Stall speed depends on power setting, flap-setting, landing gear status and actual mass and may occur in non-accelerated level flight below 53 kts / 99 km/h (worst for flaps set to CRUISE at MTOM). Stalls will occur in turns at higher speeds depending on g-force. In powered flight an acoustic signal gives warning of a stall.

If the angle of attack is increased when the acoustic stall warning is activated – or if a turn is then flown – a wing-drop may occur. Depending on the CG-position, afterwards the A/C may spin.

Stall Recovery in Powered Configuration:

1. Elevator  RELEASE back-pressure, PUSH forward.
2. Throttle  FULL POWER
3. Airspeed  WAIT for increase.
4. Attitude  CORRECT to normal flight attitude.

Warning: When recovering from a stall in horizontal flight, an altitude loss of 100 ft / 30 m is possible. In turning flight, an altitude loss of 130 ft / 40 m is possible. If the pilot reactions are delayed, the altitude loss may be more than 200 ft / 60 m.
3.5.2 Glider Configuration

Stall speed depends on flap setting, landing gear status and actual weight and may occur in non-accelerated level flight below 53 kts / 99 km/h (worst for flaps set to CRUISE at maximum weight). Stalls will occur in turns at higher speeds depending on g-force. In soaring flight an aerodynamic buffeting warns against the stall.

If the angle of attack is increased while aerodynamic buffeting occurs – or if a turn is then flown – a wing-drop may occur. Depending on the CG-position, afterwards the A/C may spin.

Stall Recovery in Glider Configuration:

1. Elevator  RELEASE back-pressure, PUSH forward.
2. Airspeed  WAIT for increase.
3. Attitude  CORRECT to normal flight attitude.

Warning: When recovering from a stall in horizontal flight, an altitude loss of 100 ft / 30 m is possible. In turning flight, an altitude loss of 130 ft / 40 m is possible. If the pilot reactions are delayed, the altitude loss may be more than 200 ft / 60 m.
3.6 Spin Recovery

If the aircraft spins unintentionally, the following procedures are recommended (for both, Glider Configuration and Powered Configuration):

1. Rudder DEFLECT in the direction opposite to the spin
2. Ailerons NEUTRAL
3. Elevator RELEASE back-pressure or PUSH slightly forward
4. Throttle IDLE
5. Flaps if in position LDG 2 set to NEUTRAL
6. End of spin and end of stall WAIT

If recovery from spin is absolutely not possible by using the described standard procedure, the following emergency procedure can be used even with airspeeds above $v_{LO} = 75$ kts / 140 km/h:

7. Landing Gear EXTEND only when spinning is not to stop by standard procedure (lever DOWN) to reach a forward movement of in-flight CG
8. Rudder NEUTRAL (as soon as the spin has stopped)
9. A/C with Elevator PULL OUT of dive with caution

**Warning:** Altitude loss from start of the spin recovery to level flight may be 660 ft / 200 m, depending on spin phase and flight attitude. The most unfavorable case results from pitching up after approx. 1 spin.

**Warning:** Recovery from the spin with flaps in landing configuration can cause structural damage. If the A/C spins with flaps in landing-configuration, retract flaps to NEUTRAL and use standard procedure of spin recovery.
**Warning:** The EXTENDING of landing gear is ONLY applicable when spin recovery is definitely not possible by using standard procedure! A structural failure of landing gear doors may result! Hence for safety reasons a landing on next suitable airfield has to be arranged in either case. The entire airframe and especially the landing gear doors have to be checked for damage or failure independent from reason of spinning!

Additionally the incidence has to be documented by the pilot in the A/C-logbook!

**Caution:** If the A/C spins with a running engine, set the throttle to IDLE.

**Caution:** With a forward CG-position, the spin can start a spiral dive. Recover from spiral dive using the standard procedures.

**Note:** With a rear CG-position, the spin is accompanied by periodical pitch movements with about one oscillation per turn.
3.7 Recovery from Spiral Dive

Caution: With middle and forward CG-positions, the spinning A/C has the tendency to start a spiral dive after some spinning turns. During a spiral dive, the airspeed and g-forces will increase in a short time.

Spiral-dive Recovery:

1. Rudder and Aileron
   STOP ROTATION (Deflect in the direction opposite to the turn)

2. Elevator
   PULL OUT of the dive with caution

Warning: Do not exceed $V_{NE} = 145$ kts / 270 km/h during the recovery.

Note: If the A/C stops the spin by itself, it can start a spiral dive.
3.8 Engine Failure

3.8.1 Engine Malfunction on Ground

1. Throttle IDLE
2. Wheel Brakes as required

**Warning:** Do NOT fly the A/C if a malfunction is not completely repaired!

**Caution:** If the oil pressure is in the red range, turn OFF the engine immediately.

3.8.2 Engine Failure during Takeoff

In the case of an engine failure, or when not enough power is available, perform the following procedure:

1. If RWY is long enough, land straight ahead.
2. If RWY is NOT long enough, the pilot has to decide how to proceed, depending on altitude, position and terrain.
3. Airspeed 60 kts / 110 km/h
4. Approach procedure DEFINE
5. Fuel Valve CLOSE
6. Ignition OFF
   Depending on the situation, it is possible to increase the glide ratio by setting the propeller to the feathered position:
7. Left Propeller Switch MANU
8. Right Propeller Switch FEATHER

**Caution:** Final position is reached not until 90 sec!
In either case:

9. Landing Gear

EXTEND (lever DOWN), if already started to retract
CHECK OUT + LOCKED (3 green lights on)

Caution:
Mind required time span for total extension of 20 sec!

10. Master Switch

OFF

Caution: If possible, turn OFF the master switch just before landing. The master switch also turns OFF the electric trim, propeller speed control and COM equipment and landing gear warning and indication.

Caution: If the engine is not running, the additional drag is greater for a windmilling propeller than for a feathered propeller. After an engine failure it is recommended to switch the propeller to FEATHER.

3.8.3 Engine Failure during Flight

An engine failure is possible in all flight phases and must be considered in flight planning. Existing experience with the engine shows, that certain engine failure situations are more likely than others. The relevant emergency procedures are described in the following section.

Engine failure due to carburetor icing was not observed, because the carburetor air is heated by the turbocharger.

In the case of a total electrical failure, the engine does not stop. The ignition circuit is separated from the electrical system (for example, if the engine master switch at the panel fails).
In most cases the propeller windmills in the airstream. In this case the engine starter normally does not need to be operated to restart the engine (also refer to chapter 4.7.3.5).

After engine-failure in flight, the following restart-procedure is recommended:

1. Airspeed 55 kts - 75 kts / 100 km/h - 140 km/h
2. Fuel Valve OPEN
3. Auxiliary Fuel Pump ON (green light ON)
4. Master Switch (battery) CHECK if ON
5. Engine Master Switch CHECK if ON
6. Master Circuit Breaker CHECK
7. Engine Bus Circuit Breaker CHECK
8. Low Fuel Caution Light CHECK (yellow LED ON/OFF)
9. Fuel Pressure CHECK 2.5 ± 1.0 x 10^-1 bar / 3.6 ± 1.5 psi (LCD Display in panel, refer to chapter 3.13.1.1)
10. Fuel Quantity CHECK (Fuel gauge on right side)
11. Fuel Transfer Pump ON (if optional left auxiliary tank is installed)
12. Propeller CHECK propeller in Takeoff position (green control light ON), otherwise set left switch to MANU, right switch to HIGH RPM (Takeoff position)
13. Choke OFF
14. Throttle IDLE (max. 10% power)
15. Ignition BOTH
16. Starter START if necessary, if engine does not start by windmilling
If the restart of the engine fails:

17. Prepare for an off-field landing or a landing on next suitable airfield.

**Caution:** Within 10 seconds after engine restart, the oil pressure must be in the green range. If not, a major engine problem may exist.

**Note:** With very low fuel pay attention to fly with wings leveled and without bank-angle (refer to chapter 3.13.1.1 to 3.13.1.3).

More instructions for engine restart in flight refer to chapter 4.7.3.5.

### 3.8.4 Drive Section Failure

In the case of a failure of the drive section the power transmission from the engine to the propeller is destroyed. The cause could be a failure of the gear, the drive shaft, their adapters or couplings. This is indicated by the smell of fire or noise from the power-transmission-system. The failure of the drive-section is most critical in case of applied engine load. The engine can exceed the maximum RPM or vibrations can cause structural damage.

**After drive-section-failure, the following procedure is recommended:**

1. Throttle immediately to IDLE
2. Airspeed ~60 kts / 110 km/h
3. Engine OFF if essential
4. Prepare for an off-field landing or a landing on next suitable airfield.

### 3.8.5 Failure of Engine Starter

If the engine ignition switch fails, the engine starter will not work for an in-flight engine restart. A failure of the engine ignition switch may be the cause.
The following procedure is recommended:

1. Master Circuit Breaker  
   CHECK

2. Engine Bus Circuit Breaker  
   CHECK

3. Master Switch  
   ON (Voltmeter must show operating voltage >10 V)

4. Engine Master Switch  
   ON

5. Engine instrumentation and control lights  
   CHECK (especially YELLOW and RED lights of the TCU during self-check)

If a restart of the engine is not possible:

6. Depending on altitude:
   Engine restart procedure with windmilling propeller (refer to chapter 4.7.3.5).
   Or prepare for an engine-off landing on next suitable airfield.
3.9 Fire

3.9.1 Fire in the Engine Compartment

If the red Fire Warning light comes on and an acoustic alarm signal buzzes or if there is smell of fire or smoke in flight, the following procedure is recommended:

**In-flight:**

**instantly:**

1. Fuel Valve
   - CLOSE (rotate)
2. Throttle
   - FULL POWER (to drain fuel lines and float chambers)
3. Landing Gear
   - EXTEND with airspeed below \(v_{LO}\) (lever DOWN),
   - CHECK OUT + LOCKED (3 green lights on)

**if necessary:**

- EMERGENCY EXTEND (if engine fire caused damage to actuation system)

**When the engine has stopped:**

4. Ignition
   - OFF
5. Airspeed
   - 55 kts - 65 kts / 100 km/h - 120 km/h
6. Left Propeller Switch
   - MANU
7. Right Propeller Switch
   - FEATHER
   - Caution: Final position is reached not until 90 sec!
8. Engine Master Switch
   - OFF
9. Cabin Ventilation
   - OPEN in case of smoke in cockpit
   (side window and/or nozzle)
10. Emergency Descent
    - INITIATE as soon as possible.
    - EXTEND airbrakes to perform.
11. Off-field Landing
    - PREPARE for next suitable terrain.
**Warning:** When the master switch is OFF, the COM and all electrical equipment is turned OFF (including hydraulic landing gear actuation, control and indication, landing gear warning, elevator trim and propeller-feathering). It is possible to manually override the trim.

**Caution:** The propeller and engine will normally continue to rotate. The only indication that the engine is not running is the display on the manifold pressure gauge.

3.9.2 Electrical Fire

**Electrical fire in-flight:**

1. Master Switch
   - OFF
2. Cabin Ventilation (side-windows and/or nozzle)
   - OPEN
3. Throttle
   - REDUCE for level flight approx. $v_x = 60$ kts / 110 km/h
4. Off-field Landing
   - PREPARE for next suitable terrain.
5. Landing Gear
   - Before Off-field landing
     - EMERGENCY EXTEND (to avoid activation of electrical system later on)
     - A check of landing gear status by indication lights is not possible anymore!
**Warning:** When the master switch is OFF, the COM and all electrical equipment is turned OFF (including hydraulic landing gear actuation, control, indication and warning, elevator trim and propeller feathering).

If there is no open fire (especially in the engine compartment), an emergency landing can be done with engine power. The engine ignition and electrical main fuel pump are independent from the master switch.

Keep in mind that the engine-instrumentation (except manifold air pressure, cylinder head temperature gauge) and the propeller feathering will NOT work. The propeller will work only with a fixed pitch. The electrical auxiliary fuel pumps will NOT work.

**Electrical fire on the ground:**

1. Master Switch OFF
2. Fuel Valve CLOSE
3. Throttle FULL POWER
4. Ignition OFF After the engine has stopped
5. Takeoff ABORT, if necessary. (refer to chapter 3.10.1)
3.10 Emergency Procedures during Takeoff

3.10.1 Aborted Takeoff

If the takeoff run needs to be aborted (due to a technical malfunction or for flight safety reasons), the following procedures are recommended:

1. Throttle
2. Airbrakes
3. Elevator
4. Wheel Brakes

If the takeoff needs to be aborted just after liftoff establish a stable attitude and enough airspeed. Then make a normal landing and use the wheel brakes with elevator pulled carefully.

1. Throttle
2. Airspeed
3. Airbrakes
4. Landing
5. Elevator (on ground)
6. Wheel Brakes

In addition if the runway is too short or if there are obstacles:

7. Fuel Valve
8. Ignition
9. Master Switch
10. Anti Collision Maneuver

If needed, do a ground-loop to stop the A/C
3.11 Emergency Landing Procedures

3.11.1 Off-Field Landing

For an off-field landing, select the landing-area carefully. Pay great attention to the character of the surface material in respect of the wheel load. Landing on soft ground with not enough load-carrying-capacity is connected with a great risk. For off-field landing always check:

1. Landing Gear EXTEND (lever DOWN)
   CHECK OUT + LOCKED (3 green lights on)
2. Loose Items STOW and SECURE
3. Seat Belts TIGHTEN

3.11.2 Emergency Landing

3.11.2.1 Emergency Landing on Soft Ground

When landing on soft ground which does not carry the A/C well, the following procedure is recommended:

For landing at the selected area with soft ground, change to Glider Configuration:

1. Landing Gear EXTEND (lever DOWN)
2. Fuel Valve CLOSE
3. Ignition OFF (drain float chamber, if possible)
4. Left Propeller Switch MANU
5. Right Propeller Switch FEATHER
   Caution: Final position is reached not until 90 sec!
### Before touchdown

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>Loose Items</td>
<td>STOW and SECURE</td>
</tr>
<tr>
<td>7.</td>
<td>Seat Belts</td>
<td>TIGHTEN</td>
</tr>
<tr>
<td>8.</td>
<td>Flaps</td>
<td>LDG 2</td>
</tr>
<tr>
<td>9.</td>
<td>Engine Master Switch</td>
<td>OFF</td>
</tr>
<tr>
<td>10.</td>
<td>Master Switch</td>
<td>OFF</td>
</tr>
<tr>
<td>11.</td>
<td>Final Approach</td>
<td>FLAT flight path</td>
</tr>
<tr>
<td>12.</td>
<td>Landing</td>
<td>Touchdown with MINIMUM AIRSPEED. Do not use full airbrakes and be aware of the risk of flipping over.</td>
</tr>
</tbody>
</table>

**Caution:** With its long landing gear, the S6-RT has a tendency to flip-over when landing on soft ground. It is recommended to touchdown with MINIMUM AIRSPEED and to pull the elevator full up until standstill.

### 3.11.2.2 Landing with Damaged Tire

When a tire is actually or possibly damaged after takeoff, the following procedure is recommended:

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Landing Gear</td>
<td>EXTEND (lever DOWN)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHECK OUT + LOCKED (3 green lights on)</td>
</tr>
<tr>
<td>2.</td>
<td>Flaps</td>
<td>TO / LDG 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If possible, perform landing in glider configuration:</td>
</tr>
<tr>
<td>3.</td>
<td>Fuel Valve</td>
<td>CLOSE</td>
</tr>
<tr>
<td>4.</td>
<td>Ignition</td>
<td>OFF (drain float chamber, if possible)</td>
</tr>
<tr>
<td>5.</td>
<td>Left Propeller Switch</td>
<td>MANU</td>
</tr>
<tr>
<td>6.</td>
<td>Right Propeller Switch</td>
<td>FEATHER</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Caution: Final position is reached not until 90 sec!</td>
</tr>
<tr>
<td>7.</td>
<td>Engine Master Switch</td>
<td>OFF</td>
</tr>
</tbody>
</table>
8. Master Switch OFF

**Damaged Main-wheel:**

9. Land the A/C at the runway-side of the undamaged wheel. Then there is enough space for direction changes.

10. Land the A/C with the wing low on the side of the undamaged wheel.

11. Taxi with aileron fully deflected to the side of the undamaged wheel to support the damaged wheel.

12. Activate brakes CAREFULLY

**Damaged Nose-wheel:**

9. Landing Touchdown with MINIMUM AIRSPEED

10. Elevator PULL to reduce load on NOSE WHEEL as long as possible.

11. Rudder Maintain direction

### 3.11.2.3 Landing with Damaged Wheel Brakes

1. Try to land on a grass surface to shorten the ground roll distance with roll-resistance.

### 3.11.2.4 Emergency Landing on water

An emergency landing on water has high risks and should be used only as the last option. If an emergency landing on water is necessary, land in the glider configuration with landing gear in retracted position. Before landing close the cabin-ventilation and the emergency window:

**Approach and Landing:**

1. Approach GLIDER CONFIGURATION

2. Cabin ventilation and emergency window CLOSED

3. Touchdown with MINIMUM AIRSPEED
If the A/C is under water after touchdown, open the cabin ventilation and emergency window to equalize the pressure between the cockpit and the water. This is needed to open the canopy.

If necessary pull the canopy jettison handle after touchdown on water (also refer to chapter 3.3 Canopy Jettison).

4. Rear canopy hook UNLOCK
5. Canopy jettison handle PULL (red handle on the panel)
6. Seat Belts UNFASTEN
7. Cabin ventilation and emergency window OPEN to equalize pressure

**Warning:** Aircraft with nose wheels tend to flip-over when landing on water. With the cockpit under water it is almost impossible to open the canopy without pressure equalization by opening the cabin ventilation and emergency window.

8. Pressure equalization by flooding of cockpit WAIT and keep CALM, until canopy can be opened

### 3.11.2.5 Landing with Ground Loop

If a collision is not avoidable during the final part of the landing, initiate a ground loop with enough distance from the obstacle.

1. Wheel Brakes Activate FULL
   **At the same time:**
   2. Rudder DEFLECT FULL in one direction
   3. Aileron DEFLECT FULL in the same direction

**Caution:** The nose wheel is only steerable when it is loaded. Without load, the nose-wheel is aligned straight-ahead.
3.12 Malfunction of Retractable Landing Gear

**Warning:** DO NOT RETRACT THE LANDING GEAR ON GROUND!

The retractable landing gear of the S6-RT is not protected against incorrect or accidentally operated retraction on ground.

3.12.1 Emergency Extend of the Landing Gear

Due to hydraulic-mechanical or electrical malfunction of the retractable landing gear or as consequence of electrical failure of A/C electronic system (e.g. breakdown of A/C electrical system, cable fire etc.) an emergency extend of the landing gear can be necessary.

**Caution:** An emergency extend of the landing gear has to be applied only if regular hydraulic operation of the landing gear is not possible or due to indefinite or defect indication light the status of the landing gear is not clear.

After an emergency extend a retraction or extension of the landing gear is not possible any more, since the hydraulic pump is deactivated with EMERGENCY EXTEND!

**Caution:** The emergency extension of the landing gear has to be applied in flight conditions free of sideslip and with approach speed of 60 kts / 110 km/h (yellow triangle airspeed indicator). Pay attention to the airspeed to be < \( v_{LO} \), otherwise the nose landing gear may lock not until speed reduction.

**Caution:** After every emergency extend of the landing gear the entire system has to be inspected thoroughly and malfunctions have to be eliminated before next flight.
### Procedure:

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Airspeed</td>
<td>REDUCE to approach speed of 60 kts / 110 km/h</td>
</tr>
<tr>
<td>2.</td>
<td>Landing Gear Lever</td>
<td>SET to EXTEND (lever DOWN)</td>
</tr>
<tr>
<td>3.</td>
<td>Handle bar for EMERGENCY EXTEND of Landing Gear</td>
<td>PULL</td>
</tr>
<tr>
<td>4.</td>
<td>Locking of Landing Gear</td>
<td>If indicator lights fully working: CHECK OUT + LOCKED (3 green lights on)</td>
</tr>
<tr>
<td>5.</td>
<td>If Nose Gear does not lock</td>
<td>REDUCE AIRSPEED to 60 kts / 110 km/h and CHECK locking</td>
</tr>
<tr>
<td></td>
<td>(center light not green)</td>
<td>If necessary reduce airspeed and pay attention to flight condition free of sideslip.</td>
</tr>
</tbody>
</table>

### Caution:

To restore the system pressure after an emergency extension, apply procedures according to chapter 7.7.6 on ground before the next flight.

### 3.12.2 Malfunctions and Maloperation on Ground

#### 3.12.2.1 Malfunction of Landing Gear

If there is clear malfunction or indefinite indication of main and nose landing gear indication lights during pre-flight check, taxiing or Before Takeoff Check the flight respectively takeoff preparation has to be interrupted.

Exemplary list of possible malfunctions:

- Failure of pressure reservoir automatic (hydraulic pump does not activate automatically if a/c is operated on ground after off-periods with Master Switch ON)
• Storage pressure indicated on gauge in landing gear bay is too low although system is activated (Master Switch ON) and manual refilling of pressure reservoir if applicable

• Permanent pumping of system pressure, signalized by frequent orange flashing of control lights on ground (normally green)

• Indications light(s) not working or permanent red/orange

Before the next flight the malfunction has to be repaired.

**Caution:** To start a flight with malfunctioning or indefinite landing gear status or landing gear indication may cause unclear emergency situations even with a fully working landing gear actuation.

3.12.2.2 Maloperation: Retraction of Landing Gear on Ground

**Warning:** DO NOT RETRACT THE LANDING GEAR ON GROUND!

The retractable landing gear of the S6-RT is not protected against incorrect or accidentally operated retraction on ground.

If the retracting mechanism for landing gear is operated on ground, the aircraft drops to the ground, what causes excessive damage to the entire airframe, cowlings and landing gear structure itself.
3.12.3 Malfunctions during Flight

**Note:** During flight, especially directly after retraction or extension of landing gear, due to gust and maneuvering loads during cruise flight or due to rapid cooling, the hydraulic system pressure may be pumped up occasionally. This is due to the system pressure automatic to keep the landing gear in its final position and is signalized by a short flash up of indication lights. A flash up about once a minute for less than 1 sec is normal and not a malfunction.

3.12.3.1 Malfunction during Retraction or Extension of Landing Gear

After operation of landing gear lever if a retraction or extension of the landing gear is not possible or clearly exceeds the required time span of 20 seconds to reach the final out or in position (signalized by control lights green or off), depending on the situation, proceed according to the following instructions:

**Landing Gear does not retract:**

If a retraction of the landing gear is not possible or takes >> 20 sec, proceed as follows:

1. Circuit Breakers for Landing Gear actuation and control **CHECK**
2. Landing Gear EXTEND again (lever DOWN) CHECK OUT + LOCKED (3 green lights on)
3. Continuing Cruise Flight Proceed normally WITHOUT EXCEEDING of $v_{LO}$ PAY ATTENTION to max. engine operating temperatures
4. Routing Prepare LANDING on next suitable airfield on the flight route. TAKE into ACCOUNT increased fuel consumption and reduced range for further routing.
Landing Gear does not extend:

If an extension of the landing gear is not possible or takes >> 20 sec, proceed as follows:

1. Circuit Breakers for landing gear actuation and control  CHECK

2. Landing Gear          EXTEND regularly (lever DOWN)  CHECK OUT + LOCKED (3 green lights on)

If not all landing gear legs are completely out and locked (min. 1 control light not green) even after >> 20 sec:

3. Landing Gear          EMERGENCY EXTEND (PULL lever)  CHECK OUT + LOCKED (3 green lights on)

If indication lights are still indefinite or not working in general for a part of landing gear or the entire landing gear:

4. Emergency Landing  Prepare EMERGENCY LANDING on grass surface acc. to 3.11.2.1, Emergency Landing on Soft Ground

5. If landing gear is partly working, land on intact landing gear side. For the landing gear part not working, proceed acc. to chapter 3.11.2.2.

With nose landing gear not working land on main landing gear and tail skid.

Caution: After a clear malfunction of the landing gear the entire system has to be inspected thoroughly on ground and the malfunction has to be repaired before the next flight.
3.12.3.2 Frequent or permanent flashing of indication lights

**Note:**
An occasional flash up of the indication lights during flight (red) or on ground (orange instead of permanent green light) signals the automatic pumping up of the hydraulic system pressure.
A flash up about 1 time / minute for less than 1 sec is normal and is not a malfunction.
With frequent retraction or extension of the landing gear (e.g. during training operation) or due to rapid temperature changes shorter flash-up intervals may occur temporarily.

With clearly shorter intervals or longer periods of indication lights flashing or indication lights permanent on as an extreme a malfunction of the hydraulic drive unit (failure of pressure switch or automatic), a hydraulic system leakage or a malfunction in signalization or reaching of final position of landing gear legs is the probable reason. Proceed according to following instructions:

1. Circuit Breakers for landing gear actuation and control  CHECK
2. Landing Gear  EXTEND regularly (lever DOWN)
   CHECK OUT + LOCKED (3 green lights on)
3. Continuing cruise flight  Proceed normally WITHOUT EXCEEDING of $v_{LO}$
   PAY ATTENTION to max. engine operating temperatures
4. Safety Landing  Prepare LANDING on next suitable airfield.
   TAKE into ACCOUNT increased fuel consumption and reduced range for further routing.
3.12.3.3 Malfunction of Landing Gear Warning

If the airbrakes are operated with landing gear retracted an acoustical warning signal comes up for the protection against landings with landing gear not extended.

If the acoustical warning does not come up with a possible operation of the airbrakes in high altitudes (e.g. for quick descent) or in reverse is permanently on, there is a malfunction of the landing gear warning.

**Caution:** With a malfunction of the landing gear warning the flight can be continued regularly. During landing approach the pilot has to ensure to extend the landing gear with enough time remaining before landing since there is no additional warning against maloperation.

Before next flight the malfunction of landing gear warning has to be repaired.

3.12.3.4 Malfunction of Cooling Radiator Fan

A malfunction of the cooling radiator fan is not noticeable separately, but causes an increased tendency to engine overheating, especially during taxiing and climb although normal operating procedures according to chapter 4.8 are followed.

3.13 Other Emergencies

3.13.1 System Malfunctions

**Warning** When a system behaves not normally - make checks as in chapter 3.13.1.1 through 3.13.1.19. **Before the next flight** find and eliminate the cause of the system malfunction according to the Maintenance Manual. If necessary, contact the manufacturer.

3.13.1.1 Fuel Pressure Gauge

**a) Fuel pressure below 1.5:**
If the fuel pressure gauge is below 1.5, the fuel pressure is below the allowable limit of 150 mbar / 2.1 psi. There can also be a malfunction of the gauge or sensor system.

The low fuel pressure can cause an engine malfunction. The cause could be:
- no fuel supply to engine
- engine malfunction
- fuel system malfunction

The following procedure is recommended:

1. Fuel Valve
   OPEN
2. Auxiliary fuel pump
   ON (green light is ON)
3. Fuel amount of the feeder tank
   CHECK, if the yellow low fuel caution light of the feeder tank is ON continuously
   If the yellow low fuel caution light is ON proceed acc. to chapter 3.13.1.3
4. Fuel quantity
   CHECK (fuel-gauges left and right)
   If necessary transfer fuel from the left auxiliary tank to the right main tank by switching ON the transfer pump.
5. When little fuel is available
   If necessary reduce power-setting and airspeed. Fly without bank angle or sideslip.

6. If the engine has stopped
   Do normal airstart procedure (refer to chapter 4.7.3.5)

If the fuel pressure is normal again when using of the auxiliary fuel pump (but drops when the auxiliary fuel pump were set to OFF) most likely there is a malfunction of the main fuel pump or a malfunction of the internal generator. The flight can be completed with auxiliary fuel pump continuously ON. But there is a risk of engine failure.

If it is not possible to restore the normal fuel pressure, prepare to land on the next suitable airfield. A sudden engine failure must be expected at anytime.

b) Fuel pressure above 3.5:

If the fuel pressure indicator is above 3.5, the fuel pressure is above the allowable limit. There can also be a malfunction of the gauge or sensor system.

The high fuel pressure can cause an engine failure. The reason for this can be a malfunction of the fuel pressure control unit or a malfunction of the fuel pump.

If the main fuel pump and the auxiliary fuel pump are working at the same time, set the auxiliary fuel pump to OFF to check if the fuel pressure will fall to below 3.5.

Prepare to land on the next suitable airfield. A sudden engine failure must be expected at anytime.

Caution: Use the auxiliary fuel pump when landing, even if the fuel pressure is too high.
3.13.1.2 Green Light for Operation of Auxiliary Fuel Pump

If the green light for the auxiliary fuel pump is ON, this is not an emergency. It shows that the auxiliary fuel pump is running.

If the auxiliary fuel pump is set to ON, but with no green light, this can be a malfunction of the auxiliary fuel pump or a malfunction of the indication light. This is not a flight-critical item, as long as the main fuel pump is running normally and the fuel pressure is normal (refer to chapter 3.13.1.1).

1. Fuel pressure MONITOR

3.13.1.3 Yellow Low Fuel Caution Light is continuously ON

If the yellow low fuel caution light is continuously ON there is only 1.3 - 1.9 US gal / 5 - 7 l of fuel in the main-tank-feeder-compartment. This can also be a malfunction of the sensor system. A blinking low fuel caution light may be triggered by sloshing fuel.

Lack of fuel will cause an engine failure. The reason for not enough fuel can be a malfunction of the fuel system. The following procedure is recommended:

1. Auxiliary Fuel Pump ON (green light is ON)
2. Fuel Transfer Pump ON, CHECK if yellow low fuel caution light goes OFF after a short time (max. a few minutes)
   (with optional left auxiliary tank)
3. Fuel Quantity CHECK (fuel quantity gauge left and right)

With low fuel in the right tank, there is commonly no malfunction. Transfer fuel from the left auxiliary tank (when installed) to the nearly empty right main tank by switching the transfer pump ON.
4. Fuel Transfer Pump
(low fuel in the right main tank)

ON until the yellow Low Fuel Caution Light goes OFF and adequate fuel has been transferred into the main tank.

If there is adequate fuel in the right main tank AND the yellow Low Fuel Caution Light is ON again after the transfer pump has been switched OFF, there is probably a malfunction of the fuel circulation pump (transferring fuel from the right main tank to the related feeder tank. In this case the remaining fuel in the right main tank is NOT available anymore (except from the fuel in the feeder tank). To prevent fuel flowing from the left auxiliary tank to the right main tank (where it could not be used) the following procedure is recommended:

5. Fuel Transfer Pump
(If a malfunction of the fuel circulation pump is suspected)

ON until the yellow Low Fuel Caution Light goes OFF. Then OFF until the yellow Low Fuel Caution Light comes ON again. Repeat until landing.

If there is NO MALFUNCTION and the yellow Low fuel Caution Light is ON indicating low fuel in the right main tank and the left auxiliary tank (when installed) is empty, the following procedure is recommended:

6. With low fuel

If necessary REDUCE power and speed. Fly with wings leveled and without bank-angle.

In either case:

7. If necessary execute a normal air-start of the engine (refer to chapter 4.7.3.5).

If the low fuel in the feeder tank cannot be corrected, prepare for a landing on the next suitable airfield. An engine failure must be expected at every time.
3.13.1.4 Red MAP Warning Light is ON or FLASHING

Red MAP warning light is continuously ON:
The manifold air pressure is higher than maximum allowed limit:

1. The manifold air pressure is not automatically controlled. In this case, THROTTLE BACK.
   Control the manifold air pressure with throttle (MAP warning light must go OFF).
   **Recommended operating limits:** \( \leq 75\% \text{ MCP} \)  
   \( \text{MAP: } \leq 31 \text{ inHg}, \text{ engine speed } \leq 5000 \text{ RPM} \)

2. Lower engine power has to be expected, the MAP control is not running correctly.

**Caution:** If the allowed engine-limits are exceeded, this must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.

Red MAP Warning Light is FLASHING:

**Takeoff Power was used for more than 5 minutes:**

1. Throttle \( \text{REDUCE (to maximum continuous-power 100\% or less)} \)

**Caution:** The manifold air pressure is not automatically reduced.

**Caution:** If the allowed time for takeoff power is exceeded, this must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.
3.13.1.5 Yellow TCU Caution Light of Manifold Air Pressure Control is FLASHING

A malfunction of the following systems is possible:
- sensors
- sensor lines
- Turbo Control Unit
- Leakage of airbox

1. CONTROL the RPM and manifold air pressure with THROTTLE (red MAP warning light must be OFF).
   **Recommended operating limits:** \( \leq 75\% \text{ MCP} \)
   \((\text{MAP:} \leq 31 \text{ inHg}, \text{engine speed} \leq 5000 \text{ RPM})\)

2. Turn OFF wastegate actuator with TCU isolation switch (the red safety switch is UP), if manual control is not satisfactory.

3. Lower engine power has to be expected, when the manifold air pressure control unit is not operating correctly.

**Caution:** If the yellow TCU caution light is flashing, this must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.

3.13.1.6 Red External Alternator Warning Light is ON

If the red external alternator warning light is ON, this shows that the alternator (with engine master switch ON) is not generating electrical power. This is normal if the engine is not running.

If the external alternator warning light is ON when the engine is running, this could be a malfunction. The following procedure is recommended:

1. Voltmeter/ Ammeter CHECK; whether there is an alternator malfunction
2. Circuit Breaker for the external alternator CHECK (if necessary push in)
   **If there is an alternator malfunction:**
3. Circuit Breaker External Alternator OFF
4. Electrical Equipment not needed OFF
5. Prepare to land on the next suitable airfield.
In the case of a failed alternator, the battery will be discharged constantly. To save energy, switch OFF all electrical equipment that is not needed.

### 3.13.1.7 Yellow Internal Generator Caution Light is ON

If the engine is running the yellow internal generator caution light ON shows a malfunction of the internal generator. This is not a critical situation. The internal generator bus is supplied with energy from the main bus (battery and external generator). The following procedure is recommended:

1. Continue flight with special attention to the red external generator warning light.

**Warning:** If the yellow internal generator caution light is ON and also the red external generator warning light is ON (refer to chapter 3.13.1.6), the TCU and the fuel pumps are supplied only by the battery. The battery will not be re-charged. If the battery is discharged the engine can fail. Prepare to land on the next suitable airfield. If the battery is well charged, it has energy for 20 - 30 minutes of flight time.

### 3.13.1.8 Total Electrical Failure

A total electrical failure can have several reasons. In any case, the COM and all electrical equipment are not available, including:

- elevator trim,
- propeller pitch control
- engine instrumentation, incl. Turbocharger Control Unit (TCU)

(except manifold air pressure gauge). Also the electrical auxiliary fuel pump and the TCU will fail. The manifold air pressure has to be controlled by hand within the allowed limits. The RPM should be as low as possible to do not exceed the maximum RPM. The following procedure is recommended:

1. Master Switch OFF (not the engine ignition switch)
2. All electrical systems OFF (Generator, Avionics)
3. All system circuit breakers
   CHECK
do not push in popped-out circuit breakers

4. Master Circuit Breaker
   CHECK (PULL and then PUSH)

5. Master Switch
   ON

When the electrical system is available again (the voltmeter shows normal voltage), try to switch ON individual systems. If possible avoid to switch ON systems with circuit breakers that popped out.

If it is not possible to repair the electrical system, the following procedure is recommended:

1. Throttle
   REDUCE for level flight to approx. \( v_x = 60 \text{ kts} / 110 \text{ km/h} \)

2. Prepare for a safety landing on the next suitable airfield.

3. Landing Gear
   EMERGENCY EXTEND
   (ref. to chapter 3.12.1)

**Warning:** The tachometer is not working. The engine-RPM can only be controlled by hearing. Do not overspeed the engine. Therefore (and because the TCU may fail), the recommended power-setting is for level flight with approx. \( v_x = 60 \text{ kts} / 110 \text{ km/h} \).

3.13.1.9 **Loss of Electrical Energy for the Turbo Control Unit (TCU)**

When the TCU has no energy, because of
- master switch OFF
- engine master switch OFF
- or the corresponding circuit breakers have popped-out.

the following procedure is recommended:

1. Turn OFF the wastegate actuator with TCU isolation switch in the ACTIVATED position (the switch is UP).
2. Restore electrical power supply to the TCU (master switch ON, engine master switch ON, CHECK the corresponding circuit breakers)

3. WAIT for about 10 seconds (TCU self-test)

4. Turn ON the waste gate actuator with TCU isolation switch in the DEACTIVATED position (the switch is DOWN).

5. If it is not possible to restore the electric power supply, the RPM and manifold air pressure must be controlled by hand. **Recommended operating limits:** ≤75% MCP (MAP: ≤31 inHg, engine speed ≤5000 RPM).

   Lower engine power must be expected.

**Caution:** Switch the waste gate actuator OFF before restoring the electrical power supply. Otherwise the waste gate actuator will also perform the TCU self-test.

**Caution:** If the allowed engine limits are exceeded, this must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.

### 3.13.1.10 Sudden Drop of Manifold Air Pressure MAP and RPM

If the MAP and RPM suddenly drop, together with **high noise** or a **bang**, it is most likely that the turbocharger is damaged:

1. SHUT DOWN the engine as soon as possible. Change to glider configuration and look for a safe landing area.

2. Limited engine operation might be possible, if there is no safe landing area (MONITOR engine instruments, especially oil pressure).

If the MAP and RPM suddenly drop and the **yellow TCU caution light** is FLASHING at the same time, a malfunction of the turbocharger control is most likely:
3. The wastegate possibly will not close. Lower engine power must be expected. (With the wastegate open the engine power is limited to approx. 89 HP / 66 kW).

**Caution:** If the allowed engine-limits are exceeded and/or the TCU caution light flashes, this must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.

### 3.13.1.11 Sudden Rise of Manifold Air Pressure MAP and Engine RPM

If the MAP and RPM suddenly rise and the yellow TCU caution light is FLASHING, a malfunction of the turbocharger control unit is most likely:

1. Control MAP and RPM with throttle (red MAP warning light must be OFF)  
   **Recommended operating limits:** ≤75% MCP  
   (MAP: ≤31 inHg, engine speed ≤5000 RPM)

2. The wastegate is possibly closed. Lower engine power must be expected. With the wastegate closed, MAP control is only possible with the throttle.

If the MAP and RPM suddenly rise and the power can not be reduced with the throttle, the throttle cable is most likely broken. The power-setting rises by spring-load to 115% full-throttle.

It is recommended to climb to a safe altitude for changing to the glider-configuration and landing on a suitable airfield. Then TURN OFF the engine:

3. Airspeed ~68 kts / 125 km/h
4. At safety altitude: Fuel Valve CLOSE
5. After engine stopped: Ignition OFF
6. After the engine has cooled down: change to glider configuration (refer to chapter 4.7.3.3) and land in glider configuration.
**Warning:** If the engine is restarted with the carburetors set to full-power, the drive section might be severely damaged.

**Caution:** If allowed engine limits are exceeded, when the red MAP warning light is ON or FLASHING, or when the yellow TCU caution light is flashing, this must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.

### 3.13.1.12 Repeating Increase and Decrease of Manifold Air Pressure (MAP) and Engine RPM

A periodic increase and decrease of MAP and RPM is most likely caused by oscillations of the manifold air pressure control unit (while the yellow TCU caution light is not flashing). The following procedure is recommended:

1. **TCU Isolation Switch**
   
   Switch to ACTIVATED position (the switch is UP) to isolate wastegate actuator

2. **after max. 5 seconds**
   
   TCU isolation switch to DEACTIVATED position (the switch is DOWN) to reactivate wastegate actuator

   **If the system is not operating normally:**

3. **TCU Isolation Switch**
   
   to ACTIVATED position (the switch is UP) to isolate the wastegate actuator permanently

4. Manifold air pressure is not controlled automatically anymore. Control MAP (red MAP warning light must remain OFF) with the throttle.

   **Recommended operating limits:** $\leq 75\%$ MCP

   (MAP: $\leq 31\text{ inHg}$, engine speed $\leq 5000\text{ RPM}$)
Caution: If the wastegate actuator is switched OFF (TCU isolation switch is ACTIVATED), lower engine power has to be expected. The manifold air pressure control is only possible with the throttle.

Caution: A exceeding of the allowed engine-limits and/or deactivation of the wastegate actuator must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.

3.13.1.13 Exceeding the Maximum Engine Operating Temperatures

Caution: With a tendency to overheat on ground, reduce CHT and oil-temperature by cowl flaps fully opened, align A/C upwind and by slightly faster taxiing with reduced throttle if applicable.

Exceeding the Maximum Cylinder Head Temperature CHT

If the maximum CHT is exceeded during flight, the following procedure is recommended:

1. Cowl Flaps fully OPEN
2. Throttle REDUCE as necessary for safe flight
3. Landing Gear RETRACT if applicable or keep RETRACTED as long as possible (lever UP)
4. If the CHT does not decrease below maximum, change to glider-configuration and prepare to land on the next suitable airfield
5. Liquid Cooling System CHECK before next flight
Caution: If the maximum cylinder head temperature CHT is exceeded, this must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.

Exceeding the Maximum Oil Temperature

If the maximum allowed oil temperature is exceeded during flight, the following procedure is recommended:

1. Cowl Flaps fully OPEN
2. Throttle REDUCE as necessary for safe flight
3. Landing Gear RETRACT if applicable or keep RETRACTED as long as possible (lever UP)
4. If the oil temperature does not decrease below maximum, change to glider configuration and prepare to land on the next suitable airfield
5. Oil System CHECK before next flight

Caution: If the maximum oil temperature is exceeded, this must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.

Caution: Exceeding the maximum engine operating temperatures can be caused by a malfunction of the engine cooling radiator fan. Refer to the Maintenance Manual (STEMME Doc.-No.: P500-006.000) for further information.
3.13.1.14 Oil Pressure below Minimum during Flight

If the oil pressure is below minimum during flight, the following procedure is recommended:

1. If a safe landing can be done in glider configuration, change to glider-configuration (refer to chapter 4.7.3.3)
2. Otherwise REDUCE throttle to the minimum required for a safe flight. An engine failure must be expected at anytime.
3. Prepare to land on the next suitable airfield
4. Oil System CHECK before next flight

**Caution:** If the oil pressure drops below minimum, this must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.

3.13.1.15 Oil Pressure below Minimum on Ground

If the oil pressure is below minimum on ground, the following procedure is recommended:

1. Engine SHUTDOWN immediately
2. Oil Quantity CHECK
3. Type of Oil in use CHECK
4. Oil System and/or Engine CHECK

3.13.1.16 Exceeding of the Maximum Allowed Engine-RPM

If the maximum engine-RPM is exceeded, REDUCE THROTTLE immediately. This may be a malfunction of the propeller pitch control (refer to chapter 3.12.1.18).

**Caution:** If the maximum allowed RPM is exceeded, this must be documented by the pilot in the A/C-logbook with details like: nature of incident, date, duration and the degree of exceeding.
3.13.1.17 Loss of Propeller Pitch Control

During flight, the pilot must check the RPM continuously. If the RPM changes unintentionally (during flight over a strong electro-magnetic-transmitter or by a malfunction of the pitch control), the following procedure is recommended:

**Unintentional pitch changes, RPM-variation in the "AUTO" position or malfunction of the automatic pitch control:**

1. REDUCE THROTTLE immediately to avoid exceeding maximum allowed RPM.
2. Set left propeller switch to MANU - the Constant Speed Control is not working now, control the propeller manually.
3. Control the RPM with the right propeller switch:
   - HIGH RPM (START) = low pitch / high RPM
   - STOP = constant pitch / constant RPM
   - FEATHER = high pitch / low RPM

**Warning:** With the Constant Speed Control not working the RPM changes with the airspeed. Correct the propeller pitch manually when changing the airspeed.

When changing to higher airspeed, there is the danger of exceeding the maximum allowed RPM, when not correcting the propeller pitch in the FEATHER direction to the desired RPM.

4. For LANDING set the right propeller switch to HIGH-RPM. The propeller changes to the START position (green propeller start indicator light goes ON). If the propeller does not change to the START position (green propeller start indicator light is OFF), reduced power and rate-of-climb for a go-around must be expected.

If the propeller can be properly controlled manually after a malfunction of the Constant Speed Control, the flight can be completed with manual propeller control. The malfunction of the Constant Speed Control must be repaired before the next flight.
If the propeller pitch CANNOT be controlled by setting the Constant-Speed-Control to AUTO or to MANU - or when set to MANU the propeller pitch or the RPM changes without command, the Constant Speed Control failed totally. The Constant Speed Control must be deactivated:

5. Activate the circuit breaker of the Constant Speed Control (Prop CTRL)

6. Control MAP and RPM with the THROTTLE to stay within the allowed range. MAP and RPM can only be controlled combined. The A/C behaves like having a fixed-pitch-propeller. Range and cruise-speed can be significantly reduced, because propeller and engine are not working under proper conditions.

7. Before LANDING - CHECK at 60 kts / 110 km/h airspeed if the Start-RPM is reached when executing a carefully THROTTLE UP. Avoid exceeding the maximum allowed RPM.
   - If the Start-RPM is reached the propeller is near the START-pitch. Landing can be executed normally.
   - If the Start-RPM is NOT reached the propeller is near the CRUISE-pitch, the pitch is too high for Takeoff and Landing. Reduced performance and rate of climb must be expected in the case of a go-around.

**Caution:** Cruise flight with propeller in the takeoff position will reduce the airspeed and shorten the range (revise flight plan if necessary!). During cruise with propeller in fixed takeoff position even in low altitudes the engines-RPM may be too high, even with power-settings below 100%. REDUCE throttle, to reduce engine-RPM below 5500 RPM (maximum continuous RPM).
3.13.1.18 Other Malfunctions of the Propeller Pitch Control

**Green takeoff position indicator light on the propeller control unit does not come to ON:**

The propeller is not in start-position or the green control light has failed.

1. During "Before Takeoff check": Eliminate the cause!
2. Before landing - CHECK at 60 kts / 110 km/h airspeed if the Start-RPM is reached when executing a carefully THROTTLE UP. Avoid exceeding the maximum allowed RPM.
   - If the Start-RPM is reached the propeller is near the START-pitch. Landing can be executed normally. The control light may have failed.
   - If the Start-RPM is NOT reached the propeller is near the CRUISE-pitch, the pitch is too high for takeoff and landing. Reduced performance and rate of climb must be expected in the case of a go-around.

**The yellow light comes ON for more than 1 second:**

1. Notify manufacturer. After consultation with the manufacturer and some tests of the propeller pitch a ferry flight may be possible. CHECK if voltage of electrical system is less than 11.5 V (normal operating voltage is 12 V).

**Both lights (green and yellow) are FLASHING at the same time:**

1. If the yellow light does not go OFF with normal voltage of electrical system, contact the manufacturer.

**Circuit Breaker pops out several times:**

1. Leave the circuit breaker OPEN! PROCEED with flight with fixed propeller pitch. Contact manufacturer of propeller or of A/C after landing.

3.13.2 Vibrations caused by the propeller or the propulsion system

Reasons for abnormal vibrations may be a local propeller damage or a malfunction of the engine or the drive system. It is recommended to REDUCE the engine-RPM immediately. If the vibrations are not clearly reduced, the following procedure is recommended:
3.13.3 Flights in Icing Conditions

Flights into icing conditions are not allowed. If icing conditions are met unintentionally, ice can build-up on:

- Wings
- Tail Surfaces
- Flight Controls
- Propeller
- Landing Gear Doors.

The risk of ice is greater at high altitudes. Additionally, ice on the cockpit-canopy can reduce the visibility.

It is recommended to initiate an **emergency descent** immediately to reach a lower altitude:

1. Throttle \( \text{IDLE} \)
2. Cowl Flaps \( \text{OPEN} \) (to avoid freezing locked in the CLOSED position)
3. Airbrakes \( \text{EXTEND} \)
4. Flight Controls \( \text{MOVE} \) (to avoid freezing locked)
5. Landing Gear \( \text{EXTEND} \) (lever DOWN)
   \( \text{CHECK OUT + LOCKED} \) (3 green lights on)

**Warning:** Ice on wings can increase the stall-speed remarkably and can change flutter-behavior. The minimum-speed is also increased by the additional weight.
3.13.4 Lightning Strike or possible Lightning Strike

1. REDUCE airspeed to LESS than maneuvering speed $v_A = 102$ kts / 190 km/h. Reduce further as required.
2. CHECK if all flight controls react as intended.
3. Afterwards, immediately LAND on next suitable airfield.

**Caution:** After a lightning strike, all electrical-systems will most likely have malfunctions or be completely inoperational. Communication and Transponder will be the first systems to fail after lightning strike.

**Warning** An A/C made of composite materials is more easily damaged by lightning strikes than an A/C made of metal. Avoid flights in or near thunderstorms!
Section 4 – Normal Operating Procedures

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4.1 Introduction

This chapter provides the normal operating procedures for the motorglider STEMME TSA-M, model "S6-RT" with the following equipment:

- retractable landing gear
- ROTAX 914 F engine
- 17.2 US gal / 65 l main tank + optional 17.2 US gal / 65 l auxiliary tank

The following sub-items provide checklists for the normal operations. The STEMME S6-RT uses the following flap settings:

CRUISE the most negative position for fast cruise, permitted up to $V_{NE} = 145 \text{ kts} / 270 \text{ km/h}$

NEUTRAL neutral position for slow cruise, also intended for flights between regions of lift in glider configuration, permitted up to $V_{NE} = 145 \text{ kts} / 270 \text{ km/h}$

TO / LDG 1 positive position for T/O, approach, landing, thermalling in glider configuration, permitted up to $V_F = 102 \text{ kts} / 190 \text{ km/h}$

LDG 2 Landing position for final approach and landing, permitted up to $V_{FL} = 75 \text{ kts} / 140 \text{ km/h}$

For power setting with throttle and propeller-RPM (refer to chapter 7.11.2.1), use the following table:

<table>
<thead>
<tr>
<th></th>
<th>Throttle</th>
<th>Manifold Air Pressure $inHg$</th>
<th>Propeller RPM $\pm50$</th>
<th>Engine RPM $\pm200$</th>
</tr>
</thead>
<tbody>
<tr>
<td>T/O</td>
<td>115%</td>
<td>39</td>
<td>2100</td>
<td>5600 $^{+200}_{-100}$</td>
</tr>
<tr>
<td>Continuous</td>
<td>100%</td>
<td>35</td>
<td>2000</td>
<td>5300 $\pm200$</td>
</tr>
<tr>
<td>(MCP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75% MCP</td>
<td>75%</td>
<td>31</td>
<td>1875</td>
<td>5000 $\pm200$</td>
</tr>
<tr>
<td>65% MCP</td>
<td>65%</td>
<td>29</td>
<td>1800</td>
<td>4800 $\pm200$</td>
</tr>
<tr>
<td>55% MCP</td>
<td>55%</td>
<td>28</td>
<td>1600</td>
<td>4300 $\pm200$</td>
</tr>
</tbody>
</table>

RPM-Table for power settings and propeller settings
### 4.2 Airspeeds for Normal Operation

All airspeeds for normal flight operation are given as IAS.

<table>
<thead>
<tr>
<th></th>
<th>Takeoff</th>
<th>Landing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Liftoff speed</strong></td>
<td>(Flaps set to “TO / LDG 1”)</td>
<td>44 kts / 82 km/h</td>
</tr>
<tr>
<td><strong>Airspeed for initial climb over 50 ft / 15 m obstacle</strong></td>
<td>(Flaps set to “TO / LDG 1”)</td>
<td>60 kts / 110 km/h</td>
</tr>
<tr>
<td><strong>Airspeed for best angle of climb ( v_x ) at MSL</strong></td>
<td>(Flaps set to “TO / LDG 1”, Landing Gear RETRACTED)</td>
<td>60 kts / 110 km/h</td>
</tr>
<tr>
<td><strong>Airspeed for best rate of climb ( v_y ) at MSL</strong></td>
<td>(Flaps set to “NEUTRAL”, Landing Gear RETRACTED)</td>
<td>68 kts / 125 km/h</td>
</tr>
<tr>
<td><strong>Approach speed for normal landing</strong></td>
<td>(Flaps set to “TO / LDG 1” or “LDG 2”)</td>
<td>60 kts / 110 km/h</td>
</tr>
<tr>
<td><strong>Minimum airspeed for go-around</strong></td>
<td>(Flaps set to “TO / LDG 1” or “LDG 2”)</td>
<td>49 kts / 90 km/h</td>
</tr>
<tr>
<td><strong>Max. crosswind component for T/O and landing</strong></td>
<td>(Flaps set to “TO / LDG 1”)</td>
<td>16 kts / 30 km/h</td>
</tr>
</tbody>
</table>
4.3 Rigging and Derigging

Before rigging, clean and grease any connecting-points of the fuselage, wings, empennage and controls.

Derigging is done in the reverse sequence of rigging.

**Caution:** Before rigging/de-rigging procedures and any moving of the aircraft SET landing gear lever to DOWN position (EXTEND) and activate master switch (Batt) to ensure landing gear is in OUT + LOCKED position and hydraulic system pressure is 90 bar / 1305 psi ±8%!
Press push-button for pressure reservoir in the landing gear bay until pressure is 90 bar / 1305 psi ±8%. If applicable wait until all indication lights are green and hydraulic pump is OFF again before deactivation of master switch.

**Warning:** Before rigging or de-rigging of the A/C always CHECK:
- both ignition circuits must be OFF
- master switch must be OFF
- ignition key must be REMOVED
- parking brake must be APPLIED

**Caution:** Only rotate the propeller in direction of rotation of propeller and engine!

4.3.1 Fuselage

1. Position the fuselage and prevent it from rolling away with parking brake and chocks.
2. Master switch MUST be OFF, ignition key MUST be REMOVED.
3. Close the canopy.
4. Rotate 3-blade-propeller by hand into Y-position (one blade vertically down).
5. Remove upper fairing.
6. Unhinge gas springs of each main gear door and remove side fairings including main gear doors.
4.3.2 Wing

Inner wing (IW)

1. Preparation
   - Rotate 3-blade-propeller by hand into Y-position
   - prepare all push rod connections between fuselage and wing
   - prepare tools and grease all 4 wing bolts
   - remove cowlings from the fuselage sides

2. Lift the inner wing over the propeller and canopy move rearwards over the center frame. Do NOT scratch the canopy with the wing’s main brackets.

3. Place it on the fuselage. Do NOT jam fuel lines or connecting cables.
   Incline the wing a little bit with the rear down.
   First place the rear joints then the forward joints onto the frame.

4. Start with the rear wing bolts. Insert the 2 bolts fully into the connectors between the fuselage and inner wing. If needed extra force can be applied to push the bolts forward using appropriate tools. Secure the 2 bolts with Fokker needles.

5. Insert the 2 forward wing bolts fully into the connectors in forward direction by using the on-board tool-set. Note - the cotter pins must pass through the hole in the bolts.

6. Secure the 2 forward wing bolts with the cotter pins.

7. Connect the two fuel-lines (out and backflow) of the wing tank with the fuel lines of the fuselage. Use the quick-disconnect-fittings of the fuel-lines by reaching from the cockpit through the opening in the rear bulkhead. To guarantee good sealing of the fittings, they must be clean.

Caution: Pay attention to correct (audible!) engagement of the quick-disconnect-fittings. Pull to test for secure fit!

8. Connect the plug for the electrical connections and the fuel sensor.

9. Install the cover at the cockpit’s rear wall.

10. Connect the 2 plugs for the pressure-tubes at the left side of the center frame with quick-disconnect-fittings.

11. Connect the 3 push rods with red quick-disconnect-fittings. Start from front with airbrakes, then flaps and the ailerons. Secure all quick-disconnect-fittings with cotter pins.
Outer wing (OW)

12. Preparation of left outer wing:
   - cockpit: set the flap-lever to maximum positive deflection LDG2!
   - cockpit: set the airbrake lever to the forward position
   - prepare all quick connect fittings from the push rods of the inner wing
   - grease the main bolts
   - use the T-handle tool to insert the main bolt into the bushing of the inner wing, do not insert it fully
   Insert the spar of the left outer wing into the spar-opening of the inner wing.
   Do not cant the outer wing with the inner wing. Leave a gap of approx. 8 in / 20 cm to allow for the connection of the flight controls.

13. Insert the spar of the left outer wing into the spar-opening of the inner wing.
   Do not cant the outer wing relative the inner wing. Leave a gap of approx. 8 in/ 20 cm to allow for the connection of the flight controls.

14. Extend the air-brake at the outer wings by moving the deflection lever by hand. Secure the airbrake with the other hand.

15. Push the outer wing into the inner wing leaving a gap of approx. 4 in/ 10 cm.

16. Starting at the front, connect the 3 control rods to the deflection levers of the airbrake, outer aileron, and inner aileron. Secure the 3 quick-connectors with cotter pins. The quick connectors must be inserted into the push rods from above. The cotter pins must be inserted bottom-up.

17. Connect the avionic plugs forward of the main spar. Plugs or cable must not protrude from the wing’s contour.

18. Insert the outer wing fully into the inner wing. Pay attention to the engagement outer wing shear bolts into the sockets of the inner wing. Maximum allowed gap between inner and outer wing is 2 mm/ 0.08 in.

19. It could be helpful to lift the outer wing at its tip to ease the insertion of the main bolt. Use the T-handle tool to insert the main bolt fully, rotate the bolt for easy movement. Unscrew and remove the tool.
   The main bolt is inserted correctly, when the outer contour of the axial safety mechanism fits smoothly to the contour of the wing surface.

20. Mount the right outer wing in the same manner as described above.

Winglet:

21. Insert the spar of the winglet into the main spar of the outer wing. Use the T-handle to insert the winglet bolt.

22. Connect the avionic plugs.

23. Insert the winglet fully.
24. Use the T-handle-tool to insert the main-bolt fully. Remove the tool. The main bolt is inserted correctly, when it does not protrude from the outer contour of the wing.

4.3.3 Horizontal-Tail-Unit

1. The elevator is connected automatically to the elevator-control-rod.
2. Pull the horizontal-tail-unit’s forward tension-screw fully out. Place the horizontal-tail-unit onto the vertical-stabilizer. Ensure that the reel of the elevator-deflection-lever fits into the bracket of the vertical stabilizer. Then move the horizontal tail rearwards, so that the mounting bolts fit completely into the sockets. All 3 mounting-bolts must engage properly into the sockets.
3. Tighten the tension-screw with a box-wrench (wrench-size: 8 mm).
4. The forward vertical edge of the horizontal-tail-unit-flange must be flush with the leading edge of the vertical stabilizer. Only then the connection is properly secured.
5. Check correct installation of the horizontal-tail-unit by pushing the leading edge upwards.

4.3.4 Fuselage Fairings

1. Install side-fairings including main gear doors and mount gas springs of each main gear door to center fuselage attachment pins.
2. Install the upper fairing. The side fairings must overlap the upper fairing at the rear.
3. Check linkage of landing gear doors and gas springs.

**Note:** Before installing the fairings, perform checks according to chapter 4.5 (“Daily Inspection”).
4.4 Fueling of the Aircraft

Fuel is filled into the wing tanks through the filler caps in the outer area of the inner wing section (right side = main tank, left side = optional auxiliary tank). Open the filler-caps by pushing and turning the slotted-screw in a counterclockwise direction with a screwdriver. Close the filler-cap by pushing the screw and turning it in a clockwise direction. Check for correct position of the gasket when re-installing the filler cap!

Note: The filling-holes end close to the upper-brim of the tanks. Therefore the wings must be leveled when fueling and when opening the filler caps. This is to prevent fuel from leaking.

Note: Do not fill the tanks completely at high temperatures. Otherwise fuel might leak from the fuel tank vents (at the wing-joint) due to thermal expansion.

Note: Check for correct grounding of the fueling system! For example, this can be done by grounding the exhaust pipe.

Note: The wing’s finish can be damaged by contact with fuel.
4.5  Daily Inspection

The pilot-in-command has to perform an accurate visual inspection of the aircraft before commencing of flight operations.

**Warning:** Flight-readiness must be checked accurately after the A/C has been rigged or prior to the first flight of the day. Not performing this check, or doing the check carelessly, could result in major accidents!

The daily inspection of the entire aircraft should be performed as a walk-around.

**Caution:** Before daily inspection procedures and any moving of the aircraft SET landing gear lever to DOWN position (EXTEND) and activate master switch (Batt) to ensure landing gear is in OUT + LOCKED position and hydraulic system pressure is 90 bar / 1305 psi ±8%!
Press push-button for pressure reservoir in the landing gear bay until pressure is 90 bar / 1305 psi ±8%. If applicable wait until all indication lights are green and hydraulic pump is OFF again before deactivation of master switch.

**Caution:** During the visual inspection, check for: mechanical damage, cracks, delamination, freedom-from-play, transmission of forces, correct mounting, contaminations, foreign objects and the general condition. Additionally, control surfaces must be checked for mobility.

Additionally to the mentioned checks, the aircraft must be inspected for cracks in the finish, deformations and roughness of surfaces. If there is any doubt about any results or findings, consult a specialist.

During walk-around check any drainage holes and ventilation openings and clean them, if necessary (refer to Maintenance Manual).
Perform the following checks during the walk-around. The checks are listed in a system-oriented manner (Before beginning, turn OFF the ignition-switch AND the master switch!).

I. Engine

1. Upper fairing
   - REMOVE

2. Firewall covers
   - REMOVE through access of upper fairing and open main gear doors

3. Visual inspection of the engine
   - CHECK for foreign objects and leaks

4. Oil system, liquid cooling system and fuel system
   - CHECK VISUALLY for leaks

5. Level of coolant in expansion tank and overflow reservoir
   - CHECK when the engine is cold (coolant level expansion-tank: Max. coolant level overflow-bottle: between min. and max. marks). If necessary, REFILL.

Warning: Before turning the propeller by hand, turn OFF both ignition-circuits AND the master switch! Activate the wheel brakes. The cockpit should be occupied by an experienced person.

Caution: When refilling coolant in the overflow-reservoir and tightening the cap afterwards make sure that the plugged vent hose remains untwisted.

6. Oil reservoir
   - OPEN the cap.

7. Oil
   - Rotate the engine for several revolutions by hand (Rotate the propeller in the normal-operating-direction). This pumps oil from the engine to the oil reservoir (according to ROTAX). Rotate the propeller until a flushing sounds can be heard at the oil reservoir.

8. Oil level
   - CHECK (min. lower mark, max. upper mark) For flights-durations of more than 8 hours, the oil-level should be at least half way between the min. and max. marks. If necessary, REFILL oil.

9. Oil reservoir
   - CLOSE the cap.
10. Hydraulic Fluid Retractable Landing Gear
   CHECK oil level at dipstick of hydraulic drive unit
   (min. lower mark, max. upper mark)

11. Movement of throttle and choke
   CHECK for mobility.

12. Lateral firewall covers
   REINSTALL

13. Cowl Flaps and Exhaust Flaps
   CHECK function

14. Both fuel vents
   CLEAR (lower right side of wing at wing-joint, optionally also at lower left side of wing at wing-joint)

15. Amount of fuel
   VISUAL INSPECTION through corresponding fuel-port

16. Drainage of fuel system
   Press the two drainage-valves of the right fuel-tank (and the drainage-valve of the left fuel-tank, if optionally installed). Drain fuel into a glass and inspect for contamination and water. Drain as much fuel as needed to ensure that all contaminations and water are removed.

**Caution:** The A/C must have been parked with the wings leveled for a sufficient time (several hours) before draining. CHECK if drainage valves close again correctly after operation. If they do not close correctly, there might be dirt in the fuel. While draining fuel there is an increased risk of fire. Before starting the engine, make sure that there is no imminent danger of fire.

II. Area of Wing-Joint

1. All 4 wing bolts
   SECURED with Fokker-needles at the rear
   SECURED with cotter pins at the front

2. Flight Controls
   CONNECTED and SECURED with cotter pins - one connector each for ailerons, flaps and airbrakes

3. Flight Controls
   CHECK for mobility

4. Fuel Lines
   CONNECTED and NO LEAKAGE
5. Connectors for electric elements in wings
CONNECTED

6. Pressure tubes from static-port and pitot tube
CONNECTED (red/red; blue/blue)

7. Check for Foreign Objects
PERFORM

8. Upper fairing
REINSTALL

III. Propeller and Front Drive

1. Fairing of front drive
REMOVE

2. Propeller Pitch Function
CHECK: Master switch ON, left propeller switch to MANU. Set the right propeller-switch to FEATHER and then back to HIGH RPM to check the complete range of propeller-pitch to the feathered position and back into the T/O-position. Check if the green indication light is ON, when the propeller is in the T/O-position (HIGH RPM) again. Then left switch AUTO, right STOP for normal operating mode, master switch OFF.

3. Propeller Blades
VISUAL INSPECTION for damage. Check condition of blades and spinner. Movement of blade-tips up to 0.1 in / 3 mm tolerable (jiggle tips slightly). Movement of pitch-angle up to 2° tolerable. No unacceptable cracks and no loose edge-guards. PU-strips must be existent and without damage, otherwise replace within 10 operating-hours after last inspection.

4. Front Drive
VISUAL INSPECTION for wear through lower, side opening.

IV. Retractable Landing Gear

1. Tire pressure
Main wheels: 51 ±1.5 psi / 3.5 ±0.1 bar
Nose wheel: 51 ±3.0 psi / 3.5 ±0.2 bar

2. Slip Marks and Tread Pattern
CHECK
3. **Brakes**

   CHECK effectiveness of brakes by pulling the brake levers (pilot-side, and optionally co-pilot side). There must be a clear resistance.

4. **Mechanical locks for nose and main landing gear.**

   CHECK if attached.

**CHECKS Landing Gear Actuation / Doors:**

5. **Hydraulic Actuators**

   CHECK for damage, deformation, leakage and dirt.

6. **Hydraulic Lines**

   CHECK all hydraulic lines, fittings and hydraulic drive unit for damage and leakage.

7. **Drag Strut**

   CHECK locking mechanics, attachments and micro switches for damage, deformation and dirt at main and nose gear drag struts.

8. **Landing Gear Doors**

   VISUAL INSPECTION for correct mounting, actuation, damage and gas springs of all landing gear doors.

9. **Final position micro switches**

   CHECK all final position micro switches for damage and dirt.

10. **Main landing gear leg deflector**

    CHECK rail and pulley if clean and free moving.

11. **Pressure Reservoir**

    Check procedure acc. to point V

**V. Check and Refill of Hydraulic Pressure Reservoir of Landing Gear**

**CHECK of pressure reservoir in the wheel well**

1. **Landing gear lever**

   CHECK on DOWN position (EXTEND)

2. **Electrical Master Switch (Battery)**

   ON

3. **Pressure reservoir**

   CHECK for pressure of 90 bar / 1305 psi ±8%
   (CHECK of pressure gauge and red check light of push-button OFF)
If the storage pressure on the pressure gauge located at the tailboom bulkhead in the landing gear bay has dropped below 90 bar / 1305 psi ±8% and/or if the red check light of the push-button is ON, the pressure reservoir has to be refilled manually.

A drop of pressure in the separate storage pressure circuit of the hydraulic system may occur normally over a longer period of service or after longer off-time.

**Note:** In case of a drop of storage pressure after an emergency extension of the retractable landing gear as well as in case of general hydraulic system drop of pressure the pressure reservoir is pumped up automatically (pressure automatic) up to 90 bar / 1305 psi ±8% with activation of master-switch (Batt).

After an emergency extension additional procedures according to chapter 7.7.6 have to be applied.

**Refill Pressure Reservoir on Ground**

4. Parking brake SET
5. Push-button with check light PRESS until pressure is 90 bar / 1305 psi ±8%
6. Pressure gauge CHECK: red warning light for drop of pressure has to go OFF above 90 bar / 1305 psi
7. Electrical Master Switch (Battery) OFF

For further information refer to the maintenance manual of the STEMME S6-RT (STEMME Doc.-No.: P500-006000).

If the storage pressure drops below limit value frequently in short time periods repair the malfunction or contact the manufacturer.

**VI. Empennage**

1. Check horizontal tail unit for correct rigging

The forward vertical edge of the horizontal tail unit flange must be flush with the leading edge of the vertical stabilizer. The reel of the elevator deflection lever must fit into the bracket.
2. Check rudder for correct rigging

The lower bolt of the rudder must be inserted into the correct socket and must be secured with nut and cotter pin.

3. Control surfaces

CHECK for mobility and for excessive play or damage.

VII. Wing

1. Control surfaces

CHECK for clearance and too much play

VISUALY CHECK for damage.

2. Tank-filler caps, drainer and vents

VISUALY CHECK for leakage (refer to section I and chapt. 4.4)

3. Winglets & Connection

Check for correct mounting

4. IW/OW-bolts

Check for correct mounting of the main bolts.

The safety-pins must smoothly fit to the contour of the wing surface

5. Static Pressure Port

CHECK during pre-flight inspection (refer to chapt. 4.6.1)

6. Stall Warning

CHECK during pre-flight inspection (refer to chapt. 4.6.1)

VIII. Cockpit

1. Canopy

Sufficient visibility

2. Cockpit Area and Seats

CHECK for foreign objects

3. Behind Seats

CHECK for foreign objects

4. Landing Gear Lever

ENSURE to be set on DOWN position (EXTEND)

5. Check of Engine Master Switch

Electrical Master switch (Batt) ON, Engine master switch ON, TCU must perform self-test and main fuel pump must be running. Then, engine master switch OFF.
### 4.6 Pre-Flight Inspection

**Warning:** DO NOT RETRACT THE LANDING GEAR ON GROUND!

The retractable landing gear of the S6-RT is not protected against incorrect or accidentally operated retraction on ground.

#### 4.6.1 Exterior Inspection

The external inspection of the entire A/C should be performed as a walk-around. Check the following items:

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A/C Documents</td>
<td>CHECK</td>
</tr>
<tr>
<td>2. Daily Inspection</td>
<td>COMPLETED</td>
</tr>
<tr>
<td>3. Landing Gear Lever</td>
<td>ENSURE to be set on DOWN position (EXTEND)</td>
</tr>
<tr>
<td>4. Loading and CG</td>
<td>CHECK and within acceptable limits</td>
</tr>
<tr>
<td>5. Amount of Oil</td>
<td>CHECK with oil dipstick</td>
</tr>
<tr>
<td>6. Amount of Coolant</td>
<td>VISUAL INSPECT trough exhaust shaft at overflow bottle in the engine compartment</td>
</tr>
<tr>
<td>7. Amount of Fuel (right/left)</td>
<td>remove filler caps. VISUAL INSPECTION. Then, replace filler caps</td>
</tr>
<tr>
<td>8. Cowlings</td>
<td>CHECK for correct mounting</td>
</tr>
<tr>
<td>9. Pitot Tube and Static Ports on Pressure Probe</td>
<td>CHECK for correct mounting and for foreign objects or contamination</td>
</tr>
<tr>
<td>10. Dynamic Pressure and Vertical Speed Indicators / Variometers</td>
<td>CHECK (carefully blow against tip of pressure probe)</td>
</tr>
<tr>
<td>11. Front and Main Landing Gear</td>
<td>CHECK components for foreign objects, condition and for correct mounting</td>
</tr>
<tr>
<td>12. Mechanical locks for nose and main landing gear.</td>
<td>REMOVE</td>
</tr>
<tr>
<td>13. Hydraulic System and Actuators</td>
<td>CHECK for condition and leakage</td>
</tr>
<tr>
<td>14. Landing Gear Doors</td>
<td>CHECK all doors for condition and correct mounting</td>
</tr>
</tbody>
</table>
CHECK flight controls (an assisting person is needed)

15. Left Airbrake  
   CHECK for transmission of force, maximum deflection and play

16. Left Aileron at flap setting "NEUTRAL"  
   CHECK for transmission of force, maximum deflection and play

17. Left Flap  
   CHECK for transmission of force, deflections from "LDG 2" to "CRUISE" and play

18. Elevator  
   CHECK for transmission of force, maximum deflection and play

19. Rudder  
   CHECK for transmission of force, maximum deflection and play

20. Right Flap  
   CHECK for transmission of force, deflections from "LDG 2" to "CRUISE" and play

21. Right Aileron at flap setting "NEUTRAL"  
   CHECK for transmission of force, maximum deflection and play

22. Right Airbrake  
   CHECK for transmission of force, maximum deflection and play

23. Electrical Master Switch (Battery)  
   ON

24. Stall Warning  
   CHECK function of acoustic warning by slight deflection of sensor plate

25. Pressure Reservoir  
   CHECK warning light for storage pressure (in landing gear bay, tailboom bulkhead) to be OFF

26. Fuel Flow Gauge (optional)  
   CHECK for correct setting after refueling or identification of fuel level

Constant Speed Propeller

27. CS-Propeller  
   CHECK function

28. Electrical Master Switch (Battery)  
   OFF
4.6.2 Interior Inspection

**CHECK before Engine Start**

1. Foreign Objects  
   CHECK, secure loose objects

2. Parachutes (optional)  
   worn correctly

3. Seat Belts  
   worn correctly by all occupants

4. Canopy  
   CLOSED and LATCHED (left, right and top)

5. Rebound Strap  
   REMOVED

6. Seat Position and Rudder Pedals  
   CHECK for comfortable position and fixation

7. Control elements and Panel  
   easily reached

8. Flight Controls  
   FREE movement (ailerons, elevator, rudder, flaps, airbrakes, cowl-flaps)

9. Landing Gear Lever  
   ENSURE to be set on DOWN position (Extend)

10. Electrical Master Switch (Battery)  
    ON

11. Trim  
    CHECK trim-function and trim-indicator over the complete range of trim

12. Fire Warning  
    CHECK function of push-button:  
    Push button, red light has to come on and alarm signal has to sound

13. Indication Lights Landing Gear  
    CHECK for correct state (3 green lights ON)
4.7 Normal Operating Procedures and Recommended Airspeeds

**Warning:** DO NOT RETRACT THE LANDING GEAR ON GROUND!

The retractable landing gear of the S6-RT is not protected against incorrect or accidentally operated retraction on ground.

**Warning:** The Extending of the landing gear is only permitted up to a maximum speed of $v_{LO} = 75$ kts / 140 km/h! Above this speed a structural failure of landing gear components, especially of landing gear doors may result.

**Note:** Although operation of retractable landing gear is permitted up to maximum speed of $v_{LO}$ it is recommended to RETRACT and EXTEND at an airspeed of 60 kts / 110 km/h.

**Note:** After a longer period of parking/hangaring on ground, during taxiing or during flight especially directly after retraction or extension of landing gear, due to gust and maneuvering loads during cruise flight or due to rapid cooling, the hydraulic system pressure may be pumped up occasionally. This is due to the system pressure automatic and is signalized by a short flash up of indication lights:

- on ground: orange instead of green light
- in flight: red flash up (with l/g RETRACTED)

A flash up about once a minute for less than 1 sec is normal and not a malfunction.

Due to rapid temperature changes or with frequent retraction or extension of the landing gear (e.g. during training operation) shorter flash-up intervals may occur temporarily.

Do not operate the throttle abruptly, but always gradually. When the throttle is operated abruptly, the propeller-pitch does not adjust as quickly as the engine power changes. There is the risk of briefly exceeding the maximum allowed RPM, before the variable pitch propeller has adjusted the RPM back to normal.
### 4.7.1 Start of Engine / Warm-Up and Taxiing

#### 4.7.1.1 Start of Engine / Warm-Up

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fuel Valve</td>
<td>OPEN</td>
</tr>
<tr>
<td>2</td>
<td>Cowl Flaps</td>
<td>OPEN (fully in)</td>
</tr>
<tr>
<td>3</td>
<td>Parking Brake</td>
<td>SET</td>
</tr>
<tr>
<td>4</td>
<td>Electrical Master Switch (Battery)</td>
<td>ON</td>
</tr>
<tr>
<td>5</td>
<td>Engine Master Switch</td>
<td>ON</td>
</tr>
<tr>
<td>6</td>
<td>TCU-self-test</td>
<td>CHECK if red MAP-warning light and yellow TCU-caution light are ON for approx. 1 to 2 seconds and then OFF again</td>
</tr>
<tr>
<td>7</td>
<td>Propeller Switch</td>
<td>CHECK function.</td>
</tr>
<tr>
<td>8</td>
<td>Propeller-RPM</td>
<td>SET propeller-RPM to <strong>2100 RPM</strong>.</td>
</tr>
<tr>
<td>9</td>
<td>Fuel Quantity</td>
<td>CHECK fuel gauges</td>
</tr>
<tr>
<td>10</td>
<td>Fuel Flow Gauge (optional)</td>
<td>ADJUST to actual fuel quantity (after measuring/refueling), CHECK against fuel gauges</td>
</tr>
<tr>
<td>11</td>
<td>Fuel Pressure</td>
<td>CHECK if red fuel-pressure-warning-light is OFF, fuel-pressure-gauge 2.5 ±1.0 (250 ±100 hPa) / 3.6 ±1.5 psi.</td>
</tr>
<tr>
<td>12</td>
<td>Auxiliary Fuel Pump</td>
<td>ACTIVATE briefly to check function. CHECK for operating noise, fuel pressure gauge still 2.5 ±1.0 (250 ±100 hPa) / 3.6 ±1.5 psi.</td>
</tr>
<tr>
<td>13</td>
<td>Fuel Transfer Pump (only with optional auxiliary tank)</td>
<td>ACTIVATE briefly to check function. CHECK for operating noise. With fuel tank completely filled the Fuel Transfer Pump does not start!</td>
</tr>
<tr>
<td>Step</td>
<td>Control</td>
<td>Action</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>--------</td>
</tr>
<tr>
<td>14.</td>
<td>Choke</td>
<td>fully ON if engine is cold (oil temp. &lt; approx. 120 °F / 50 °C) fully OFF if engine is warm (oil temp. &gt; approx. 120 °F / 50 °C)</td>
</tr>
<tr>
<td>15.</td>
<td>Throttle</td>
<td>IDLE if engine is cold (oil temp. &lt; approx. 120 °F / 50 °C) <strong>Throttle approx. 10%</strong> if engine is warm (oil temp. &gt; approx. 120 °F / 50 °C)</td>
</tr>
<tr>
<td>16.</td>
<td>Flaps</td>
<td>SET to NEUTRAL</td>
</tr>
<tr>
<td>17.</td>
<td>Propeller Area</td>
<td>CHECK CLEAR</td>
</tr>
<tr>
<td>18.</td>
<td>Ignition Switch</td>
<td>ACTIVATE (START) until engine is running (RPM in the green range), then set to BOTH</td>
</tr>
</tbody>
</table>

**Note:** The ignition is activated only approx. 2 seconds after operating the ignition switch. Do not activate the engine starter for more than 10 seconds, then allow a 2 minute break.

<table>
<thead>
<tr>
<th>Step</th>
<th>Control</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.</td>
<td>Oil Pressure</td>
<td>CHECK if in the green range. If performing cold start, it is allowed to be in the yellow range at first.</td>
</tr>
<tr>
<td>20.</td>
<td>External Alternator</td>
<td>CHECK if circuit breaker is ON, red external alternator warning light must go OFF</td>
</tr>
<tr>
<td>21.</td>
<td>Internal Generator</td>
<td>CHECK, yellow internal-generator-caution-light must go OFF</td>
</tr>
<tr>
<td>22.</td>
<td>Choke</td>
<td>fully OFF (If performing cold-start, set to OFF after approx. 1 minute. At the same time INCREASE throttle slightly.)</td>
</tr>
</tbody>
</table>

**Note:** The engine can take more than 10% throttle, only if the choke is fully OFF.

<table>
<thead>
<tr>
<th>Step</th>
<th>Control</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.</td>
<td>Warm-up</td>
<td>SET engine-RPM to approx. <strong>2200 RPM</strong> until oil temperature and CHT are in the green range. This is faster if the cowl flaps are closed for the time of the warm-up.</td>
</tr>
</tbody>
</table>
24. Warm-up Time

ALIGN the aircraft UPWIND if possible to avoid lateral airflow to the cooling air intake.

REDUCE time span for engine warm-up without taxiing to the required minimum.

4.7.1.2 Taxiing

1. Avionic Switch
   - ON
2. COM/ NAV/ XPDR
   - ON and SET (XPDR to STBY)
3. Parking Brake
   - RELEASE
4. Directional Control
   - with RUDDER PEDALS
5. Wheel Brakes
   - activate with BRAKE LEVER at the control stick
   - CHECK function of wheel brakes at slow taxiing.
6. Oil Temperature, CHT
   - CHECK, must be in the green range

4.7.2 Takeoff and Climb

4.7.2.1 Before Takeoff Check (at Holding Point)

1. Aircraft
   - ALIGN the aircraft UPWIND at Taxi Holding Point if possible.
2. Parking Brake
   - ACTIVATE
3. Fuel Valve
   - OPEN
4. Cowl Flaps
   - fully OPEN
5. Airbrake Lever
   - IN and LOCKED
6. Flaps
   - SET to "TO / LDG 1"
7. Choke
   - fully OFF
8. Propeller Switch
   - AUTO
9. Propeller-RPM
   - SET propeller-RPM to 2100 RPM
10. Magneto Check R/L
    - SET engine-RPM to 4200 ±100 RPM with throttle.
    - CHECK right and left ignition
11. Takeoff Power

CHECK: gradually increase throttle to 115%, then adjust propeller-RPM to **2100 RPM**. Engine-RPM should be \(5600 \pm 200\) RPM and manifold-air-pressure (MAP) should be **39 inHg**. SET **wheel brakes fully** during check of takeoff power.

**Warning:** THROTTLE UP too fast can result in exceeding the engines maximum allowed RPM. This can be avoided by using the throttle carefully.

**Note:** Depending on the air density (airfield elevation or temperature) the green start-control-light can go OFF before reaching FULL POWER. This is NOT a malfunction. The Constant Speed Control has limited the RPM under the given circumstances.

12. All Circuit Breakers and Fuses CHECK

13. Voltmeter CHECK (12 V to 14 V)

14. Ammeter CHECK if **POSITIVE**

15. Oil Pressure, Oil Temperature, CHT CHECK, must be in the green range

16. Trim SET to **NEUTRAL** for T/O

According to the c.g.-position from NEUTRAL up to halfway tail-heavy

17. Altimeter SET to QNH (field elevation)

18. Auxiliary Fuel Pump ON

19. All caution and warning lights OFF (only the green indication lights shall be ON:
- 3 lights landing gear
- 1 light auxiliary fuel pump
- 1 light for propeller in Takeoff position)
20. Fuel Transfer Pump (only with optional auxiliary tank) | ON
21. XPDR | ALT (MODE C)
22. Controls | FREE movement (ailerons, elevator, rudder, flaps, airbrakes, cowl flaps)
23. Canopy | CLOSED (right, left, top)
24. Seatbelts | FASTENED
25. Wind Conditions | CHECK
26. Parking Brake | RELEASE when ready for takeoff
27. Wings | CHECK if dry or wet.

**Warning:** With wet wings in some extend a significant increase in lift-off speed and takeoff distance has to be expected. In extreme cases a takeoff can even be impossible!

### 4.7.2.2 Takeoff

1. Aircraft | ALIGN on RWY
2. Wheel Brakes | SET
3. Propeller | CHECK settings: must be left switch **AUTO** and right switch **STOP**, 2100 RPM, green indication light **ON**
4. Throttle | increase gradually to FULL POWER. (Move to forward stop, past detent for MCP)

**Warning:** THROTTLE UP too fast can result in exceeding the engines maximum allowed RPM. This can be avoided by using the throttle carefully.
**Note:** Depending on the air density (airfield elevation or temperature) the green start-control-light can go OFF before reaching FULL POWER. This is NOT a malfunction. The Constant Speed Control has limited the RPM under the given circumstances.

5. **T/O-RPM / Manifold Air Pressure**
   
   CHECK:
   
   engine-RPM **5600 ±200 RPM** with
   
   **39 inHg** MAP (a short overshooting of MAP for 2 seconds is possible)

6. **Fuel Pressure**
   
   CHECK: red caution-light OFF, pressure 2.5 ±1.0 (250 ±100 hPa) / 3.6 ±1.5 psi.

7. **Oil Pressure, Oil Temperature, CHT**
   
   CHECK, must be in the green range.

8. **All caution lights and warning lights**
   
   OFF (only the green indication lights may be ON)

9. **Wheel brakes**
   
   RELEASE

10. **Takeoff Run**

11. **Rotation and Takeoff**
   
   The A/C takes off by itself from all three wheels at approx. 43 kts / 80 km/h, if flaps are set to "TO / LDG 1"

**4.7.2.3 Climb**

**Caution:** To avoid overheating of the engine cooling system during climb the landing gear has to be retracted as soon as possible after reaching safety-altitude.

**Caution:** The retraction and extension of the landing gear has to be applied only in flight conditions free of sideslip.
**Caution:** With retraction of the landing gear the A/C center of gravity moves rearward and the trim speed is reduced. This has to be considered for adjustment of trim during climb!

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1. Climb Speed (at MTOM) | **best rate-of-climb:**  
  \( v_y = 68 \text{ kts} / 125 \text{ km/h} \), flaps set to "NEUTRAL".  
  **best angle-of-climb:**  
  \( v_x = 60 \text{ kts} / 110 \text{ km/h} \), flaps set to "TO / LDG 1"
| 3. Landing Gear | RETRACT (lever UP) directly after reaching safety-altitude.  
  Recommended: RETRACT at \( v_x = 60 \text{ kts} / 110 \text{ km/h} \)  
  CHECK all indication lights: first RED, then OFF
| 4. Required Time Span for Retraction | CHECK. If time span for retraction exceeds 30 sec, RETRACT Landing Gear completely once again and EXTEND after that  
  CHECK for flight condition free of sideslip and compliance of recommended airspeed of 60 kts / 110 km/h
| 5. Trim | If necessary, ADJUST trim  
  RECOMMENDED after retraction of landing gear: one scale mark nose heavy
| 6. Oil Temp. / CHT | MONITOR. Before exceeding allowable ranges, REDUCE throttle.
| 7. Throttle | REDUCE THROTTLE after maximum of 5 min. to MCP or less (detent at throttle)
| 8. Propeller-RPM | ADJUST according to manifold air pressure gauge --> refer to RPM-table in chapter 4.1
4.7.3 Cruise / Cross-Country-Flying

**Caution:** During cruise flight even with airspeeds below \(v_{LO}\) the landing gear has to be kept RETRACTED.

### 4.7.3.1 Cruise (Powered)

1. **Throttle**
   - SET cruise-power according to MAP

2. **Propeller-RPM**
   - ADJUST according to manifold-air-pressure-gauge
   - \(\Rightarrow\) refer to RPM-table in chapter 4.1

3. **Flaps**
   - Set to "CRUISE" for fast cruise.
   - Set to "NEUTRAL" for normal cruise

4. **Trim**
   - SET according to airspeed

5. **Cowl Flaps**
   - REDUCE according to throttle, altitude, air-temperature and similar

6. **Oil Temp. / CHT**
   - MONITOR continuously:
     - must be in the green range, if necessary adjust cowl flaps

7. **Fuel Management**
   - \(\text{(with optional left tank installed)}\)
   - MONITOR

### 4.7.3.2 Fuel Management

The integral fuel tanks are located in the inner wing section with automatic fuel extraction. The only way to control the fuel extraction is by using the fuel valve to interrupt the fuel-flow or the auxiliary fuel pump (which assists the main-fuel-pump). The correct extraction of fuel can be monitored with the two fuel gauges and one low-fuel-caution-light.

The fuel tank system consists of one main tank with a feeder compartment in the right wing. An auxiliary tank in the left wing may be installed optionally.

If the engine is running, the feeder compartment is filled automatically from the main tank by a pump. If the feeder compartment is completely filled, then fuel flows back into the right main tank. The fuel transfer pump of the optional auxiliary tank also transports fuel into the feeder compartment.
Fuel is only taken from the optional auxiliary tank if less than 2/3 - 3/4 of the maximum amount of fuel remains in the main tank and the fuel transfer pump is switched ON.

**Note:** The low-fuel-caution-light (yellow LED) indicates a malfunction of the pumps. When the light goes ON permanently, the amount of fuel in the feeder compartment is below the critical amount. The remaining fuel in the feeder compartment then is 1.3 - 1.9 US gal / 5 - 7 l.

A short blinking of the low-fuel-caution-light during maneuvers or in gusty air indicates no malfunction. It is triggered by fuel sloshing in the feeder compartment.

If the optional left auxiliary tank is installed, and the fuel transfer pump is ON, the amount of fuel in the right tank may never drop below $\frac{2}{3} - \frac{3}{4}$ UNTIL the left tank is completely empty. If this does happen, then there is a malfunction of the fuel transfer pump (from the left tank to the feeder compartment). Flight planning must then take into account that only the remaining amount of fuel in the right tank is available.

**Note:** After a shut-down of the engine the low-fuel-caution-light (yellow LED) can go ON. After setting the engine switch to ON it should go OFF after a short time - when the circulation pump has refilled the feeder compartment.

### 4.7.3.3 Engine-Shut-Down (Transition to Glider Configuration)

1. Throttle
   - REDUCE to IDLE
2. Airspeed
   - REDUCE to approx. 50 - 55 kts / 90 - 100 km/h
3. Engine cool-down
   - WAIT until oil temp. and CHT are $<212 \, ^\circ F / 100 \, ^\circ C$
4. Propeller-RPM
   - SET propeller-RPM to **2100 RPM**
5. Ignition Switch
   - OFF
6. Propeller Switch
   - Left MANU, right FEATHER
7. Engine Master Switch  OFF when propeller has reached final pitch visibly
8. Cowl Flaps  CLOSE
9. Fuel Valve  CLOSE

### 4.7.3.4 Soaring

1. Flaps  circling in thermals: "TO / LDG 1"
   Flight between thermals: "NEUTRAL"

**Warning:** The voltage must not fall below the minimum of 11.5V during soaring flight. If the minimum voltage is reached the engine has to be restarted with windmilling immediately.

**Note:** Best glide-ratio occurs with flaps set to “NEUTRAL“, lowest sink rate with flaps set to "TO / LDG 1“.

### 4.7.3.5 Engine Restart (Transition to Powered Configuration)

**Warning:** When restarting the engine in flight with a windmilling propeller and at a high airspeed, the THROTTLE must be set to IDLE. Otherwise the engine can exceed its maximum RPM immediately after restarting.

**Warning:** If the engine is running (windmilling) do NOT use the starter. The engine could be damaged.
Caution: With low battery voltage near minimum value of 11.5V the engine restart is only possible with windmilling.

Note: During engine air-start, the altitude-loss is minimum 690 ft / 210 m, depending on meteorological sink rate.

Differentiation:
Normal airstart:
appr. 100 m / 330 ft (for 90 s propeller pitch)
Windmilling:
appr. 210 m / 690 ft (with acceleration to 160 km/h / 86 kts)

1. Engine Master Switch  ON
2. Propeller-RPM  SET propeller-RPM to 2100 RPM
3. Propeller Switch  left switch MANU, right switch HIGH RPM
   Note: propeller reaches full pitch after 90 seconds
4. Fuel Valve  OPEN
5. TCU-self-test  CHECK if red MAP-warning-light and yellow TCU-caution-light go ON for approx. 1-2 seconds and then go OFF again
6. Cowl Flaps  fully OPEN
7. Fuel Gauges  CHECK
8. Fuel Pressure  CHECK if red warning-light is OFF, fuel pressure gauge 2.5 ±1.0 (250 ±100 hPa) / 3.6 ±1.5 psi.
   If necessary, ACTIVATE auxiliary fuel pump
9. Choke  fully ON if engine is cold (oil temp. < approx. 120 °F / 50 °C)
   fully OFF if engine is warm (oil temp. >approx. 120 °F / 50 °C)
10. Throttle  IDLE if engine is cold
11. Indication Light of propeller T/O-position

WAIT for green LIGHT is ON, then
left propeller switch AUTO,
right propeller switch STOP
propeller speed **2100 RPM**

12. Ignition Switch

a) Windmilling propeller:
   only BOTH
b) Propeller has stopped:
   START until engine starts to run,
   then BOTH,

**Note:** The ignition is activated only approx. 2 seconds after operating the ignition switch. Do not activate the engine starter for more than 10 seconds, then allow a 2 minute break.

**Note:** The engine can be started if the propeller has pitched halfway (after approx. 30 seconds). Throttle-up only when the propeller is fully pitched to the T/O-position. (green indication light is ON).

**Note:** The stopped propeller (in the T/O-position) begins to windmill above approx. 86 kts / 160 km/h. This means that the engine can be started without the starter at any time, if the airspeed is high enough.

13. Oil Pressure

CHECK if in the green range. If performing cold start, it is allowed to be in the yellow range at first.

14. External Alternator

CHECK if red external alternator warning light goes OFF

15. Internal Generator

CHECK if yellow internal generator caution light goes OFF

16. Voltmeter

CHECK

17. Ammeter

CHECK if POSITIVE
18. Choke

fully OFF (If performing cold start, set back to OFF after approx. 1 minute. At the same time INCREASE throttle slightly.

Note: The engine can take more than 10% throttle, only if the choke is fully OFF.

19. Warm-up

SET engine-RPM to approx. 2200 RPM until oil temperature and CHT are in the green range. (The warm-up is quicker if the cowl-flaps are CLOSED.)

4.7.4 Landing in Powered Configuration

If the optional left auxiliary-tank is installed, it is recommended to turn ON the fuel transfer pump. This makes certain that the feeder compartment is completely filled.

If the fuel transfer pump is OFF during the approach and the yellow low-fuel-caution-light goes ON, then the fuel transfer pump must be turned ON.

Caution: The extension of the landing gear has to be applied only in flight conditions free of sideslip.

Caution: If the airbrakes are operated before extension of the landing gear, an acoustical warning signal comes up for protection against landings with landing gear retracted.
If the airbrakes are operated in high altitudes for quick descent the warning signal is not of significance.
4.7.4.1 Glideslope Control with Airbrakes (Throttle in IDLE)

1. Approach Speed
   60 kts / 110 km/h (recommended for MTOM)
   keep constant until beginning of flare

2. Trim
   SET according to approach speed

3. Flaps
   SET to “TO / LDG 1”

4. Cowl Flaps
   fully OPEN

5. Auxiliary Fuel Pump
   ON

6. Propeller Switch
   AUTO

7. Propeller-RPM
   SET propeller-RPM to 2100 RPM

8. Landing Gear
   EXTEND
   (lever DOWN)
   CHECK OUT + LOCKED
   (3 green lights on)
   Mind required time span for total extension of 20 sec!
   If applicable ADJUST trim

9. Throttle
   IDLE

10. All caution lights and warning lights
    OFF (only the green indication lights shall be ON:
        - 3 lights landing gear
        - 1 light auxiliary fuel pump
        - 1 light for propeller in Takeoff position)

11. Airbrakes
    control glideslope by OPERATING airbrakes accordingly during final approach

12. Flare and touchdown
    If enough airspeed is available, set the airbrakes to approx. the half-extended position and flare carefully with the elevator. Let the A/C touchdown on the main-gear. After touchdown, quickly EXTEND the airbrakes.

13. Wheel Brakes
    ACTIVATE as necessary after touchdown.
Note: The approach and landing can alternatively be flown with the flaps set to "LDG 2". However, it is recommended to set this flap setting only during final approach.

4.7.4.2 Glideslope Control with Low Engine Power

1. Approach Speed
   - 60 kts / 110 km/h (recommended for MTOM)
   - keep constant until beginning of flare

2. Trim
   - SET according to approach-speed

3. Flaps
   - SET to "TO / LDG 1"

4. Cowl Flaps
   - fully OPEN

5. Auxiliary Fuel Pump
   - ON

6. Propeller Switch
   - AUTO

7. Propeller-RPM
   - SET propeller-RPM to **2100 RPM**

8. Landing Gear
   - EXTEND (lever DOWN)
   - CHECK OUT + LOCKED (3 green lights on)
   - Mind required time span for total extension of 20 sec!
   - If applicable ADJUST trim

9. All caution lights and warning lights
   - OFF (only the green indication lights shall be ON:
     - 3 lights landing gear
     - 1 light auxiliary fuel pump
     - 1 light for propeller in Takeoff position, if applicable)

10. Airbrakes
    - UNLOCK, and extend partially.
    - LOCK in partially extended "CENTER"-position and HOLD (intended for low engine-power landing).
**Warning:** When using the partially extended airbrake position for glideslope control with low engine-power the airbrake lever has to be hold in position during touchdown, since the intermediate position is not arrested! Otherwise the locking may release which results in a sudden retraction of the airbrakes. This would cause an A/C lift-off again with the danger of a stall if not taken into consideration.

11. Throttle
    OPERATE as required for glideslope control

12. Flare and Touchdown
    Set THROTTLE to IDLE at beginning of flare. Flare carefully with the elevator. Let the A/C touchdown on the main-gear.

13. Wheel Brakes
    ACTIVATE as necessary after touchdown.

**Caution:** If the airbrakes are operated before extension of the landing gear, an acoustical warning signal comes up for protection against landings with landing gear retracted.

### 4.7.4.3 Go-Around (with or without Touchdown)

According to the selected approach-procedure – glideslope control with airbrakes (==> sect. 4.7.4.1) or with low engine power (sect. 4.7.4.2) – different procedures for a go-around are recommended.

**The main-principle during a go-around is:** First operate the lever with which the glideslope is controlled.

After approach with airbrakes extended:

1. Airbrakes
carefully RETRACT and LOCK

**Note:** If the airbrakes are retracted too quickly when the A/C is on the ground, the A/C may lift off again if it has enough speed.
2. Throttle carefully FULL POWER

**Warning:** THROTTLE UP too fast can result in exceeding the engines maximum allowed RPM. This can be avoided by using the throttle carefully.

3. Flaps once the safety-altitude (approx. 50 ft / 15 m) is reached, **carefully set to "TO / LDG 1"** (if flaps were set to "LDG 2" before)

**Warning:** Setting the flaps from "LDG 2" to "TO / LDG 1" too quickly can cause the A/C to plunge down unintentionally.

4. Landing Gear RETRACT if applicable (lever UP)
   CHECK all indication lights: first RED, then OFF

5. Climb according to chapter 4.7.2.3

After approach with low engine-power:

1. Throttle FULL POWER

**Warning:** THROTTLE UP to fast can result in exceeding the engines maximum allowed RPM. This can be avoided by using the throttle carefully.

**Note:** If the A/C has enough speed, it will lift-off immediately after increasing the throttle-setting. This might mean the airbrakes have to be retracted AFTER the A/C has lifted off again. If the airbrakes are in the "CENTER"-position for a low engine-power landing and the propeller-RPM is set to 2100 RPM, the A/C still has enough power for a shallow climb.

2. Airbrakes RETRACT and LOCK
3. Flaps once the safety-altitude (approx. 50 ft / 15 m) is reached, **carefully set**
4. Landing Gear

RETRACT if applicable
(lever UP)

CHECK all indication lights:
first RED, then OFF

**Warning:** Setting the flaps from "LDG 2" to "TO / LDG 1" too quickly can cause the A/C to plunge down unintentionally.

5. Climb

according to chapter 4.7.2.3

---

**4.7.5 Landing in Glider Configuration**

**Caution:** If the airbrakes are operated before extension of the landing gear, an acoustical warning signal comes up for protection against landings with landing gear retracted. If the airbrakes are operated in high altitudes for quick descent the warning signal is not of significance.

**4.7.5.1 Approach to Landing in Glider Configuration**

1. Approach Speed

60 kts / 110 km/h (recommended for MTOM)

keep constant until beginning of flare

2. Trim

SET according to approach-speed

3. Propeller Switch

left MANU, right FEATHER

4. Flaps

SET to "TO / LDG 1"

5. Landing Gear

EXTEND
(lever DOWN)

CHECK OUT + LOCKED
(3 green lights on)

Mind required time span for total extension of 20 sec!
If applicable ADJUST trim control glideslope by OPERATING airbrakes accordingly during final approach.

6. Airbrakes

If enough airspeed is available, set the airbrakes to approx. the half-extended position and flare carefully with the elevator. Let the A/C touchdown on the main-gear. After touchdown, quickly EXTEND the airbrakes.

7. Flare and Touchdown

ACTIVATE as necessary after touchdown.

8. Wheel Brakes

==> according to chapters 4.7.1.1 and 4.7.1.2

9. Start of engine and taxiing

Note: The approach and landing can alternatively be flown with the flaps set to "LDG 2". However, it is recommended to set this flap-setting only during final approach.

4.7.6 After Landing and Parking

4.7.6.1 After Landing

1. Flaps SET to "NEUTRAL"
2. Airbrakes RETRACT and LOCK
3. Auxiliary Fuel Pump OFF
4. XPDR STBY / OFF
5. Throttle use setting adequate for taxiing
6. Directional Control OPERATE rudder pedals
7. Wheel Brakes if necessary, OPERATE brake lever at control stick
### 4.7.6.2 Parking

1. **Throttle**  
   REDUCE to IDLE

2. **Parking Brake**  
   SET

3. **Engine cool-down**  
   WAIT until oil temp and CHT are < 212° F / 100° C

4. **COM/ NAV/ XPDR**  
   OFF

5. **Avionic switch**  
   OFF

6. **Ignition Switch**  
   OFF

7. **Engine Master Switch**  
   OFF

8. **Electrical Master Switch (Battery)**  
   OFF

9. **Cowl Flaps**  
   CLOSE

10. **Fuel Valve**  
    CLOSE

11. **Rebound Strap**  
    CONNECT

12. **Canopy**  
    OPEN (right, left, top)
4.7.7 Flights at High Altitudes

The true airspeed (TAS) at high altitudes is above the indicated airspeed (IAS). There is no restriction to the allowed flight envelope below FL65 (2000 m). Above this altitude, the never exceed speed \( v_{NE} \) is decreased according to the decrease in air density. This is shown in the following tables:

<table>
<thead>
<tr>
<th>Flight Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight Level</td>
</tr>
<tr>
<td>ft MSL</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>145 kts / 270 km/h</td>
</tr>
<tr>
<td>3300</td>
</tr>
<tr>
<td>145 kts / 270 km/h</td>
</tr>
<tr>
<td>6500</td>
</tr>
<tr>
<td>145 kts / 270 km/h</td>
</tr>
<tr>
<td>10000</td>
</tr>
<tr>
<td>138 kts / 255 km/h</td>
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<tr>
<td>13000</td>
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<tr>
<td>132 kts / 245 km/h</td>
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<tr>
<td>16500</td>
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<tr>
<td>124 kts / 230 km/h</td>
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<tr>
<td>19500</td>
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<tr>
<td>119 kts / 220 km/h</td>
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<tr>
<td>26000</td>
</tr>
<tr>
<td>105 kts / 195 km/h</td>
</tr>
<tr>
<td>33000</td>
</tr>
<tr>
<td>92 kts / 170 km/h</td>
</tr>
<tr>
<td>39500</td>
</tr>
<tr>
<td>81 kts / 150 km/h</td>
</tr>
</tbody>
</table>

Always keep the airspeed below the never exceed speeds given above. Only then can it be guaranteed that the aircraft will not flutter.

Due to the extremely low outside air temperatures (OAT) at high altitude it is possible that the capacity of the battery is reduced significantly. This might prevent the engine from being started with the electric starter. Starting the engine might only be possible once lower altitudes are reached and the battery has been allowed to warm up again. The engine manufacturer mentions a minimum temperature of the battery of \(-13 \, ^\circ F / -25 \, ^\circ C\). Starting the engine by windmilling the propeller should be possible. However, this has not been tried in flight tests. The above restrictions should be considered in flight planning.

At high altitudes ice can form on the inside of the canopy due to freezing breath. This can significantly reduce the visibility. If necessary, sink to a lower altitude with higher temperatures and/or lower humidity. If needed, open the emergency window.
Flying at high altitude can cause ice to form on the airframe. This can cause significant disadvantages in the aerodynamic behavior, aircraft mass and CG-position. A considerable decline of flight performance and behavior is possible. Flights in icing conditions are not allowed and must be avoided.

4.7.8 Flights in Rain

Rain influences the air-flow around the A/C. Flight performance and behavior will change. When flying in rain, the following is recommended:

1. Increase all recommended speeds for takeoff and landing by at least +6 kts/10 km/h. This should also be done for all other minimum air-speeds.
2. The rate of climb will decrease (up to 50%) and the cruise speed will decrease (up to 30%). These reductions have to be taken into account when flight planning. Also take into account the decreases in maximum range and endurance.
3. For flying in rain, no important changes of trim have been observed. However, changes in the trim speed should be expected.

4.7.9 Takeoff and Landing with Crosswind

For stronger crosswind the following is recommended:

1. Takeoff with FLAPS set to NEUTRAL. The A/C has no tendency to lift-off automatically and should intentionally be rotated at 49 kts/90 km/h by PULLING slowly at the control stick. The landing gear’s directional stability reduces the A/C’s sensitivity to crosswind until rotating.

| Note: | The stall-speed with flaps set to NEUTRAL is 3 kts/6 km/h higher than with flaps set to TO/LDG 1. |
2. **Land** with FLAPS set to NEUTRAL. The A/C has the tendency to float longer than normal and touchdown with a higher speed. The landing gear’s directional-stability reduces the A/C’s sensitivity to crosswind during the ground roll.

Due to the change in stall speed, it is recommended to INCREASE the approach speed from normally 60 kts / 110 km/h by 4 kts / 8 km/h to 64 kts / 118 km/h with the FLAPS set to NEUTRAL.

In crosswind conditions, two different APPROACH PROCEDURES are possible. These can be combined as necessary:

3. **Approach with** longitudinal axis of the fuselage aligned with the RWY. Move the aircraft into a slip by **lowering the upwind wing**. This is the steady-heading-sideslip-procedure recommended for powered A/C. It has the advantage that the attitude usually does not need to be changed until touchdown. This procedure has been demonstrated for crosswind-components of up to 16 kts / 30 km/h. The wing-tip still has enough ground-clearance.

4. **Approach with** a crab-angle against the wind and keep the wings **level**. This is the procedure recommended for gliders. It has the advantage that both wing-tips have the greatest possible ground-clearance. The disadvantage of this procedure is that the fuselage needs to be aligned with the RWY by using a well-controlled movement of the rudder. This is necessary to prevent the wheels from skidding when touching down.

**Crosswind landings** have been **demonstrated** with crosswind components of up to 16 kts / 30 km/h.
4.7.10 Flights in Strong Turbulence

1. Airspeed

   REDUCE to max.
   \[ V_{RA} = 102 \text{ kts} / 190 \text{ km/h} \]

**Note:** During flight, especially due to gust and maneuvering loads or due to rapid temperature changes, the hydraulic system pressure may be pumped up occasionally. This is signalized by a short red flash up of the indication lights. A flash up about once a minute for less than 1 sec is normal and not a malfunction.

4.7.11 Flights in Icing Conditions

Ice and hoar-frost significantly influence the air-flow around the A/C. The mass will increase and flight performance and behavior will decrease significantly.

1. Avoid flights in icing conditions.
2. In the case of an unintended flight into an area of icing conditions, leave the area immediately by turning around or reducing altitude.
3. Increase all recommended speeds for takeoff and landing by at least +6 kts / 10 km/h. This should also be done for all other minimum air-speeds.
4. The rate of climb will decrease (up to 50%) and the cruise speed will decrease (up to 30%).
4.7.12 Flights near Thunderstorms

1. Avoid flights near or into a thunderstorm. Strong turbulences, ice, strong rain or hail can be expected. The aircraft also has no adequate lightning protection.

2. In the case of an unintended flight into an area of thunderstorms, leave the area immediately.

**Warning:** If it is suspected that lightning struck the A/C, immediately follow the procedures of chapter 3.13.4.

**Caution:** A/C made of composite materials is more susceptible to lighting strikes than A/C made of metals.
4.7.13 Aerobatics

Aerobatics are not allowed!
Section 5 – Flight Performance

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5.3 Performance Tables and Diagrams ....................................................................... 5-4
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5.1 Introduction

This section contains data about the flight performance which can be expected of the STEMME TSA-M, model “S6-RT”. This data is approved by the appropriate authorities. Also, additional data is given which does not need to be approved. This collection of data is good for pre-flight planning purposes.

The performance data given in the tables and diagrams was determined in flight tests with an aircraft and engine in serial configuration. It has been corrected to the conditions of the international standard atmosphere (ISA: 59 °F / 15 °C, 29.92 inHg / 1013.25 hPa, MSL).

The values were gained with average piloting skill, using the procedures of this operating manual.

A bad maintenance condition, different levels of pilot experience and meteorological influences will change these values.
5.2 Usage of Performance Tables and Diagrams

The influence of the different variables on the flight performance is shown in the tables and diagrams. This allows for good flight planning when the pilot knows all outside influences and available information.

Good flight planning, good maintenance of the aircraft and good pilot experience will cause the actual performance values to be near to the values given in this operating manual.

When planning a flight, always estimate the values from the tables and diagrams to the safe side. This way unknown influences (slightly different aircraft configuration, turbulence, or other influences) can be considered.
5.3 Performance Tables and Diagrams

5.3.1 Corrections of Airspeed Indicator / Indication Error

The following airspeed-indicator-correction takes into account the installation error. It does NOT take into account the instrument error of the airspeed-indicator. All airspeed values in this Flight Manual are indicated air-speeds (IAS).
Illustration 5-1: Corrections of Airspeed Indicator

(For information)

This airspeed calibration is valid for powered as well as unpowered flight and also for all flap settings.
5.3.2 Pressure Altitude and Density Altitude

The flight performance of the aircraft depends on the air density or density altitude. To determine the density altitude, the following diagram can be used. (This may be needed to determine the engine power.) If the QNH is known (this can be read from the altimeter), the density altitude can be calculated with the temperature.

Diagram for converting pressure altitude and density altitude:

Illustration 5-2: Conversion of Pressure Altitude and Density Altitude

Note: The current pressure altitude is shown on the altimeter if it is set to 29.92 inHg / 1013.25 hPa.
5.3.3 ISA (International Standard Atmosphere)

[Image: Illustration 5-3: International Standard Atmosphere]

5.3.4 Stall Speed and Minimum Airspeeds

The stall speed and lowest flying speed of the aircraft depends on the configuration of the aircraft and the mode of operation.

The stall speed is the speed at which a stalled flight state is reached. The minimum airspeed is lowest stationary speed that is controllable (reaching of the control-stops).

**Warning:** When recovering from a stall in horizontal flight, an altitude loss of 100 ft / 30 m is possible. In turning flight, an altitude loss of 130 ft / 40 m is possible. If the pilot reactions are delayed, the altitude loss may be more than 200 ft / 60 m.
Caution: Stall speed increases with weight and g-load. In turns stall speed depends on bank angle and corresponding g-load.

5.3.4.1 Stall Speed and Minimum Airspeed in Powered Flight

Configuration: Most Forward CG-Location 8.86 in / 225 mm behind RP
- Takeoff Mass 1984 lbs / 900 kg
- Landing Gear EXTENDED
- Propeller HIGH RPM

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Stall Speed [IAS]</th>
<th>Bank angle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0°</td>
</tr>
<tr>
<td>T/O Flaps TO / LDG 1</td>
<td>V_{S1} kts / km/h</td>
<td>42</td>
</tr>
<tr>
<td>T/O Flaps NEUTRAL</td>
<td>V_{S1} kts / km/h</td>
<td>44</td>
</tr>
<tr>
<td>Landing Flaps LDG 2</td>
<td>V_{S0} kts / km/h</td>
<td>43</td>
</tr>
<tr>
<td>Landing Flaps TO / LDG 1</td>
<td>V_{S1} kts / km/h</td>
<td>46</td>
</tr>
<tr>
<td>Landing Flaps NEUTRAL</td>
<td>V_{S1} kts / km/h</td>
<td>48</td>
</tr>
<tr>
<td>Cruise Flaps CRUISE</td>
<td>V_{S1} kts / km/h</td>
<td>49</td>
</tr>
</tbody>
</table>
**Caution:** The aircraft is equipped with an acoustic stall warning. It only works if the engine is running and if the electrical system is operational. The stall warning activates about 3 to 4 kts / 5 to 8 km/h above the stall.

**Note:** If the throttle is set to IDLE and the CG-location is far aft, then slightly lower stall speeds might be reached. The aircraft might drop a wing, even if the flight controls are not against the aft stop.

### 5.3.4.2 Stall Speed and Minimum Airspeed in Soaring Flight

**Configuration:**
- Most Forward CG-Location: 8.86 in / 225 mm behind RP
- Takeoff Mass: 1984 lbs / 900 kg
- Landing Gear: EXTENDED
- Engine: OFF
- Propeller: left MANU, right FEATHER

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Stall Speed [IAS]</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Bank angle</td>
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<tr>
<td></td>
<td>0°</td>
</tr>
<tr>
<td>Landing Flaps LDG 2</td>
<td>$V_{S0}$</td>
</tr>
<tr>
<td>Flaps set to &quot;LDG 2&quot;, Airbrakes LOCKED</td>
<td>kts / km/h</td>
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<tr>
<td>Landing Flaps TO / LDG 1</td>
<td>$V_{S1}$</td>
</tr>
<tr>
<td>Flaps set to &quot;TO / LDG 1&quot;, Air-brakes FULLY EXTENDED</td>
<td>kts / km/h</td>
</tr>
<tr>
<td>Landing Flaps NEUTRAL</td>
<td>$V_{S1}$</td>
</tr>
<tr>
<td>Flaps set to &quot;NEUTRAL&quot;, Air-brakes FULLY EXTENDED</td>
<td>kts / km/h</td>
</tr>
<tr>
<td>Thermalling Flaps TO / LDG 1</td>
<td>$V_{S1}$</td>
</tr>
<tr>
<td>Flaps set to &quot;TO / LDG 1&quot;, Air-brakes LOCKED</td>
<td>kts / km/h</td>
</tr>
</tbody>
</table>
**Warning:** When recovering from a stall in horizontal flight, an altitude loss of 100 ft / 30 m is possible. In turning flight, an altitude loss of 130 ft / 40 m is possible. If the pilot reactions are delayed, the altitude loss may be more than 200 ft / 60 m.

**Caution:** In the glider configuration stall warning for the pilot is ONLY through aerodynamic buffeting. The onset of buffeting begins about 3 to 4 kts / 5 to 8 km/h above the stall.

**Note:** If the CG-location is far aft, then slightly lower stall speeds might be reached. The aircraft might drop a wing downwards, even if the flight controls are not against the aft stop.

### 5.3.5 Wind Components

- The maximum demonstrated crosswind component for taxi, takeoff and landing is: 16 kts / 30 km/h
5.3.6  T/O Ground Roll and T/O Distance at MTOM

Conditions:
- Throttle: FULL POWER / MTOP (115%)
- Flaps: “TO / LDG 1“
- Rotating Speed (IAS): \( v_R = 43 \text{ kts} / 80 \text{ km/h} \) at 1984 lbs / 900 kg
- Airspeed in 15 m (IAS): \( v_y = 60 \text{ kts} / 110 \text{ km/h} \) at 1984 lbs / 900 kg
- RWY Surface: paved, horizontally leveled and dry
- Landing Gear: EXTENDED over complete T/O-Distance

Data given for MSL, ICAO standard atmosphere

T/O ground roll: 804 ft / 245 m
T/O distance: 1509 ft / 460 m (over 50 ft / 15 m obstacle)

**Caution:** The T/O ground roll can increase significantly when flying from grass runways. Expect at least a 25% increase in the T/O ground roll on grass runways. Bad maintenance, not following the given procedures, bad meteorological conditions (moisture, snow and similar) and bad local conditions (rough surfaces and similar) can increase the T/O distance significantly.

**Caution:** A RWY-uphill-slope of 2% (altitude change of 2 ft over 100 ft horizontal distance) increases the T/O distance by about 10%. The change in T/O ground roll will be even higher.
<table>
<thead>
<tr>
<th>Pressure Alt above MSL</th>
<th>Temperature</th>
<th>T/O Ground Roll</th>
<th>T/O Distance (50 ft / 15m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ft]</td>
<td>[m]</td>
<td>[°F]</td>
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<td>100</td>
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</tbody>
</table>
5.3.7 Climb Performance

Conditions:

- Throttle: max. Continuous / MCP (100%)
- Flaps: "NEUTRAL"
- Landing Gear: RETRACTED
- Airspeed, best rate of climb (IAS): \( v_y = 68 \text{ kts} / 125 \text{ km/h} \) at 1984 lbs / 900 kg
- Altitude: MSL

Maximum rate of climb: \( v_V = 925 \text{ ft/min} / 4.7 \text{ m/s} \)

5.3.8 Power Settings in Cruise Flight

Conditions:

- Throttle: max. Continuous / MCP (100%)
- Flaps: "CRUISE"
- Landing Gear: RETRACTED
- A/C-mass: 1984 lbs / 900 kg

Maximum cruise-speed: \( v_H = 135 \text{ kts} / 250 \text{ km/h} \)

5.3.9 Climb Gradient during Go-Around

Conditions:

- Throttle: FULL POWER / MTOP (115%)
- Flaps: "TO / LDG 1"
- Landing Gear: EXTENDED
- Airspeed (IAS): \( v_x = 60 \text{ kts} / 110 \text{ km/h} \) at 1984 lbs / 900 kg
- Climb rate \( v_V \): 1000 ft/min / 5.1 m/s
5.3.10 Landing Distance

The landing distance is clearly shorter than the takeoff distance at MTOM.

**Caution:** The landing-distance can increase significantly when flying from grass runways. Bad maintenance, not following the given procedures, bad meteorological conditions (rain, high temperatures, unfavorable wind and similar) and bad local conditions can increase the landing distance significantly.

**Caution:** A RWY downhill slope of 2% (altitude change of 2 ft over 100 ft horizontal distance) increases the landing distance by about 10%.

**Note:** A higher approach speed will cause significantly higher landing distances.
5.3.11 Maximum Endurance and Range

**Caution:** The given performance data were measured with a technically and aerodynamically efficient working aircraft. The values may vary depending on the condition of the aircraft.

Conditions:
- Throttle: 75%
- Flaps: "NEUTRAL"
- Landing Gear: RETRACTED
- Speed: 122 kts / 227 km/h
- A/C-Mass: 1984 lbs / 900 kg
- Fuel Consumption: 5.4 gal/h / 20.4 l/h
- Useable Fuel:
  - Standard: 17.2 US gal / 65 l
  - Optional Tank: 33.5 US gal / 127 l (with optional left wing tank)

The maximum endurance (without reserves) is only valid for the useable fuel (depending on A/C-equipment) and when the aircraft is fuelled optimally.

When making errors while fueling the A/C (for example: A/C is not horizontal, A/C is parked on a sloped surface, or similar) changes of up to ±5% in the maximum amount of fuel can occur.

The minimum unusable fuel in the right wing tank (standard) is 0.55 US gal / 2.1 l. In the left wing tank (optional) it is 0.3 US gal / 1 l.

To determine the approximate endurance with tanks **completely filled** (without reserve), follow this method:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Fuel Consumption</th>
<th>Endurance (h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>16.6 gal / 63 l</td>
<td>3.08 h</td>
</tr>
<tr>
<td>With optional tank</td>
<td>33.5 gal / 127 l</td>
<td>6.22 h</td>
</tr>
</tbody>
</table>

Available flight-time ≈ max. flight-time (from table or graph) **multiplied** with **amount of useable fuel** divided by max. amount of useable fuel.

Calculate the **range without reserves** approximately by using the available endurance and the true airspeed.

<table>
<thead>
<tr>
<th>Condition</th>
<th>True Airspeed (kts/km/h)</th>
<th>Range (nm/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>122 kts / 227 km/h</td>
<td>377.5 nm / 699.1 km</td>
</tr>
<tr>
<td>With optional tank</td>
<td>122 kts / 227 km/h</td>
<td>762.4 nm / 1411.9 km</td>
</tr>
</tbody>
</table>
5.3.12  Approved Noise Level


For approved Noise Level refer to EASA Type Certificate Data Sheet for Noise, TCDSN No. EASA.A.143, latest approved Revision.
Section 6 – Mass and Balance / Equipment

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  6.2.1 State during Weighing ........................................................................6-3
6.3 Empty Mass and CG-Location .....................................................................6-5
  6.3.1 Logsheet for Report of Empty Mass and CG-Location .......................6-5
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  6.4.1 Mass Moments and Useful Load .........................................................6-9
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6.5 Equipment List and Installed Equipment List .............................................6-12
  6.5.1 Equipment List ....................................................................................6-13
6.1 Introduction

The aircraft will only reach the flight performance and handling characteristics described in this operations manual if it is operated in the safe limits for loading and for the center of gravity (CG).

The pilot-in-command is responsible for the correct loading of the aircraft within the loading limits and CG-limits. The movement of the CG due to fuel consumption must always be considered.

This section presents information for weighing the aircraft and determining the empty-CG-location properly. Also, the measurement of the empty mass moment - as measured from the reference-plane (RP) - is given.

A list of all equipment installed in the aircraft during weighing (installed equipment list) - as well as a list of all approved equipment for this aircraft (equipment list) – is given in chapter 6.5.

The weight, empty-CG-location and empty mass moment for the aircraft are determined during the pre-delivery inspection. This data is then noted in the logsheet for report of the empty-mass and the CG-location (chapter 6.3.1).

Repeat the weighing of the aircraft in the intervals required by law (generally every 4 years).

Note: The empty mass, empty-CG-location and empty mass moment need to be calculated or measured when making changes to the installed equipment. This data must be determined and recorded in accordance with the aeronautical regulations.

Note: The empty mass, empty-CG-location and empty mass moment need to be measured when repairs have been made or when the aircraft has been painted new.

Note: The empty mass, empty-CG-location and empty mass moment need to be confirmed on the logsheet (chapter 6.3.1) by certified personnel.
6.2 Aircraft Weights

If ANY changes to the delivery configuration of the aircraft are made, the empty mass must be determined again. This is needed for all of the following calculations.

The state of the aircraft and its equipment when weighing must be defined precisely.

More information about weighing the aircraft is given in the maintenance manual (STEMME Doc.-No.: P500-006.000).

6.2.1 State during Weighing

- Installed equipment according to the current equipment list
- No loose ballast
- Aircraft dry, including operating fluids:
  - Brake fluid
  - Amount of engine oil (0.5 – 0.8 US gal / 2 – 3 liters)
  - Coolant (0.63 – 0.66 US gal / 2.4 – 2.5 liters)
  - Unusable fuel (0.55 US gal / 2.1 liters + 0.3 US gal / 1 liter, optional)

The aircraft's empty mass and empty-CG-location are determined using the following method. Every wheel of the landing gear is placed in a weighing scale (left main gear: $m_L$, right main gear: $m_R$, front gear: $m_F$). The aircraft's longitudinal axis will be aligned in the manner described by the following diagram.

Illustration 6-1: Aircraft alignment during weighing
The reference plane (RP) is located at the leading edge of the inner wing at the wing root. It is aligned vertically to the longitudinal axis. This plane creates a reference line on the ground.

Longitudinal-inclination: Place a wedge 1000:42 (2,4° = 2°26′) on the rear fuselage section. Align the top of the wedge horizontally.

Keep in mind that the lateral axis must be almost horizontal.

When the aircraft is aligned properly, reference points are projected vertically down onto the ground from the root leading edge of the left and right wings. This generates a vertical plane. The connecting line between the two reference points is the reference line. From this reference line, the distance to the front landing gear (distance b) and main landing gear (distance a) is measured. (See Illustration 6-1: Aircraft alignment during weighing).

The following formulas are used to calculate the empty-mass, the empty mass moment and the empty-CG-location:

Empty Mass \( m_{\text{Empty}} \) [lbs] :

\[
m_{\text{Empty}} = m_L + m_R + m_F
\]

Empty Mass Moment \( M_{\text{Empty}} \) [ft lb] :

\[
M_{\text{Empty}} = m_L \cdot a + m_R \cdot a - m_F \cdot b
\]

Empty CG Location from the reference plane \( D_{SL} \) [ft] :

\[
x = \frac{M_{\text{Empty}}}{m_{\text{Empty}}}
\]
6.3 Empty Mass and CG-Location

The current empty mass and empty CG-location must be documented chronologically in a report of empty mass and CG-location (chapter 6.3.1).

Every change in the empty mass or empty CG-location (which might be caused by changes in equipment, repainting, repairs or similar) must be documented in this report.

If the cause of the changes is precisely known (mass and lever must be known; for example, when changes in equipment are made), then new empty mass and empty CG-location can be determined through calculations. If the cause of the changes is NOT precisely known (for example, when making repairs), the aircraft must be weighted again.

6.3.1 Logsheet for Report of Empty Mass and CG-Location

The following logsheet describes the chronological changes in the aircraft’s empty mass and CG-location. (The logsheet can be reused for subsequent reports.) These changes might be caused by changes in equipment and / or structural parts (for example: repairs). All levers refer to the reference plane (RP). (behind RP: positive lever, in front of RP: negative lever).

The first entries are the values determined during the pre-delivery inspection.
# Report of Empty Mass and CG-Location

(continuous report of changes to the aircraft structure and/or equipment)

<table>
<thead>
<tr>
<th>Con. No.</th>
<th>Date</th>
<th>Description of action taken</th>
<th>Mass [lbs]</th>
<th>Lever to RP [ft]</th>
<th>Moment [ft lb]</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>....</td>
<td>1. Weighing at delivery</td>
<td>...........</td>
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</tbody>
</table>
6.4 Operating Mass and Operating-CG

Only operate the aircraft within the loading-limits and limits for the CG-location. The current operating mass and operating-CG can only be calculated by determining the useful load for the planned flight.

To determine the operating mass and operating-CG graphically and/or through calculations, use the tables and diagrams given in the following chapters:

- 6.4.1 Mass Moments and Useful load: Loading diagram
- 6.4.2 Calculation of the proper loading for flight

Perform the following steps:

1. Take the empty-mass \( m_{\text{Empty}} \) and the empty-mass-moment \( M_{\text{Empty}} \) from the current weighing report or from the weighing logsheet. Place these values in the corresponding columns, row 1 of the table 6.4.2 "Calculation of the proper loading for flight".

2. Determine the total mass in the cockpit – including the mass of the pilot, copilot and load carried in the cockpit. From this data, determine the corresponding mass-moments by using Diagram 6.4.1 "Mass Moments and useful load: Loading-diagram" or calculate the mass-moments more precisely: \( \text{mass} \times \text{corresponding lever} \). Keep the negative value of the lever in mind, if a location is in front of the RP. Use separate columns in row 2 for the left and right seat in table 6.4.2 "Calculation of the proper loading for flight".

3. Determine the load carried in the rear baggage compartment by using the same methods as in point 2. Place these values in the corresponding columns of row 3 of the table. Here, the lever always has a positive value.

4. Add all masses and moments from row 1 to row 3 of the table. Place these total values in row 4 of the table. These results represent the aircraft with empty tanks.

5. Due to constant displacement of CG backward with retraction of landing gear in flight, an additional constant mass moment of 152.14 ft lb / 21.04 kgm has to be considered.

6. Divide the results from row 4 (incl. constant mass-moment from row 5) to determine the lever of the operating-CG in flight. This must be within the allowed limits. If this is not the case, the useful load must be adjusted.
Note: The most rearward in-flight C.G. for the aircraft is reached for loading configuration "Fuel Tank empty". So the critical case to be checked is with landing gear retracted (most rearward C.G.-limit).

If the most forward in-flight C.G.-limit is exceeded for this case the aircraft loading has to be adjusted clearly rearward. Otherwise there is no fuel load possible.

7. Finally the fuel load must be determined precisely. Calculate the corresponding mass-moment by using the same methods as in point 2. Place these values in the corresponding columns of row 7 of the table. The lever of the fuel mass changes with changes in the amount of fuel. Due to this, ONLY use diagram 6.4.1 for this.

8. Now calculate the total mass and total moment from row 4 and row 7 of the table. Place these values in row 8. This represents the aircraft in its T/O configuration with fuel. The constant mass moment from row 5 (as result of retraction of landing gear) must NOT be considered here.

Note: Due to displacement of C.G. forward with maximum fuel load the critical case to be checked is with landing gear extended (most forward in-flight CG-limit) for this loading configuration.

9. Divide the results from row 8 to determine the lever of the CG in the T/O-configuration. These values must be within the allowed limits. If this is not the case, useful load and fuel must be adjusted.

All mentioned and used levers give the distance from the corresponding CG to the reference plane (RP)!

Warning: The CG must always stay within the allowed limits. If this is not the case, unstable aircraft behavior might result!
6.4.1 Mass Moments and Useful Load

Loading Diagram

- Pilot / Copilot fully rearward, (-) because in front of RP
- Pilot / Copilot fully forward, (-) because in front of RP

- Example: Step 1
- Example: Step 2
- Example: Step 3
- Example: Step 6

[Diagram showing Loading Moment vs. Amount of Fuel]
### 6.4.2 Calculation of Proper Loading for Flight

<table>
<thead>
<tr>
<th>Calculation of the proper loading for flight</th>
<th>STEMME S6-RT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reg. No.: ..........................</td>
<td>Mass [lbs]</td>
</tr>
<tr>
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<td>Moment [ft lb]</td>
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<table>
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<th>1. Empty Mass and Empty Mass Moment (from current Report of Empty Mass and CG-Location)</th>
<th>........................ ft</th>
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<tr>
<td>2. Pilot and Copilot</td>
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<td>Lever (mean value):</td>
<td>- 1,4731 ft</td>
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<td>3. Rear Baggage Compartment</td>
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<td>4. Operating Mass and Total Mass Moment, without Fuel (Sum 1. through 3.)</td>
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<td>5. Displacement of Mass Moment due to retraction of landing gear</td>
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<td>+152.14 ft lb</td>
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| 6. CG-Location (in RP): \[
\frac{\text{Moment} \ [\text{ft lb}] \cdot 12 \text{ in} / \text{ft}}{\text{Mass} \ [\text{lbs}]}
\] | ........................ in (behind RP) |
| Allowed: | 8,82 in to 16,10 in |
| 7. Fuel load: | ........................ in (behind RP) |
| Useable Fuel (0.744kg/l) | ........................ in (behind RP) |
| Lever: 0.3642 ft (mean value) | 8,82 in to 16,10 in |
| see Diagram 6.4.1 | 8,82 in to 16,10 in |
| 8. Total Operating Mass and Total Mass Moment with Fuel (Sum 4. and 7.) | ........................ in (behind RP) |
| 9. CG-Location (in RP): \[
\frac{\text{Moment} \ [\text{ft lb}] \cdot 12 \text{ in} / \text{ft}}{\text{Mass} \ [\text{lbs}]}
\] | ........................ in (behind RP) |
| Allowed: | 8,82 in to 16,10 in |
**Note:** When calculating the CG-position without including the change of fuel mass during flight, the CG must be within the following limits:

8,82 (+1,26) in to 16,10 (-1,30) in / (behind RP).

224 (+32) mm to 409 (-33) mm
6.5 Equipment List and Installed Equipment List

The equipment list is a list of all certified equipment which can be installed in the STEMME S6-RT.

The installed equipment list is a list of all equipment which is actually installed in the aircraft. All equipment items actually installed in the aircraft are marked with “X” in the column “Inst.” (Installed).

**Note:** The installation of additional equipment must be performed in correspondence with the Maintenance Manual.

The given equipment list contains the following information for a better overview:

The column "Con. No." includes a continuing number and a character for specification with the meaning:

- I Instruments
- A Avionics
- M Miscellaneous Equipment Items

The columns "Mass" and "Lever" give the mass and the effective lever relative to the reference plane (RP) of the equipment item listed in the column.

- **Positive Levers** are displacements behind RP
- **Negative Levers** are displacements in front of RP
# 6.5.1 Equipment List

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<th>Description</th>
<th>Manufacturer</th>
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<th>Inst.</th>
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<th>Lever [ft] + or -</th>
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# Flight Manual STEMME S6-RT

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Clearance Installed Equipment List

Date
Section 7 – Description of the Aircraft and its Systems and Equipment

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7.1 Introduction

This section of the Flight Manual contains a technical description of the aircraft and its systems and equipment. There are also user notes for each system.

The description of installed non-standard systems is given in section 9.

Additional explanations of the components and systems of the Stemme S6-RT are given in the Maintenance Manual (Stemme Doc.-No.: P500-006.000).
7.2 Airframe

7.2.1 Fuselage

The front section of the fuselage – including the cockpit – is constructed from carbon-fiber-composites. For additional stiffness and a decrease in mass, it is reinforced with longitudinal stringers and circular frames. The midsection is made of a steel-tube-framework with fairings made of carbon fiber composites. The landing gear bays for nose and main landing gear are completely covered by landing gear doors. The rear section with integrated vertical fin is also made of carbon fiber composites. The force transmission between the separate fuselage sections is realized with pin joints.

For reasons of fire-containment, the engine is completely encased in fire-resistant walls. Certain elements can easily be removed for maintenance.

7.2.2 Wing System

The complete wing system has a span of 59 ft / 18 m and is made of 5 separate sections. These are one inner wing, left and right outer wings and two winglets.

An integral tank for fuel is located in the forward area of the right inner wing (an optional second tank can be installed in the left inner wing). The airbrakes are located in the inner section of the outer wing.

The wing spars of all wing-sections are made completely of carbon fiber composites. The wing shells are made of CFC-sandwich elements.

The connection between the inner wing and the fuselage is realized by four pins which attach the wings to the steel-tube-framework.

The outer wings are connected to the inner wing by one socket-pin at each wing-joint and two shear-force-fittings at each wing-root. Additional details can be taken from section 4 "Normal Operating Procedures“.

7.2.3 Empennage

The T-shaped tail is also made of spars and sandwich-shells made of carbon fiber composites. This set-up is similar to the wing system. The horizontal stabilizer can easily be removed from the vertical stabilizer. It is connected by a removable three-point mounting. To protect the tail against unwanted tail strikes (when rotating or in ground operations), it is equipped with a tail skid.
7.3 Flight Controls

The control forces are transmitted to the flight controls with control rods or control cables. Control-brackets — made of rust-proof coated steel — are laminated into each flight-control. The bearings are prepared for easy movement at all times.

The connections of the three control-elements integrated into each wing (aileron, flap and airbrace) to the control rods are located in the midsection of the fuselage. These connections are disconnectable. Additional connections of the flight-controls between the inner wing and the outer wing are designed as secured quick-connectors (non-automatic).

7.3.1 Ailerons

Design: CFC-Sandwich, 2-part Aileron across the span of the outer wing.

Mounting: Inner-aileron: 9 joints and 1 control connector each
Outer-aileron: 7 joints and 1 control connector each
Axial fixations near the control connectors

Operation: Operated with control rods
Aileron-differential realized by parted ailerons. Outer ailerons deflect more than inner ailerons. Flap deflection is also overlayed.
Movement by sideways-deflection of control stick.

7.3.2 Elevator

Design: CFC-Sandwich

Mounting: 3 joints on each elevator side, 1 centralized automatic control connector

Operation: Operated with control rods (which are located in the front section, midsection and rear section of the fuselage).
Removable horizontal stabilizer mounted by screwing the self-securing connection bolt.
Movement by push and pull on control stick

The electric trim is moved with a toggle switch on the control stick.
7.3.3 Rudder and Nose Wheel Steering

Design: CFC-Sandwich
Mounting: Rudder mounted on top and bottom, 1 control connector on bottom
Operation: The rudder movement is transmitted in the front section and midsection of the fuselage by control cables. In the rear section this changes to control rods.

The rudder is operated by the rudder pedals. When on the ground with landing gear extended, the nose-wheel-steering is also connected to the rudder pedals. The steerable nose wheel is operated by control-cables.

7.3.4 Flaps

Design: CFC-Sandwich
Mounting: 6 joints and 1 control-connector each
Operation: Operated with push-rods, flap-deflection is effective across whole wing-span (inner wing and outer wing)

The flaps are set by using the flap-lever with detents. Setting-indicator is located near the flap lever.

The flap-deflection is overlaid over the aileron deflection at the outer wing.

Unlock the flap lever by pushing it to the right. It automatically detents through the use of a spring.

Possible flap settings:
- Cruise Flight (CRUISE): - 4.0°
- Neutral (NEUTRAL): + 5°
- T/O / Landing (TO / LDG 1): + 18.5°
- Landing (LDG 2): + 25°
7.3.5 Adjustable Rudder Pedals

The position of the rudder pedals can be adjusted. This allows for a safe and comfortable operation of the rudder pedals, even if the seating position and size of the pilot changes.

**Note:** The rudder pedals must be locked properly after they have been adjusted!

The rudder pedals are unlocked by pulling the black handle forward of the control stick.

**Moving the pedals forward:**
To move the pedals forward, pull the handle and push onto the pedals with your feet. Keep the handle pulled until the pedals have reached the position you want. Afterwards, release the handle and lock the pedals.

**Moving the pedals rearward:**
To move the pedals rearward, pull them back with the handle. Afterwards, release the handle and lock the pedals.
7.4 Airbrakes

The Schempp-Hirth-style airbrakes are located at the inner section of the outer wing.

Design: Airbrake designed as aluminum section, sealing plates made of CFC, placed at top ends of airbrakes.

Mounting: 2 rotational shafts in each airbrake box

Operation: Operated with control rods, the airbrakes lock at the wing joint. The airbrakes are operated by moving the blue airbrake lever.
7.5 Operating Elements

This section is an overview of all control elements in the cockpit. More detailed descriptions of each element are given in each relevant section of this Flight Manual as well as in the Maintenance Manual.

For operation instructions of the installed equipment refer to the Maintenance Manual of the STEMME S6 / S6-RT (STEMME Doc.-No.: P500-006.000) and to the operation manuals of the manufacturer provided for the installed equipment.
Illustration 7-1: Overview of the Control Elements in the Cockpit
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Canopy Locks</td>
<td>White handles on left and right side of canopy frame (additional rear canopy hook at upper rear middle of canopy end)</td>
</tr>
<tr>
<td>2</td>
<td>Airbrake Lever</td>
<td>Blue lever on left cockpit wall and on left side of center console.</td>
</tr>
<tr>
<td>3</td>
<td>Cabin Ventilation</td>
<td>Black pull-button, one at each seat to control cabin-ventilation.</td>
</tr>
<tr>
<td>4</td>
<td>Control Stick</td>
<td>Dual controls, centered forward of each seat</td>
</tr>
<tr>
<td>5</td>
<td>Wheel Brake Lever</td>
<td>Black lever at control stick, when parking lock lever with pin.</td>
</tr>
<tr>
<td>6</td>
<td>Choke Lever</td>
<td>Black lever on forward center console on the left side. The adjustment of the Choke Lever is realized by predefined clamping.</td>
</tr>
<tr>
<td>7</td>
<td>Canopy Jettison</td>
<td>Red handle on top of the forward center console, below the instrument panel.</td>
</tr>
<tr>
<td>8</td>
<td>Cowl Flaps Lever</td>
<td>Black handle on top of the forward center-console below Canopy-Jettison handle (to operate the inlets and outlets of the engine cowling). The lever is unlocked by pushing a push-button and locked again by releasing the button.</td>
</tr>
<tr>
<td>9</td>
<td>Rudder Pedals</td>
<td>One pair for each seat in the foot area.</td>
</tr>
<tr>
<td>10</td>
<td>Flap Lever</td>
<td>Black lever on the right side of the center console. To unlock push to the right.</td>
</tr>
<tr>
<td>11</td>
<td>Throttle</td>
<td>Black lever, centered on the center console.</td>
</tr>
<tr>
<td>12</td>
<td>Rudder Pedal Handle</td>
<td>One for each seat, in front of the control stick. Pull to unlock.</td>
</tr>
<tr>
<td>13</td>
<td>Seat Back Adjustment</td>
<td>For each seat, located at the left and right on the bottom end of the backrest. Release to adjust the backrest at its lower attachment by pulling the slider to the inside.</td>
</tr>
</tbody>
</table>
Illustration 7-2: Overview of Control Elements in the rear Cockpit

(14) Fuel Valve
Red rotary handle on the rear center console at the upper canopy frame, behind head-position of the pilot.

(15) Handle bar for Emergency Extend
Black pull-handle, next to fuel valve, pulling of the handle opens the hydraulic valve for emergency extend by bowden cable.
7.6 Instrument Panel

7.6.1 Layout of the Instrument Panel

The illustration shows the layout and position of the most important control elements and instruments on the instrument panel in the standard configuration.
Instruments and indicators on the instrument panel:

<table>
<thead>
<tr>
<th></th>
<th>Instrument/Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Airspeed Indicator</td>
</tr>
<tr>
<td>(2)</td>
<td>Spare (opt. Soaring Computer)</td>
</tr>
<tr>
<td>(3)</td>
<td>Electronic Flight Information System (EFIS)</td>
</tr>
<tr>
<td>(4)</td>
<td>VOR/ ILS Indicator (CDI) Garmin</td>
</tr>
<tr>
<td>(5)</td>
<td>Vertical Speed Indicator/Variometer</td>
</tr>
<tr>
<td>(6)</td>
<td>Altimeter</td>
</tr>
<tr>
<td>(7)</td>
<td>Electronic Variometer</td>
</tr>
<tr>
<td>(8)</td>
<td>Control Knob Canopy Ventilation</td>
</tr>
<tr>
<td>(9)</td>
<td>Trim Indicator</td>
</tr>
<tr>
<td>(10)</td>
<td>Compass</td>
</tr>
<tr>
<td>(11)</td>
<td>Audio Panel Garmin</td>
</tr>
<tr>
<td>(12)</td>
<td>COM/ NAV/ GPS Garmin</td>
</tr>
<tr>
<td>(13)</td>
<td>Transponder Garmin</td>
</tr>
<tr>
<td>(14)</td>
<td>Tachometer of Engine</td>
</tr>
<tr>
<td>(15)</td>
<td>Manifold Air Pressure Gauge</td>
</tr>
<tr>
<td>(16)</td>
<td>ASI (optional Fuel Flow Indicator)</td>
</tr>
<tr>
<td>(17)</td>
<td>Fire Warning</td>
</tr>
<tr>
<td>(18)</td>
<td>Oil Temperature Gauge</td>
</tr>
<tr>
<td>(19)</td>
<td>Cylinder Head Temperature, left</td>
</tr>
<tr>
<td>(20)</td>
<td>Fuel Gauge, left Tank (option)</td>
</tr>
<tr>
<td>(21)</td>
<td>Voltmeter</td>
</tr>
<tr>
<td>(22)</td>
<td>Oil Pressure Gauge</td>
</tr>
<tr>
<td>(23)</td>
<td>Cylinder Head Temperature, right</td>
</tr>
<tr>
<td>(24)</td>
<td>Fuel Gauge, right Tank</td>
</tr>
<tr>
<td>(25)</td>
<td>Ammeter</td>
</tr>
<tr>
<td>(26)</td>
<td>Engine Hours Meter</td>
</tr>
<tr>
<td>(27)</td>
<td>opt. 12 V Socket</td>
</tr>
</tbody>
</table>

Annunciator panel on the instrument panel:

<table>
<thead>
<tr>
<th></th>
<th>Annunciator</th>
</tr>
</thead>
<tbody>
<tr>
<td>(L1)</td>
<td>Low Fuel Caution Light (yellow)</td>
</tr>
<tr>
<td>(L2)</td>
<td>Indication Light of the Auxiliary Fuel Pump (green)</td>
</tr>
<tr>
<td>(L3)</td>
<td>TCU Caution Light (Turbo Control Unit) (yellow)</td>
</tr>
<tr>
<td>(L4)</td>
<td>MAP Warning Light (red)</td>
</tr>
<tr>
<td>(L5)</td>
<td>Internal Generator Caution Light (yellow)</td>
</tr>
<tr>
<td>(L6)</td>
<td>External Alternator Warning Light (red)</td>
</tr>
<tr>
<td>(L7)</td>
<td>Indication Lights Landing Gear (left main, nose, right main)</td>
</tr>
</tbody>
</table>
Circuit-breakers for avionics:

<table>
<thead>
<tr>
<th>(A1)</th>
<th>Alt Field</th>
<th>(A10)</th>
<th>Spare</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A2)</td>
<td>Ldg. Gear Control</td>
<td>(A11)</td>
<td>Audio Panel</td>
</tr>
<tr>
<td>(A3)</td>
<td>Stall Warning</td>
<td>(A12)</td>
<td>ELT</td>
</tr>
<tr>
<td>(A4)</td>
<td>Voltmeter</td>
<td>(A13)</td>
<td>Spare (opt. Soaring Computer)</td>
</tr>
<tr>
<td>(A5)</td>
<td>Pitch Control for Propeller</td>
<td>(A14)</td>
<td>NAV/ GPS</td>
</tr>
<tr>
<td>(A6)</td>
<td>12 V Socket</td>
<td>(A15)</td>
<td>EFIS (not certified as a primary instrumentation)</td>
</tr>
<tr>
<td>(A7)</td>
<td>Trim</td>
<td>(A16)</td>
<td>XPDR</td>
</tr>
<tr>
<td>(A8)</td>
<td>Engine Bus</td>
<td>(A17)</td>
<td>COM/ Radio</td>
</tr>
<tr>
<td>(A9)</td>
<td>Ldg. Gear Power</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.6.2 Control Elements of the Instrument Panel

The following illustration shows the layout of the additional control elements of the instrument panel in the standard configuration.

![Illustration 7-4: Control-Elements of the Instrument Panel](image)

Control elements of the instrument panel:

<table>
<thead>
<tr>
<th>(1) Master Switch (Batt) and Switch for Engine Bus (Eng)</th>
<th>(5) Fuel Pressure Difference Gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Landing Gear Lever</td>
<td>(6) TCU Isolation Switch (red safety switch)</td>
</tr>
<tr>
<td>(3) Control Unit for Propeller Pitch</td>
<td>(7) Main Circuit Breaker 50A</td>
</tr>
<tr>
<td>(4) Ignition Switch</td>
<td>(8) Circuit-Breaker for External Alternator 50A (refer also to 7.13.4 Electrical Consumers and Circuit-Breaker-System)</td>
</tr>
</tbody>
</table>
Circuit breakers/ switches of the instrument panel:

<table>
<thead>
<tr>
<th>(S1)</th>
<th>Auxiliary Fuel Pump</th>
<th>(S5)</th>
<th>POS-Lights</th>
</tr>
</thead>
<tbody>
<tr>
<td>(S2)</td>
<td>Fuel Transfer Pump (for optional left tank)</td>
<td>(S6)</td>
<td>Landing Light</td>
</tr>
<tr>
<td>(S3)</td>
<td>Instrument Light</td>
<td>(S7)</td>
<td>Avionics Master Switch</td>
</tr>
<tr>
<td>(S4)</td>
<td>Anti Collision Light</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.7 Landing Gear

The landing gear is a retractable tricycle configuration with nose wheel steering. In the retracted configuration, all three landing gear legs are completely covered by landing gear doors. The landing gear mechanics for retraction and extension is driven by hydraulic actuation system.

7.7.1 Nose Gear and Steering

The nose gear is made of a steel strut which is stiff to torque. It is attached to the forward fuselage section at an attachment plate by screws. The shock strut is dampened by the use of elastomers and has a maximum spring-travel of approx. 4 in / 100 mm.

The nose wheel is steered by rotating the nose wheel fork, which is attached to the shock strut. This rotation is performed with several levers. When the nose gear is extended and loaded on ground, it connects automatically to the rudder controls. In the un-loaded and retracted position, it is automatically disconnected from the rudder controls and locks in the direction of the longitudinal-axis.

Extending and Retraction of the nose gear is actuated by a hydraulic actuator connected to the nose gear drag strut. In the fully extended position the drag strut locks by its overcenter locking and additional spring independent from hydraulic pressure.

7.7.2 Main Gear and Brakes

The struts of the main landing gear are welded tubes, which are stiff to torque. They are connected to the central steel tube framework of the midsection of the fuselage via retraction kinematic.

The elastically mounted main-wheels are located at the end of rockers, which in turn are supported by elastomer dampened springs. The maximum spring travel of the main gear is approx. 6 in / 150 mm.

The main-wheel-brakes are hydraulically actuated and designed as dual-piston disk-brakes. The brakes are activated by operating the brake lever at the control stick. The main-brake-cylinder is located at the brake lever. The expansion reservoir is located at the left-hand brake lever. To prevent the brakes from locking, the brake circuit is equipped with an anti-lock-regulator which is mounted in the midsection of the fuselage.

To lock the wheels for parking (hydraulic parking brake) push in the locking-pin at the side of the left hand brake lever.

The extension and retraction of the main landing gear is realized for both landing gear legs by hydraulic actuators connected to each drag strut. In the
extended end position, the supporting drag strut is locked by a deadlock blocking and additional springs independent from hydraulic pressure.

7.7.3  Landing Gear Doors

All three landing gear legs are equipped with separate gear doors, covering each of the landing gear legs and landing gear bays completely and aerodynamically. The gear doors are open in the extended landing gear configuration and are closed simultaneously with retraction of the landing gear.

The doors of the main landing gear are arranged along the flow direction and mounted to the center fuselage side fairings above the landing gears. The gear doors are actuated by mechanical linkage to the particular main landing gear leg.

The nose landing gear has a gear door also arranged along the flow direction, which is mounted sideways the nose landing gear. The actuation of the door is linked kinematical to the nose landing gear leg by hinge kinematic.

7.7.4  Hydraulic Actuation

In the rear section of the center fuselage steel-frame, the hydraulic drive unit is installed. The unit consists of the electrically powered hydraulic pump including controller for the pressurization of the complete hydraulic system and a pressure reservoir for emergency extension of the main and nose landing gear. The pressure reservoir is filled to 90 bar / 1305 psi ±8% and is equipped with a pressure gauge (near hydr. drive unit) to check storage pressure.

After switching off the hydraulic pump the system pressure is maintained by check valves. With master-switch (Batt) ON the hydraulic drive unit automatically pumps up the system pressure to 90 bar / 1305 psi ±8% (pressure automatic) if necessary.

7.7.5  Operation and Electrical system of retractable Landing Gear

The landing gear is operated by one combined dip-switch (lever) for nose and main landing gear. The lever is located in the area of the control elements of the instrument panel on the left side of the propeller pitch control unit.

The lever provides the following settings:

- Position UP: RETRACT landing gear
- Position DOWN: EXTEND landing gear
In addition, there is a switch in the landing gear bay for manual re-filling of the pressure reservoir on the ground after a drop of storage pressure in the separate storage pressure hydraulic circuit. The switch designed as push-button activates the hydraulic drive unit. As soon as the storage pressure is pumped up to 90 bar / 1305 psi ±8%, the push-button can be released. The push-button is combined with a red low-pressure warning light, which goes off above a storage pressure of 90 bar / 1305 psi. An additional pressure gauge in the landing gear bay allows quantitative check of pressure.

The electrical system for hydraulic pump actuation and control of the landing gear is protected by two separate circuit breakers (CB):

- 1 Circuit breaker (CB 25 A) for hydraulic drive unit
- 1 Circuit breaker (CB 2 A) for landing gear control and indication

7.7.5.1 Monitoring of the Retractable Landing Gear

The system for monitoring of the retractable landing gear can be described as follows:

- The final position for all landing gear legs is monitored separately for each landing gear leg by micro switches for positions UP and DOWN.
- With master-switch ON the hydraulic system pressure is kept at 90 bar / 1305 psi ±8% by pressure switches, if necessary by pumping up
- For control of status of each landing gear leg including respective door three indication lights are arranged in the upper left section of the instrument panel.
- Following status is signalized by the indication lights:
  GREEN: Landing gear OUT and LOCKED
  RED: Landing gear moves in or out, hydraulic pump ON
  ORANGE: particular landing gear leg OUT and LOCKED but hydraulic pump still ON since the other legs have not reached their final position OUT and LOCKED or system pressure of 90 bar / 1305 psi ±8% not reached (hydraulic pump ON)
  OFF: Landing gear completely IN and/or system powerless (CB/master switch OFF)

  A red control light is integrated to the push-button in the landing gear bay to signalize a drop of storage pressure below 90 bar / 1305 psi ±8%.

For further information refer to the Maintenance Manual of the STEMME S6-RT (STEMME Doc.-No.: P500-006.000).
7.7.5.2 Landing Gear Warning

In order to prevent a landing with unintentionally retracted landing gear the S6-RT is equipped with an acoustical landing gear warning. The acoustical warning comes up, if the airbrakes are operated with landing gear retracted and it is activated by a switch at the airbrake lever.

The landing gear warning does not require separate attendance and is checked on function during maintenance.

**Note:** If the airbrakes are operated apart for landing approach in high altitudes for start of a quick descent the acoustical warning signal is not of significance.

7.7.6 Procedures after Emergency Extension of the Landing Gear

The procedures applicable for emergency extension of the retractable landing gear are described in section 3 of this Flight Manual Supplement.

This sub-section gives a short description of the system for emergency extension of the retractable landing gear and describes the required procedures after an emergency extension on ground.

Pulling the handle bar for the emergency extension of the landing gear releases the valve for emergency extend (VEE) by a bowden cable. The valve opens the pressure reservoir to the hydraulic system, which extends all hydraulic actuators for one time to the final stop and locks in the overcenter locking position of the particular landing gear drag strut. The tare weight of the landing gear legs has a supporting function.

At the same time with operation of emergency extend the lever of the VEE actuation locks and deactivates the hydraulic drive unit, which also turns off the red warning light for drop of pressure.

**Caution:** During flight after an emergency extension a reactivation of the hydraulic system is not possible!
To reactivate the hydraulic system after an emergency extension on ground, proceed according to following instructions:

1. Push black handle for EMERGENCY EXTEND in the cockpit in its normal position (push backward) after landing on ground
2. Swing lever for release of VEE backward in normal position
3. Fix securing clamp of bowden cable to VEE lever
4. Set landing gear lever to DOWN position (EXTEND)
5. Activate master switch (Batt) and wait until hydraulic system pressure (90 bar / 1305 psi ±8%) is reached and hydraulic pump deactivates automatically

For further information refer to the Maintenance Manual of the STEMME S6-RT (STEMME Doc.-No.: P500-006.000).
The seats are made of cushioned seat-pans, which are integrated into the cockpit floor. Their positions are adjustable at the top and bottom (optional), so that they can be positioned ergonomically. The upper sections of each backrest are designed as head-rests.

Optionally, the backrest can also be adjusted at the bottom. The adjustment has to be done before flight by moving the backrest along the lower mounting rails. By pulling the adjusting rail left and right to the inside at the same time the backrest is unlocked and can be moved to the desired position. Pay attention to even move of left and right rail to avoid wedge of adjustment. After adjustment lock the rails in the nearest position.

Also, the slope of the backrest can be adjusted. This allows the backrest to be positioned by placing a small lever in one of several detents near the mounting of the seat belts.

Every seat is equipped with a four-point-safety-harness and a central lock. The abdominal-belts are mounted at mounting-positions at the left and right sides of the seat-pan. The shoulder belts are mounted at the crossbar located above and behind the seatbacks.

Permitted seat belts are documented in chapter 6.5 of this Flight Manual.

Attachment points for automatic parachutes are NOT provided. Due to this, only use parachutes that are operated by hand.
7.9 Baggage Compartment

The baggage compartment is located at the front of the tail-boom, just behind the connector-frame between the midsection and rear section of the fuselage. A maximum load of 44 lbs / 20 kg may be loaded into the compartment. It can be loaded through a forward-opening door at the top of the fuselage. The locks are engaged with quick-closing push-buttons at the rear of the door.

**Caution:** Do NOT place rigid or sharp objects in the baggage-compartment without strapping them down! Also pay attention to increase of minimum cockpit load (refer to chapter 2.18).
7.10 Canopy and Cockpit

7.10.1 Canopy

The canopy is made of plexiglas and framed by a thin canopy-frame made of CFC. This setup allows for good all-round-visibility. The canopy is hinged at the front of the cockpit and opens in a forward direction. A convenient entry is therefore possible. The opening of the canopy is supported by two gas-pressurized springs at the front. When on the ground, it is secured against being opened by gusts with a rebound-strap.

The canopy is locked with two ergonomically-located white levers, at the left and right side of the cockpit frame. At the rear it is also locked by a rear canopy-hook. (This so called "Roeger hook" hook is designed to hold the rear of the canopy down at the beginning of the canopy-jettison-procedure and causes it to rotate upwards and be torn away.)

**Warning:** For canopy-jettison, ONLY pull the canopy-jettison-handle. The rear canopy-hook (“Roeger-hook”) MUST remain engaged.

**Caution:** Disconnect the rebound-strap of the canopy before T/O. In case of canopy-jettison, the rebound-strap might prevent the canopy from being torn away.

Locks for the side-windows can be ordered optionally. This prevents unauthorized personnel from having access to the aircraft.

**Caution:** The side windows may NOT be locked during flight. In case of an emergency, this would make rescue attempts more difficult.
7.10.2 Entry

The method of entry varies individually and depends on the size and agility of the pilot.

The following procedure is a convenient and comfortable method of entering the aircraft:

- Stand with your back facing the cockpit.
- Place one hand on the leading-edge of the wing near the wing-root. Place the other hand on the cockpit frame.
- Raise yourself off the ground with both arms and jumping slightly upwards. Move to sit on the cockpit-frame at the lowest spot.
- Recover your balance and support yourself on the center console in the cockpit. Then move legs-first into the cockpit.

7.10.3 Cabin Ventilation

The ventilation of the cabin occurs individually for each seat and the canopy. The air for the cabin-ventilation flows from the free-airflow beneath propeller-spinner into two air-inlets. From there it is lead into a centralized air-distribution-system, where the airflow splits to the separate vents.

The canopy-vents are located near the canopy-hinge. They are operated with a Bowden-cable installed at the center top of the instrument-panel.

Each seat for the pilot and copilot has one vent in the leg-room and two vents in the seating-area which supply the flight crew with fresh air. Ventilation can be controlled individually for each seat at the vents near the knees.

Operation of all vent-controls follows the same principal:

If the vent-control is fully PULLED rearward, the corresponding vent is fully OPEN. Otherwise, if the vent-control is fully PUSHED forward, the corresponding vents are fully CLOSED.

Additional ventilation can be obtained by opening the side-windows of the canopy.
7.11 Propulsion System and Engine ____________________

7.11.1 Engine and General Information

The installed engine is a model ROTAX 914 F2:

- 4-cylinder 4-stroke Otto engine in opposed-cylinder design including turbocharger with electronic manifold air pressure (MAP) control and integrated reduction gear
- Liquid cooled cylinder heads and ram air cooled cylinders
- Electronic dual magneto capacitor ignition
- Two CD-carburetor, one on each engine side
- Flanged reduction-gear and overload clutch

The engine is mounted in the midsection of the fuselage with the engine-suspension connecting it to the steel tube framework. There, the engine causes low noise emissions for the cabin and the aircraft’s surroundings.

Specifications of the ROTAX 914 F2:

- Max. T/O Power (MTOP): 113 HP / 84.5 kW at 5800 RPM (Takeoff RPM limited to 5600 RPM by const. speed propeller control)
- Max. Continuous Power (MCP): 98 HP / 73.4 kW at 5500 RPM
- Engine Displacement: 73.9 in³ / 1211 cm³
- Transmission Ratio of Engine Gear: i=2.428
- Compression Ratio: 9.0 : 1

Fuel and fuel Consumption:

- Fuel to be used: MOGAS (unleaded gasoline according to EN 228, min. RON 95)
  or AVGAS 100LL
- Fuel Consumption at MCP (100%): 7.0 US gal/h / 26.6 l/h
- Fuel Consumption at 75% Power: 5.4 US gal/h / 20.4 l/h
- Fuel Consumption at 55% Power: 3.4 US gal/h / 13 l/h
7.11.2 Propeller

The installed MT-propeller is a model MTV 7-A / 170-51 with constant speed control unit.

- Electrically adjustable 3-Blade Constant-Speed Propeller, continuously adjustable from T/O-setting to glider setting, electronic constant speed control, control unit: P120-A (DB)

- Forged/milled hub made of light-alloys. Blasted and anodized surface finish

- Blades made of wood composites with a liner made of fiber composites, edge guard at the outer edges of the propeller made of stainless steel, acrylic finish, coated with PU-film on the remaining surfaces.

- Spinner with baseplate and commutator ring or with commutator ring and starter disk.

The propeller pitch is continuously adjustable from the T/O-setting to the cruise setting or glider setting, depending on the mode of operation. A direct current motor is controlled by the automatic propeller control unit, which selects the corresponding propeller pitch according to the power setting and airspeed.

7.11.2.1 Propeller Pitch Control

The automatic propeller control unit P-120-A is operated with the control elements located in the lower center area of the instrument panel.

To adjust the control-unit use the two flip switches and the rotary switch. The left flip-switch can be set to the "AUTO" and "MANU" (manual) positions. At "MANU" the right flip-switch can be set to "HIGH RPM" and "FEATHER". Select the propeller-RPM with the rotary switch.
The standard position of the left flip-switch is "AUTO", for the right flip switch it is "STOP". The propeller-RPM set with the rotary switch will be held constant during the flight.

If the left flip-switch is set to "MANU" and the right flip switch is set to "HIGH RPM" (T/O-setting), then the propeller will remain in flat pitch. The green indication light indicates that the propeller is in the T/O-setting (flattest pitch).

To change the propeller-pitch to the glide setting, set the left flip switch to "MANU" and the right flip switch to "FEATHER". To leave the glide position, set the left flip-switch to "MANU" and then set the right flip-switch to "HIGH RPM" (T/O-setting). The propeller reaches the final pitch after 90 s. After the propeller has moved out of the glide-setting (a green indication light will go ON and the propeller starts to windmill) and after restart of the engine, set the left flip switch to "AUTO" and the right flip switch to "STOP". Now select the desired propeller-RPM with the rotary switch.

The installed control unit will perform a self-test once it is supplied with electric power from the electrical system. The unit can be used once the yellow and green indication lights FLASH for several seconds.

If the yellow indication-light flashes during operation or other indications of malfunctions are given, follow the procedures of chapter 3.13.1.18 and contact the manufacturer.
**Warning:** Before rotating the propeller by hand (for example to pump oil through the engine before a cold-start), REMOVE the ignition key and set the master-switch to OFF!

**Warning:** Do NOT turn the propeller against its regular direction of motion!

**Caution:** Avoid high propeller-RPM on the ground. This could lead to stone chippings on the propeller blades. Due to this, perform engine runs only on appropriate surfaces.

Also always follow the procedures described in chapters 3 and 4.

### 7.11.3 Operation of the Engine

#### 7.11.3.1 Throttle

The throttle is located on the center console between the seats. It is equipped with a forward detent for 100% power (maximum continuous power, MCP) and a forward stop for 115% power (maximum takeoff power, MTOP). A spring pulls the throttle into the "FULL POWER" position.

**Warning:** The maximum takeoff power of 115% must not be used for more than 5 minutes. Otherwise, the engine may be damaged!
Caution: The throttle settings of 100% and 115% power can be set without looking at the throttle. 100% power is set once the first detent is reached. To set 115% power, the throttle needs to be pushed past the first detent and against the forward stop.

7.11.3.2 Choke

Operate the choke of the two carburetors with the black lever on the center console, to the left of the throttle lever. At the carburetors a spring pulls the bowden cable to the CHOKE CLOSED position.

For adjustment the choke lever can be set continuously to the required position between CHOKE ON (lever rearward) and CHOKE OFF (lever forward).

A preset clamping avoids unintended displacement of choke setting.

When operating the choke, the combustion mixture is enriched in the starter carburetor with additional fuel. This is needed for a cold start of the engine. The starter carburetor is only operational if the throttle is set to IDLE.

Caution: Only use the choke briefly when performing a cold start. Before T/O it must be set to the CLOSED position again.

Note: During the daily check, check to see if the starter carburetor reaches the stop position. Also check the operation of the butterfly valve on the carburetor.

7.11.4 Turbocharger and Control System

The ROTAX 914 F2 engine is equipped with a turbocharger. It uses the energy of the exhaust gas stream to increase the manifold air pressure (MAP). The air pressure in the air-box is set with the waste gate of the turbocharger turbine. The turbocharger turbine is controlled by the turbo control unit (TCU). The target-MAP is determined by the setting of the butterfly valve on the carburetor.

The induction of the air is performed through a NACA-inlet on the lower engine cowling.
The inducted air is compressed (and warmed to some extent) in the turbocharger. Therefore, a carburetor-heat-system is not necessary because ice will not form in any flight-conditions.

**Warning:** Just before reaching the setting for take-off-power (between 108% and 110% power), the target-MAP will rise in a step. Setting the engine-power precisely is not possible anymore. Instead, periodic oscillations of the control-unit and the engine-RPM might occur. Avoid the range between 100% 115% engine-power and move through it quickly, when the throttle is set.

To avoid damage to the engine, the MAP is reduced when the engine-RPM is too high or when the inducted air is too warm.

To monitor the turbo-control-unit, use the red MAP-warning-light and the yellow TCU-caution-light. When turning ON the electrical system, both lights will go ON for approx. 1 to 2 sec. during a self-test.

**Caution:** If the self-test fails, do not start the engine!

**Yellow TCU-Caution-Light**

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>TCU is operational</td>
</tr>
<tr>
<td>FLASHING</td>
<td>TCU is NOT operational, for procedures refer to section 3 “Emergency Procedures”.</td>
</tr>
</tbody>
</table>
**Red MAP-Warning-Light**

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>Engine is operated within allowed limits</td>
</tr>
<tr>
<td>ON</td>
<td>Operation above maximum-MAP, for procedures refer to section 3 &quot;Emergency Procedures&quot;</td>
</tr>
<tr>
<td>FLASHING</td>
<td>Take-off-Power has been set for more than 5 minutes, for procedures refer to section 3 &quot;Emergency Procedures&quot;</td>
</tr>
</tbody>
</table>

**Caution:** If the red MAP-warning-light is ON, IMMEDIATELY reduce power!

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7.11.5 Fire Warning

The engine compartment of the STEMME S6-RT is equipped with a fire detecting system which in case of an engine fire gives a clear warning signal by a red warning light in combination with an acoustic alarm signal.

For fire detection 2 thermal sensors are mounted on the outside of the engine fire wall above the carburetors and another 2 sensors are mounted on the left and right containment of the fire wall outlet and exhaust shaft.

The system is designed fail-safe, that means a possible cable break to the sensors causes a fire warning signal.

**Red Fire Warning light (Push-button)**

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In case of thermal sensors activation a fire warning occurs by permanent red light and acoustic alarm signal</td>
</tr>
<tr>
<td>Test</td>
<td>Push the fire warning button to check function, with pushing the button the red light and the acoustic alarm signal has to work</td>
</tr>
</tbody>
</table>
7.11.6 Engine-Cooling-System

The heat dissipation of the liquid-cooling-system for the cylinder-heads occurs in a aluminum-gill-radiator. An oil-cooler for the lubrication-circuit is placed below the aluminum-gill-radiator. Both coolers are placed below the engine and are supplied with ram-air from the central NACA-inlet between the main-landing-gear-legs on the bottom of the fuselage.

The ram-air for cooling the cylinders is inducted through an inlet which is located to the right of the water-cooler. It then is lead through a hose and an air-distributor made of glass-fiber-composites (GFC) to the cylinders.

The used cooling-air is discharged through two outlets. The first is an adjustable gill-outlet on the lower side of the fuselage, whereas the second is the outlet of the exhaust-gas-system on top of the fuselage between the wings.

Depending on the value of the operating-temperature of the engine, the position of the gill-outlet and of the cowl-flaps can be adjusted with a bowden-cable.

Operation of the cowl-flaps:

The cowl-flaps of the inlets and outlets are manually operated with a self-locking black T-handle at the center-console below the instrument-panel.

If the handle is positioned fully forward this causes the cowl-flaps to be fully OPEN. When pulling on the handle, the flaps can be closed up to a minimum position. To pull the cowl-flap-handle, it needs to be unlocked by pushing an unlock-button. Lock the cowl-flap-handle in the desired position by simply releasing the unlock-button.

If the engine is cold or when in the glider-configuration (engine not running), keep the inlets and outlets closed. This minimizes the warm-up-time for the running engine or reduces the aerodynamic drag in the glider-configuration.

Note: The cooling-system is very powerful. Because of this, it needs to be regulated in all phases of the flight (T/O, cruise, and others)!
Information about the Liquid-Cooling-System:
The following illustration shows the schematics of the liquid-cooling-system:

Illustration 7-6: Schematics of the Liquid-Cooling-System
(Illustration by ROTAX)

1. **Expansion-Tank**
The expansion-tank (1) is located at the top of the engine. It has a overpressure-valve and breather-valve which lead to the overflow-bottle (4). The coolant level in the expansion-tank has to be checked with every Daily Inspection and refilled up to max. amount (up to top of tank) if necessary.

2. **Radiator**
The radiator (2) is located at the bottom of the central steel-tube-framework. It is supplied with ram-air through the lower center NACA-cooling-inlet.

3. **Filling-Hole**
The filling-hole (3) for the expansion-tank (1) is located on top of the expansion-tank (1). It is covered with a lid which closes the hole in a pressure-resistant manner. This is where the cooling-system is filled and refilled if necessary.

4. **Overflow-Bottle**
The overflow-bottle (4) is located at the left side behind the engine, near the rear engine-suspension. It is designed as a fluid-buffer when the coolant expands. The coolant level at the overflow-bottle (4) is checked before every flight. If necessary, refill coolant until coolant-level at overflow-bottle is between "min." and "max." again.
The coolant-circuit is a closed system. A camshaft-driven water-pump circulates the coolant through the system. To allow coolant to escape into the overflow-bottle when warming up, an overpressure-valve is installed. When the coolant contracts again during the cool-down-phase, coolant is sucked into the circuit again. Air is automatically bled from the circuit.

**Caution:** Do NOT open the lid of the expansion-tank if the engine is warm. The engine-cooling-system is pressurized! There is a severe risk of being burnt by boiling splash-water!

**Caution:** When refilling coolant in the overflow-reservoir and tightening the cap afterwards make sure that the plugged vent hose remains untwisted.

**Note:** The system has an overpressure-valve. Because of this, coolant needed in the overflow-bottle (4) can NOT be refilled at the expansion-tank (1).

To improve the engine cooling performance especially on ground and during climb, the S6-RT with retractable landing gear is equipped with a cooling radiator fan. The cooling fan is controlled by a thermostat and activates automatically. A separate operation is not required.
7.11.7 Lubrication-System

The ROTAX 914 F2 is lubricated by a pressurized dry-sump lubrication-system. Its main-oil-pump has an integrated pressure-control-mechanism. Additionally, a suction-pump is installed. Both oil-pumps are driven by the camshaft.

Illustration 7-7: Schematics of the Engine’s Lubrication-System (Illustration by ROTAX)

1. Oil-tank with filler-neck and integrated dip-stick
2. Oil-cooler (located below the radiator)
3. Oil-pipe for the turbo-charger
4. Return-pipe for the turbo-charger
5. Breather-pipe

The main-oil-pump transports the oil from the oil-tank through separate oil-cooler and oil-filter to the lubricating-points. Escaping oil is returned through the crank-case.

The turbo-charger is supplied through a separate oil-pipe by the main-oil-pump. There, the oil is suctioned by a separate pump and returned directly to the oil-tank.

At the flange of the oil-pump, a temperature-sensor is installed, which measures the oil-intake-temperature. A dipstick allows the amount of oil to be measured.
Caution: Before checking the amount of oil, rotate the propeller by hand in the standard direction-of-rotation. Rotate it until you hear a "flushing" sound. This is to assure that the oil has been moved from the sump of the engine back to the oil-tank.

7.11.8 Load Transmission and Transmissions

7.11.8.1 Front Drive

The RPM of the long-shaft is reduced to the propeller-RPM with the front-drive, which is located in the nose of the A/C. The drive-shaft of the front-drive is screwed to the propeller-hub. The drive is a belt-drive (model: STEMME 050.251), which is encased in cast-magnesium. The gear-belt-discs are made of aluminum and have a transmission-ratio of $i = 1.100$.

The drive suspension is screwed onto the load-transmission-frame (drive-frame) with elastomer elements. It transmits the propeller-thrust into the aircraft’s structure with low vibration.

Note: Check the gear belt of the drive according to chapter 4.5 "Daily Check" and according to the maintenance-manual.
7.11.8.2 Long-Shaft

The power-transmission between the engine and the front-drive is realized with a long-shaft made of carbon-fiber-composites (CFC). It runs from the front-end of the fuselage through a tunnel in the center-console to the output-gear of the engine. The engine-shaft-flange is connected to the long-shaft with a spline-shaft-connector, which allows for axial motion of the long-shaft. A flexible-disk on each side of the long-shaft compensates angle-errors and angular motion. In case of a failure of the long-shaft, it is contained in a protective tunnel made of aramid fiber composites. This contains the shaft and sharp fragments in case of shaft-rupture. The following illustration shows the concept of the load transmission.

Illustration 7-8: Concept of the Power Transmission System

1. MT Constant Speed Propeller
2. Front Drive STEMME 050.251
3. Flexible Disks
4. Long Shaft made of CFC
5. ROTAX Engine
7.12 Fuel System

7.12.1 Design of the Fuel-System

The main tank is the integral-tank in the front area of the right wing. It has a fuel capacity of 17.2 US gal / 65 l, of which 2.1 US gal / 8 l are designed as a separate feeder compartment.

Contaminated fuel (water, particles and similar) can be drained through the sumps of each compartment of the right tank. These drain-valves are located at the bottom of the right wing.

The fuel is moved from the main compartment to the feeder compartment by a continuously-running pump. If the feeder compartment is completely filled, then the fuel flows back to the main compartment through an opening in the divider.

The amount of fuel in the feeder compartment is monitored by the low fuel caution light.

The feeder compartment supplies the engine with fuel. A coarse filter and fine filter are integrated into the feeder pipe to the engine.

Both, the feeder pipe and the return pipe, are connected with the fuel system (which is installed in the fuselage) through quick connectors.

The fuel flows from the quick connectors to the fuel pumps (main fuel pump and auxiliary fuel pump). From there, it continues to the fuel valve in the cockpit and then to the pressure regulator in front of the carburetors.

A return pipe leads from the pressure regulator through a quick connector back to the feeder compartment.

Optionally, an additional integral tank can be installed in the left inner wing. This is designed as a completely external tank. Contaminated fuel (water, particles and similar) can be drained through the sumps of the left tank. These drain valves are located at the bottom of the left wing.

The tank’s maximum fuel-capacity of 17.2 US gal / 65 l can be moved to the main tank with a transfer pump.

The transfer of fuel is automatically regulated. This automatic regulator can be activated and de-activated by the pilot with the switch "Transfer-pump". This transfer begins if the main tank is filled to less than 2/3 - 3/4 of its capacity or the main tank is filled below the reaction point of the fuel sensor. It ends once the amount of fuel in the main tank has reached approx. 2/3 - 3/4 of its capacity again. Monitor the operation of the system with the fuel gauge for the main tank.
Caution: Keep the aircraft leveled during fueling! Also, do NOT fill the tanks to the top-edge in warm weather conditions (keep in mind the thermal expansion of the fuel). Else fuel might leak through the fuel tank vents.

The fuel tank vents end at the wing joints between the inner wing and outer wings. The fuel filler necks are located at the upper outer side of the inner wings.

7.12.2 Control Elements and Gauges in the Cockpit

The following control elements and gauges are located in the cockpit:

- Fuel Valve (Fuel-Shut-Off-Valve) on the rear center console near the head of the pilot, separates the engine from the fuel supply (vertical “ON”, horizontal “OFF”, corresponding to flow direction from wing tank to mid-fuselage engine)
- Fuel Transfer Pump Switch at the switch panel of the instrument panel, settings "ON" and "OFF"
- Low Fuel Caution Light (yellow) Indication light for remaining fuel less than 1.3-1.9 US gal / 5-7 l in feeder compartment
- Indication Light of Auxiliary Fuel Pump (green) Status-indicator, is goes ON if the auxiliary fuel pump is running
- Fuel Gauge right and left (optional) On the instrument panel, shows the amount of fuel in the left and right integral tanks
- Fuel Flow Gauge (optional) On the instrument panel, shows the current fuel flow to the engine. For basic setting before flight enter or check the actual amount of fuel.

7.12.3 Circuit Logic and Operation of the Fuel Pumps

During normal operations, only the main fuel pump and the fuel circulation pump for the feeder compartment of the right tank are running. The auxiliary fuel pump is not running in this case. They are supplied by the electric circuit of the internal generator (internal generator or main battery). To operate the pumps, the master switch and the engine bus must be turned ON.

If the aux. pump switch is ON, for example during T/O and landing, then the auxiliary fuel pump is also running.
Illustration 7-9: Layout of Fuel System
If the optional left fuel tank is installed, then fuel can be moved from the left auxiliary-tank to the right main tank by operating the fuel transfer pump.

Operation of the fuel transfer pump is monitored by the amount of fuel in the right tank (automatic fuel transfer):

- If the amount of fuel in the right tank is more than 2/3 - 3/4 of its maximum capacity and is above the low fuel warning, then no fuel is transferred. This prevents the right tank from becoming overfilled.

- If the amount of fuel in the right is below 2/3 - 3/4 of its maximum capacity or below the level, the fuel-sensor could sense, the transfer of fuel begins automatically if this is activated.

The transfer of fuel can be interrupted at any time by hand (independent of the amount of fuel in the right tank) by operating the fuel transfer pump switch.

### 7.12.4 Measurement of the Amount of Fuel

The amount of fuel in each tank is measured with capacitive sensors. This data is then displayed on one fuel-gauge for each installed tank, mounted on the instrument-panel.

An additional optical sensor is mounted in the feeder-compartment. It signals, that less than approx. 1.3 - 1.9 US gal / 5 - 7 l of fuel remain in the feeder compartment.
7.13 Electrical System

7.13.1 Power Supply and Battery System

The rated voltage of the electrical system is 12V.

The starter-battery is designed as a maintenance-free lead-battery with AGM-technology. The required minimum capacity is 16 Ah. The battery-mounting is located in the rear area of the engine compartment, outside of the fire-wall.

If the engine is running, the electrical system is supplied by a 600 W-alternator. This alternator is flanged to the engine and is driven by a V-belt. An additional generator is integrated into the engine and only supplies the main-fuel-pump and the TCU.

The electrical circuits of all electric consumers are protected by fuses or circuit breakers.

7.13.2 Ignition System

The ROTAX 914 F2 engine is equipped with a dual non-contacting capacitor-ignition-system. This ignition system is supplied by an integrated generator. The ignition-system is maintenance-free and requires no external power-supply.

Two independent charging coils are mounted on the crankshaft-case. Each coil supplies one of the two independent ignition-circuits. The electrical energy is stored in the capacitors of the electronic modules. At the ignition point, 2 of the 4 external probes discharge the capacitors through the primary-coils of the dual-ignition transformers. The order of ignition is: 1-4-2-3.

7.13.3 Electrical Circuits

The electrical-system is divided into 4 main-electrical-circuits. They are supplied by 4 busses:

Main-Bus: supplies all consumers needed with a running or non-running engine (powered-configuration or glider-configuration). It is turned ON with the master-switch-level "Main". The main-bus is made up of the circuit-breakers A1 – A3 and A11 – A-14 (see ill. 7-3) as well as by the fuses S3 – S7 (see ill. 7-4).

Engine-Bus: supplies all consumers only required in the powered-configuration. The engine-bus is connected to the main-bus with a relay. It is turned ON with the master-switch-level "Engine". Turning OFF the engine-bus in the glider-configuration drains less energy from the battery. The engine-bus is designed as a distribution-box with fuses and is located behind the right side of the instrument-panel.
Avionics-Bus: supplies all avionics and is connected to the main-bus with the “Avionics” isolation switch. The avionics-bus is made up of the circuit breakers A4 – A10 (Ill. 7-3).

Internal-Generator-Bus: supplies the TCU and the main fuel pump independently from the remaining electrical system. The internal generator bus is designed as a distribution box with fuses and is located on the control-board in the engine compartment (at the rear of the fire wall).

7.13.4 Electrical Consumers and Circuit Breaker System

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Circuit Breaker (A)</th>
<th>Fuse (A)</th>
<th>Isolation Switch (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Bus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine Bus</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master Circuit Breaker</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit Breaker for the Alternator</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stall Warning</td>
<td>2</td>
<td></td>
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</tr>
<tr>
<td>Electrical Trim</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propeller Pitch Control</td>
<td>5</td>
<td></td>
<td></td>
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<tr>
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### 7.13.5 Control Elements

In the following chapter, the different settings of important control elements of the electrical system are explained (also refer to the chapter 7.6 for instrument panel layout).

**Master Switch:** Separates all power sources from the main bus

**Subordinated Switches:**

- **Engine Master Switch:** Turns ON or OFF all electrical devices needed for engine-operation (starter, propeller-pitch-control, engine-instruments and similar) by connecting them to
the battery or external alternator. This switch is mechanically coupled to the "Batt" Master Switch. To turn ON the engine bus with the "Eng" Master Switch, the "Batt" Master Switch also needs to be turned ON. To turn OFF the "Batt" Master Switch, the engine bus also needs to be turned OFF. This makes certain, that the external alternator is only turned ON, when the battery is also turned ON.

**Ignition Switch:**
The ignition key switch can be set to "OFF", "RIGHT", "LEFT" and "BOTH". It operates the ignition circuits and the electrical engine starter.

**TCU-Isolation Switch:**
This switch separates the waste-gate-actuator from the turbo-control-unit when necessary. The switch is protected against accidental activation because it only needs to be operated in the event of a TCU-malfunction. The normal operating position is the DOWN (protected) setting. To disconnect the actuator, set the switch to the UP position.

**Avionics Master Switch:**
Activates the avionics bus. It is designed as a 20A-circuit-breaker.

**Auxiliary Fuel Pump:**
The auxiliary fuel pump is turned ON and OFF with this switch when needed. The aux. fuel pump runs at the same time as the main fuel pump. If the switch is set to ON, then the green indication light on the annunciator panel will go ON.

**Fuel Transfer Pump:**
Activates the automatic control for fuel transfer from the left wing-tank (when installed) to the right wing (=automatic fuel transfer) (refer to chapter 7.12 about the fuel system).

**Propeller Pitch Control:**
Rotary switch for adjusting the propeller’s pitch (refer to chapter 7.11.2 about the propeller)

**Fire Warning**
Warning light with push-button for alarm indication of fire in the engine compartment by red light and acoustic alarm signal, push to check function (refer to chapter 7.11.5)

**Landing Gear Lever**
Lever switch to RETRACT or EXTEND the landing gear (refer to Chap. 7.7)

### 7.13.6 Gauges and Indicator Lights

**Voltmeter**
indicates the voltage at the main bus

**Ammeter**
indicates the electric current drawn from the battery (discharge) or flowing into the battery (charge)
<table>
<thead>
<tr>
<th>Internal Generator Caution Light (yellow)</th>
<th>The yellow light goes ON if the output-voltage of the generator controller is below the battery-voltage (failure of the controller or the generator).</th>
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</thead>
<tbody>
<tr>
<td>External Alternator Warning Light (red)</td>
<td>The red light goes ON if the output-voltage of the belt-driven external alternator falls below the battery voltage (failure of the external-alternator).</td>
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</tbody>
</table>
| 3 Indication lights for state of Landing Gear, one for each leg | Light GREEN: if gear leg is OUT and LOCKED,  
Light RED: if gear leg moves IN or OUT  
Light ORANGE: landing gear leg(s) OUT and LOCKED but hydraulic pump still ON (final system pressure not reached)  
Light OFF: if gear leg is in final IN position, or system powerless (CB/master switch OFF) |
| Landing Gear Warning | Acoustical warning signal to prevent a landing with gear retracted, comes up if airbrakes are operated with landing gear retracted |
7.14 Static Pressure and Dynamic Pressure System

A tubular probe measures the total pressure, static pressure and total energy compensated pressure (TEC-pressure). It is located at the left wing-joint between the inner wing and outer wing. The pressure sensing lines lead to the center of the wing. There, they need to be connected to the adapters of the mid section of the fuselage. From there, the lines are lead to the rear side of the instrument panel.

All tubes of the pressure system in the forward area of the cockpit are equipped with filters against moisture and dust.

The assignment of the pressure ports of different instruments (standard instruments and optional instruments) to the pressure system can be taken from the maintenance manual.
7.15 Stall Warning

If the airspeed drops to less than 1.1 times the stall speed at any flap setting, then stall horn will sound. The horn is installed in the instrument panel. The stall warning system is designed as a small wind vane with a trigger switch. It is mounted at the leading edge of the left wing, near the wing joint.
Section 8 – Handling, Servicing and Maintenance

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8.1 Introduction

This section describes procedures recommended for the correct handling of the aircraft on the ground as well as for the servicing of the aircraft. Certain check regulations and maintenance regulations are mentioned. They need to be observed if the aircraft is to retain the performance and reliability of a new aircraft.

Additional information is given in the Maintenance Manual.

| Caution | Keep to the lubrication chart in the Maintenance Manual. Depending on the climatic conditions and operating conditions, preventive maintenance needs to be done. If the operating conditions are very unfavorable, the maintenance intervals need to be reduced. |
8.2 Maintenance Intervals of the Aircraft

More detailed information about the maintenance and checklists is given in the Maintenance Manual of the STEMME S6-RT (STEMME Doc.-No.: P500-006.000).

One-time-maintenance needs to be done after the first 25h of operation for a new aircraft and for a new or remanufactured engine. Afterwards, observe the following maintenance intervals:

- **Structure** (refer to Maintenance Manual STEMME S6-RT):
  - lowest interval: 100 h
- **Engine** (refer to Maintenance Manual STEMME S6-RT):
  - lowest interval: 50 h

To retain the airworthiness of the A/C, an ANNUAL check (refer to Maintenance Manual S6-RT) must be performed at least once per year. This is independent of the operating hours of the A/C.

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**Caution:** Unscheduled maintenance is necessary after: hard landings, abrupt stop of the engine or propeller, engine fire, lightning strike and other malfunctions or damage.

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**Caution:** When running the engine with AVGAS, the necessary interval for oil changes is reduced to 50 h.
8.3 Changes or Repairs

Changes

Changes which may affect the airworthiness of the certified aircraft model need to be authorized by the appropriate authorities. A statement from the manufacturer must be obtained. This is to ensure the continuing airworthiness of the aircraft. Changes to the approved sections of the Flight Manual or the Maintenance Manual need to be approved by the appropriate aviation authorities.

Repairs

Repairs of the aircraft must only be conducted with generally accepted maintenance procedures or specially developed maintenance procedures by authorized personnel.

If the "Daily Check" reveals minor damage – which do not affect the airworthiness of the aircraft – they may be repaired directly. If the importance of detected damage is not directly obvious a knowledgeable person in the area of fiber composite structures needs to be consulted.

Warning: Repairs or changes to the surfaces of any control-surface might influence the airworthiness. This is the case if the control surface masses and remaining moment (refer to Maintenance Manual) are not within the required limits.
8.4 Ground Handling and Road Transport

8.4.1 Taxiing and Towing on the Ground

When towing the aircraft behind a car, a person must be seated at the pilot’s seat. Otherwise the front wheel steering will not be engaged. Only drive with walking speed. Do not make tight turns. This prevents unnecessary loads on the landing gear and collisions with the propeller.

It is recommended to connect the tow-bar in an area of the nose gear which is not covered with fairings. To rotate the A/C on the spot, press the rear fuselage section downwards to lift-up the nose gear.

- Moving rearwards: Steer the airplane at the vertical stabilizer and only push at the inner wing.

Caution: Before any moving of the aircraft on ground SET landing gear lever to DOWN position (EXTEND) and activate master switch (Batt) to ensure landing gear is in OUT + LOCKED position and hydraulic system pressure is 90 bar / 1305 psi ±8%!

Press push-button with check light for pressure reservoir in the landing gear bay until pressure is 90 bar / 1305 psi ±8%. If applicable wait until all indication lights are green and hydraulic pump is OFF again before deactivation of master switch.

Caution: Do NOT lift or push on the control surfaces or flaps.

8.4.2 Parking

- For parking, lock the parking brake lever with the locking pin or place chocks at the wheels.
- Attach the mechanical locks on the nose and main landing gear.
- Align against the wind, set flaps to "NEUTRAL"
- When parking the aircraft for a longer time outside or when the weather developments are uncertain, strap-down the aircraft. (Hangaring it is an even better option). Remove the pitot tube and pressure probe and store them in the cockpit. Cover the pressure probe opening with a protection cap. Cover the exhaust gas opening of the upper cowlign.
- It is recommended to hangar the aircraft.
Note: A lost of system pressure in the hydraulic system of the landing gear can be caused by change of environmental temperature and long aircraft downtimes. The locking force of the landing gears can be reduced by pressure lost. This reduction can cause an uncontrolled retracting of the landing gear on ground.

Caution: Avoid parking the aircraft with a bank angle. (Keep the wings horizontal). Else, fuel might leak from the fuel tank vents.

8.4.3 Storage/ Hangaring

The aircraft should only be parked or stored in well-ventilated rooms. Closed and weather-proof transport trailers need to be equipped with adequate ventilation openings. Keep in mind, that the aircraft and its components should be stored in a tension-free manner.

- Unlock airbrakes (to relax the airbrake control rods)
- Release parking brake and secure A/C with chocks (do this when hangaring or when parking for a longer period of time)
- Attach the mechanical locks on the nose and main landing gear.
- Use of dust covers, if possible.
8.4.4 Road Transport

Road transport of the aircraft can be conducted on open or closed trailers. Derig the aircraft (remove outer wings, inner wing, horizontal stabilizer and loose items) before transporting it.

Only use broad belts for strapping down and securing the aircraft. Place carpet, felt or foamed rubber on all areas of contact.

Preparations for road transport

Fuselage:
- Park the fuselage safely on the main gears and nose gear.
- Attach the mechanical locks on the nose and main landing gear.
- Secure the fuselage against shifting or rolling by strapping it down with belts. Cushion the areas of contact between A/C and belts well.
- Keep space clear for the propeller.
- Make sure that there is no collision of any loaded parts to the drag struts of main and nose landing gear
- Do not transport loose items (headsets, parachutes or similar) in the cockpit. Lock seat belts.

Caution: If the road transport is done with a defect/ malfunction of the retractable landing gear, contact the manufacturer for possible required special procedures.

Wings:
- Drain all fuel and store it in containers which are approved for road-transport.
- Special care needs to be taken when storing the inner wing. It is very heavy.
- There are two possibilities for storing the inner wing for transport. The first method is to place it on the leading edge. Here, it needs to be placed on the large, cushioned areas of contact which match the contours of the leading edge. The other method is to lay the wing down flat. In this case, the inner wing needs to be supported at each outer edge with a large, cushioned area of contact. The mid section of the inner wing (Connection between wing and fuselage) may NOT touch the ground.
- The outer-wings should be transported standing on their leading-edges. Use the method previously described for the inner wing. Make sure each outer-wing is placed on two large, cushioned areas of contact.
• All parts must be secured against shifting and rotation.

**Caution:** Do NOT strap the aircraft-components down with belts over control-surfaces, flaps or brackets.

**Horizontal Stabilizer:**

• It is recommended to store the horizontal stabilizer in a molding, standing on its leading edge or laying down flat.

• All molding should be cushioned (use carpet, felt or similar). This protects the surface and distributes the loads better.

The road transport is conducted according to the requirements of the transport trailer and used truck.
8.5 Cleaning and Care

Even though the surfaces of composite aircraft are robust and tough, they should be cared for. Keep the following information about the cleaning and care of the A/C in mind (refer to the Maintenance Manual of the S6-RT for additional information):

If the aircraft will be operated year-round, then it must be cared in such a manner that no rust will form on the connecting elements of the fuselage, wings and horizontal stabilizer.

**Warning:** All structural components made of fiber-composites should have a white surface. (Exceptions are areas for the registration-number and for caution-marks.) Very dark colors can cause the surface to warm up to critical temperatures. An unnoticed loss of structural integrity might result.

**Caution:** Strong contamination of the surfaces will reduce flight performance and will cause light surfaces to heat up when exposed to sunlight.

8.5.1 Finished Surfaces

The entire surface of the aircraft is finished with a weather resistant white two-component-finish. However, the aircraft should still be protected from moisture. It should also not be exposed to direct sunlight (heat) and continuous UV-light for longer than necessary.

- Remove water which has reached the interior of components by storing the components dryly and rotating them several times.
- Clean and wash the surfaces regularly with clear water, a sponge and a leather-rag. Give special attention to the leading edges of the wings and stabilizers. To remove bugs and dirt (which may caused by the propeller), the use of a bug-sponge is recommended.
- Keep the static-pressure-ports and dynamic-pressure-ports free of dirt and water. Check regularly.
- Use commercial rinsing-agents or soap-suds only rarely to remove tough dirt.
• Benzines and alcohols may be used briefly (for example to remove contamination at the exhaust-gas-outlet). *NEVER use chlorinated hydrocarbons (tri-, tetra, per- or similar)!*

• For finish-care and conservation, use *silicone-free polishes without abrasives.*

**Polishing:**

• Clean the surface with fresh water and a sponge. Let it dry Afterwards.

• Spread a small amount of polish of the type "Rapid Grade G6" and fresh water onto the surface. Afterwards buff the surface with a grind-applicator of the type "G-Mop M14" at approx. 1500 RPM.

• After removing the scratches caused by the sandpaper and the grind applicator clean the surface with fresh water. Continue the process with polish of the type "Regular Grade G3".

• To reach the highest quality finish (optional), clean the surface and grind applicator again with fresh water. Continue the process with polish of the type "Extra Fine Grade G10".

• Clean the surface with fresh water, a sponge and a bit of acetone (if necessary). Afterwards let it dry.

After polishing the surface must not be dull. Otherwise the polishing-process must be repeated again.

**8.5.2 Canopy**

• To wash the canopy, use a soft, clean and scratch-free sponge or rag.

• Clean the cabin-canopy with plexiglass-cleaners, if available. Else use clear water. To dry, use a clean leather-rag or microfiber rag. Never rub on dry plexiglas!

• To remove small scratches, special plexiglas polishes are available. Never use solvents!

• Interior and exterior surfaces of the canopy should be treated in the same manner.
8.5.3 Propeller
Damage to the propeller and operational malfunctions need to be inspected by a knowledgeable person.

- The surface (PU-finish and acrylic-finish) can be cleaned using commercial cleaning agents and preserving-agents intended for cars.
- Prevent moisture from reaching the wooden core. When in doubt, let the propeller be inspected by an examiner.
- For additional information, see “operating-instructions and installation-instructions” ATA 61-01-18 (E-118) by mt-Propeller (the manufacturer).

8.5.4 Engine
The cleaning of the engine is performed during regular maintenance, according to the directions of the manufacturer’s (ROTAX) Maintenance Manual. (“Maintenance Manual (Line Maintenance) for ROTAX engine model 914 Series“)

8.5.5 Retractable Landing Gear
The retraction mechanics and hydraulic actuators of the nose and main landing gear have to be kept clean and smooth-running. Especially the final position micro switches have to be cleaned carefully without sharp objects. For cleaning of the hydraulic actuators use a scratch-free rag.

Also refer to section 4 (chapters 4.5 and 4.6, daily and pre-flight checks) of this Flight Manual supplement and to the Maintenance Manual of STEMME S6-RT (STEMME Doc.: P500-006.000).

8.5.6 Interior, Seats and Fairings
Dirt in the interior, when possible, should be removed using a vacuum cleaner. Loose or lost items should be removed or stored in an appropriate manner.

- Clean composite surfaces with a lint-free and slightly moistened rag.
- The instruments should be cleaned with a dry, soft and scratch-free rag.
8.6 Trouble-Shooting of the Engine

**Warning:** Maintenance and servicing must only be performed by qualified technicians who have received specific training for this engine model. If the following procedures are not successful, contact an authorized business. The engine must NOT be operated again until the malfunction is fixed!

**Engine will not start:**

**Possible cause:**
- Fuel Valve closed?
- no fuel?
- starter-RPM too low?
- starter-RPM too low, problems when performing cold start?

**Trouble-shooting:**
- OPEN Fuel Valve
- REFUEL A/C
- CHECK battery
- USE fuel efficient engine oil of high quality, hot E-starter will lose power quickly, let it COOL DOWN for a sufficient period. Pre-heat the engine.

**Engine runs rough after having warmed up, exhaust-gas is sooty:**
- choke ON

**Oil pressure to low:**
- not enough oil in oil tank

**Engine is dieseling:**
- engine too hot

**Engine knocks when loaded:**
- wrong type of fuel
Difficulties in cold weather:

- idle-RPM too low  
  PRE-HEAT engine

- battery power too low  
  INSTALL fully charged battery, PERFORM jump-start.

- high oil pressure  
  When performing a cold start oil-pressure up to 102 psi / 7 bar is not an indication of engine problems. If necessary, perform oil change.

- oil pressure too low after cold start  
  Viscosity of oil too high at oil-suction-pipe. TURN OFF engine and PRE-HEAT oil.
Section 9 – Supplements

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9.2 List of Supplemental and Alternative Equipment ................................. 9-3
9.1 Introduction

This section gives supplemental information about supplemental or alternative equipment installed in the aircraft, which has not been covered in the previous text of the Flight Manual (chapters 1 through 8). This information is also needed for a safe operation of the A/C. Pilots are provided with all information and instructions necessary for safe and efficient operation of the aircraft.

The supplements added in this section refer to the installed components. It must only be included the supplements according to the aircraft configuration.

If not otherwise specified, the supplements to the basic model S6 (Doc.-No.: P400-006.000 FAA) are also valid for the Flight Manual in hand for the model S6-RT (Doc.-No.: P400-006.001 FAA).

The installation of supplemental or alternative equipment or accessories is based on a service bulletin (SB) if equipment is not already installed at delivery. The necessary supplemental information is provided in the form of Flight Manual Supplements. These inserts are shipped together with the parts kit for later installation. The inserts should be placed behind the cover sheet of chapter 9.2.

The compliance with every SB with effect to the Flight Manual must be certified by an examiner on the SB/AD compliance record in the aircraft’s logbook before the next flight. This certification also includes an examination of the Flight Manual.
9.2 List of Supplemental and Alternative Equipment

The following list contains all approved supplements that in the case of installation of equipment and systems in addition or as an alternative to the standard configuration are valid. These supplements contain additional information and instructions on the content of the basic Flight Manual (sections 1 through 8) or replace them if necessary.

The currently installed supplemental or alternative equipment of the aircraft has to be marked in the table below with date and check note. This applies to alternative equipment already installed at delivery as well as for equipment later installed.

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### Supplements Stemme TSA-M, model S6-RT

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