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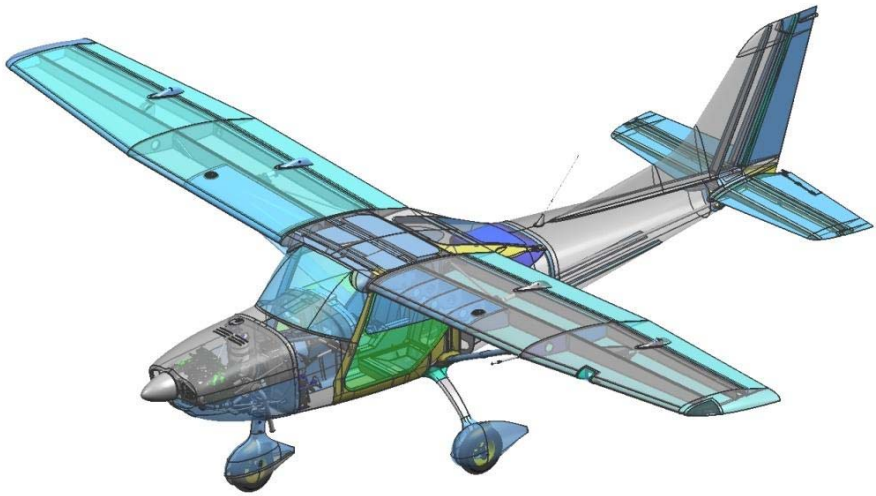
| | Document type :<br><br>**Flight and operational manual** | Aircraft serial number:<br><br>Registration: |

# *TL-3000 SIRIUS*



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**0 List of changes**

| Change, amendment serial number | Bulletin number | Changed pages | New page release or change date | Execution date and signature |
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# CONTENTS

# Section 1
# General information

**1.1 Introduction**

This flight and operational manual produced by TL Ultralight is designed to introduce TL -3000 SIRIUS aircraft to its operator. It provides the basic usage information and operational procedures ensuring the most effective aircraft utilization by the operator.
Each holder of this flight and operational manual and/or its parts is obliged to maintain it in updated state by implementation of amendments, revisions and changes as published in the bulletin through the following web-page:
**http://tl-ultralight.cz/en/bulletin/**
Handwritten amendments and revisions of this manual are not allowed except of situations when the security interest requires an immediate amendment or revision.
This flight and operational manual is divided by topics into several sections that are split into paragraphs according to the significance and importance of their subject matter. In case of page replacement, amendment or handwriting revision, such fact must be recorded on the Changes log page by recording the change or amendment serial number, bulletin number in which the change was published or page changed or amended, new page or change publishing date, and implementation date and signature.
This operational manual is established such way that any revision or amendment execution is only possible by replacing or adding the appropriate pages and discarding the obsolete pages. Therefore, it is necessary that all manual holders pay increased attention to recording all changes and amendments and their implementing.

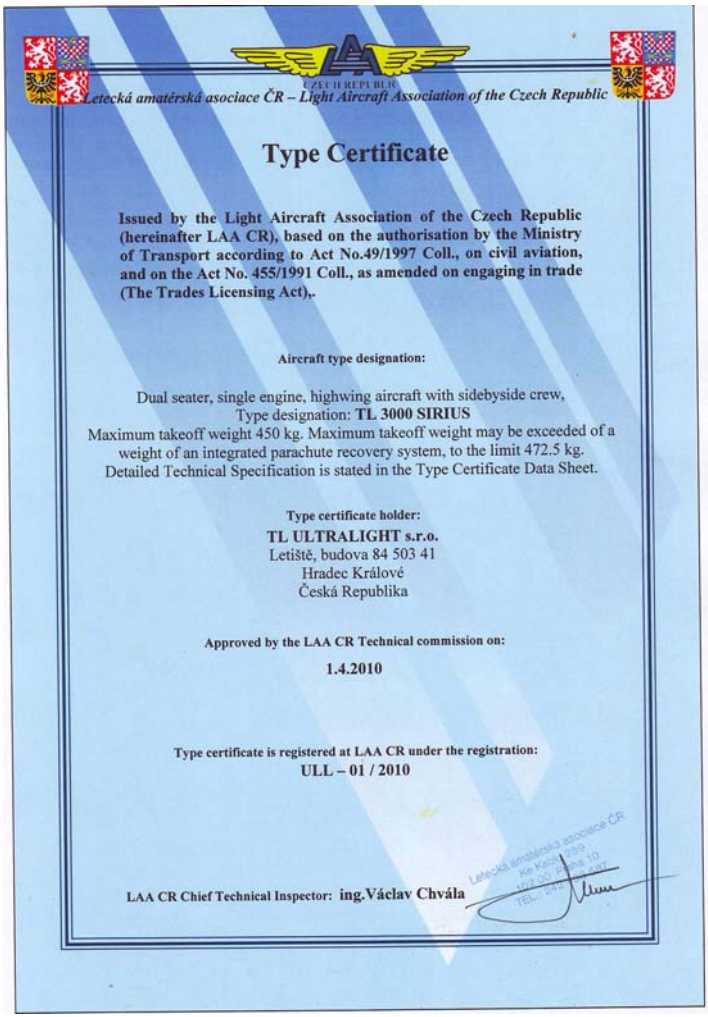
**Caution**:

**This aircraft, belonging to sports aviation gadgets, is not subject to Civil Aviation Authority of the Czech Republic approval and is operated by the user at his/her own risk.**

**1.2 Certification attest**

This aircraft has been approved by the Amateur Light Aircraft Association of the Czech Republic in accordance with the regulation "Ultralight Aircraft Airworthiness Requirements".

The type certificate Nr. ULL-01/2010 was issued on April 1st, 2010.



CZECH REPUBLIC
*Letecká amatérská asociace ČR – Light Aircraft Association of the Czech Republic*

**Type Certificate**

**Issued by the Light Aircraft Association of the Czech Republic (hereinafter LAA CR), based on the authorisation by the Ministry of Transport according to Act No.49/1997 Coll., on civil aviation, and on the Act No. 455/1991 Coll., as amended on engaging in trade (The Trades Licensing Act),.**

**Aircraft type designation:**

Dual seater, single engine, highwing aircraft with sidebyside crew,
Type designation: **TL 3000 SIRIUS**
Maximum takeoff weight 450 kg. Maximum takeoff weight may be exceeded of a weight of an integrated parachute recovery system, to the limit 472.5 kg.
Detailed Technical Specification is stated in the Type Certificate Data Sheet.

**Type certificate holder:**
**TL ULTRALIGHT s.r.o.**
Letiště, budova 84 503 41
Hradec Králové
Česká Republika

**Approved by the LAA CR Technical commission on:**
**1.4.2010**

**Type certificate is registered at LAA CR under the registration:**
**ULL – 01 / 2010**

**LAA CR Chief Technical Inspector: ing.Václav Chvála**

### 1.3 Abbreviations and definitions

| | |
|---|---|
| **CAS** | The calibrated airspeed is the indicated airspeed corrected for the positional and instrumental error. The calibrated airspeed is equal to the real airspeed in the ISA at the see level. |
| **IAS** | The indicated airspeed is the airspeed shown on the aircraft Pitot static speed indicating system with the scale that is adjusted to include the influence of the adiabatic stream coercibility at standard atmosphere zero altitude but not corrected for the speedometer system error.<br>(ço/ç)1/2.<br>ço = air specific weight at the see level<br>ç = air specific gravity at given altitude |
| **ISA** | International standard atmosphere |
| **MAC** | Mean aerodynamic chord |
| $V_{NE}$ | Maximum never exceed speed |
| $V_{NO}$ | Maximum structural cruising speed |
| $V_{RA}$ | Maximum turbulence penetrating speed |
| $V_{A}$ | Design manoeuvring speed |
| $V_{FE}$ | Maximum flap extended speed |
| $G_{LET}$ | Empty aircraft weight (kg) |
| $G_{PAL}$ | Fuel weight (kg) |
| $G_{POS}$ | Crew weight (kg) |
| $G_{ZAV}$ | Luggage weight (kg) |
| $G_{P}$ | Aircraft weight load on the nose gear (kg) |
| $G_{H}$ | Aircraft weight load on the main undercarriage (kg) |
| $X_{T}$ | Empty aircraft centre of gravity distance from the index plane, i.e. from the wing leading edge (mm) |
| $X_{\% LET}$ | Empty aircraft centre of gravity position (% MAC ) |
| $X_{\% KONFIGURACE}$ | Required configuration centring position (% MAC ) |

**1.4 Warnings, cautions and notes**

This flight and operational manual provides the following definitions of warning, caution and note:

**WARNING:**
**Overlooking an appropriate procedure leads to instant or significant flight safety decrease.**

**CAUTION:**
**Overlooking an appropriate procedure leads to short or long lasting minor flight safety decrease.**

*NOTE:*
*It notifies about a special point that is not directly related to the flight safety but is important or unusual*

**1.5 Technical data**

TL-3000 Sirius ultra light aircraft is a two-seat classical design high-wing monoplane with the nose type undercarriage. The entire aircraft is built of the composite materials.

**Wing**

| | |
|---|---|
| Wing span | 9,4 m |
| Length | 6,75 m |
| Height | 2.25 m |
| Wing area | 11,15 $m^2$ |
| Wing span – cord ratio | 7,92 |
| Area load | 40,3 kg/ $m^2$ |
| Root profile depth | 1,3 m |
| Tip profile depth | 0,9 m |

**Ailerons**

| | |
|---|---|
| Aileron span | 1.87 m |
| Aileron area | 0.51 |
| Aileron angle | Upwards $15^0$ |
| | Downwards $9^0$ |

**Flaps**

| | |
|---|---|
| Flap span | 2.07 m |
| Flap area | 0.66 $m^2$ |
| Flap angle | Start $10.5^0$ |

| | |
|---|---|
| | Interposition $28^0$ |
| | Landing $45^0$ |

Horizontal tailplane

| | |
|---|---|
| Horizontal tailplane span | 3.0 m |
| Horizontal tailplane area | 1.62 $m^2$ |
| Elevator angle | Upwards $19,5^0$ |
| | Downwards $11^0$ |

Vertical tailplane

| | |
|---|---|
| Vertical tailplane area | 1.45 $m^2$ |
| Rudder angle | +/- $20^0$ |

Undercarriage

| | |
|---|---|
| Main wheel-spacing | 2.17 m |
| Wheelbase | 1.53 m |
| Undercarriage wheel dimensions | 400 X 100 |
| Atmospheric pressure in the tyres | 2.0 kPa |
| Nose wheel rebound | Coil spring |
| Main undercarriage rebound | Tyres, undercarriage leg resilience |
| Brakes | Hydraulic disc brakes |

Fuel tank volume 130 litres

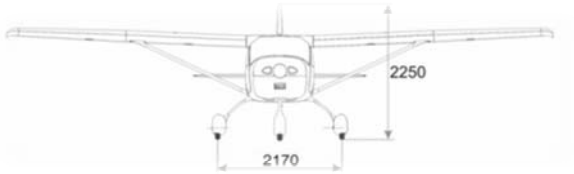
| | |
|---|---|
| Empty aircraft weight | kg |
| Wing mean aerodynamic chord length (MAC) | MAC = 1230 mm |

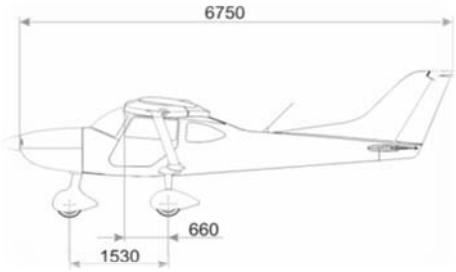
Engine
Rotax 912 ULS, a boxer type four-stroke four-cylinder, the heads of cylinders are liquid-cooled and the cylinders are air-cooled. The engine is integrated with a reducer and two carburettors. It is equipped with a double contactless condenser ignition.

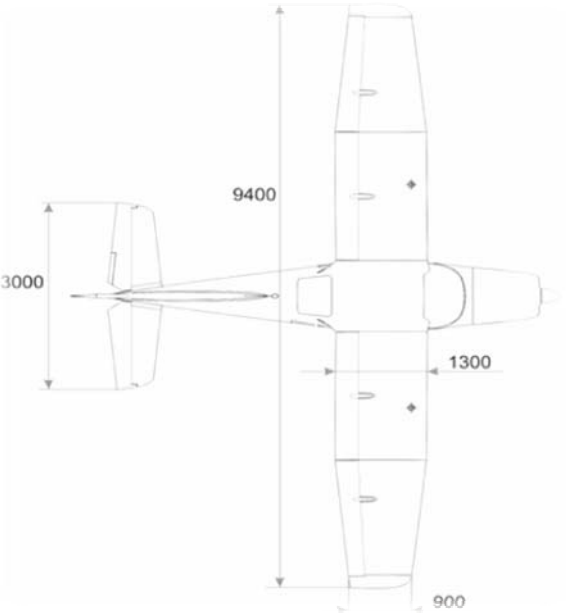
Propeller
The aircraft is equipped with a three-blade, DUC ground adjustable pitch propeller.

Rescue system
GRS 473

**1.6 Three-view drawing**



# Section 2
# Operational limitations

**2.1 Introduction**

Section 2 includes operational limitations, instruments markings, and basic placards (labels), necessary to ensure safe operating of the aircraft, its engine, standard systems and equipment.

**2.2 Flight speeds**

| | Speed | IAS(km/h) | NOTE |
|---|---|---|---|
| $V_{NE}$ | Maximum never exceed speed | 253 | Do not exceed this speed in any flight regime |
| $V_H$ | Maximum speed of horizontal flight at max. steady engine power | 226 | Engine RPM 5400 per min |
| $V_{OPT}$ | Optimal cruising speed | 178 | Engine RPM 4500 per min |
| $V_A$ | Design manoeuvring speed | 150 | Above this speed use 1/3 rudder deflection and do not make sudden steering interventions – it could result in aircraft overload. |
| $V_{FE}$ | Maximum speed with the elevated flaps<br>Flaps position 1 | 140 | Do not cross this speed with the flaps elevated in positions 1, 2, and 3 |
| | Flaps position 2 | 120 | |
| | Flaps position 3 | 105 | |

**2.3 Speed indicator markings**

Speed indicator markings and colour code significance are shown in the table:

| Marking | Value or range [IAS km/h] | Significance |
|---|---|---|
| White arch | 58-140 | Operating range with the elevated flaps |
| Green arch | 66-200 | Normal operational range. The upper limit is the maximum structural cruising speed |
| Yellow arch | 200-253 | Increased caution regime! Manoeuvres must be performed with caution and only in a calm atmosphere |
| Radial red line | 230 | Maximum speed in all flight phases |

**2.4 Power plant**

| | | |
|---|---|---|
| Engine manufacturer: | BOMBARDIER-Rotax-GmbH (Austria) | |
| Engine model: | Rotax-912UL | Rotax-912ULS |
| Engine type: | four-stroke four-cylinder boxer type | |
| Maximum power: | 80 hp | 100 hp |
| Full take-off power limit | 5800 rpm 1/min (5 min) | |
| Max. permanent rotation speed | 5500 rpm 1/min | |
| Idle run rotation speed | approx. 1400 rpm 1/min | |
| Maximum cylinder head temperature at the measuring point | 150 ºC (300 ºF) | 135 ºC (284 ºF) |
| Oil temperature:- operating<br>- minimum<br>- maximum | 90-110 ºC (190-250 ºF)<br>50 ºC (120 ºF)<br>140 ºC (285 ºF) | 90-110 ºC (190-250 ºF)<br>50 ºC (120 ºF)<br>130 ºC (266 ºF) |

| | |
|---|---|
| Exhaust fume temperature:<br>- maximum starting<br>- maximum<br>- operating, at the distance of 70 mm from the cylinder | <br>880 ºC (1620 ºF)<br>850 ºC (1560 ºF)<br>800 ºC (1470 ºF) |

| | | |
|---|---|---|
| Oil pressure: - operating<br>- minimum<br>- maximum | 2,0-5,0 bar (29-73 psi) over 3500 RPM<br>0,8 bar (12 psi) under 3500 RPM<br>7 bar (100 psi); max. pressure is short-time tolerable during a cold engine start | |
| Fuel pressure: - operating<br>- maximum | 0,15-0,4 bar (2,2-5,8 psi)<br>0,4 bar (5,8 psi) | |
| Fuel: (European norm) | EN 228 super min.<br>90 octanes | EN 228 super min.<br>95 oct. |
| Oil: | According to API „SG“ or higher (Castrol GTX 3) | |
| Minimum engine starting temperature | -25 C | |
| Maximum engine starting temperature | +50 C | |
| | | |

| | |
|---|---|
| Propeller manufacturer: | DUC Hélices, Lentilly-France |
| Propeller type: | DUC three-blade, ground adjustable pitch propeller |

**Caution**:
**This engine type is not certified as an aviation engine. In spite of the maximum attention paid to its manufacturing, the engine can fail anytime and the pilot is fully responsible for the consequences of such failure.**

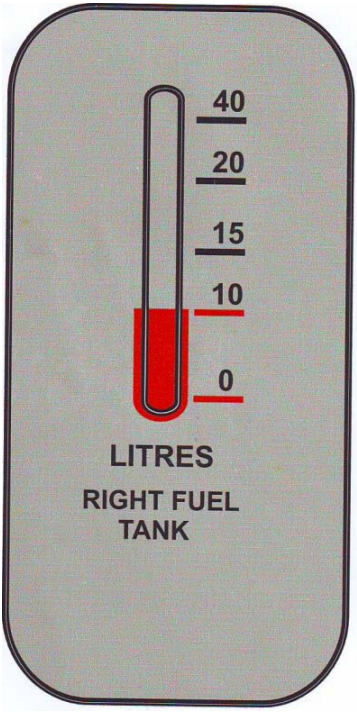
**2.5 Power plant instrument markings**

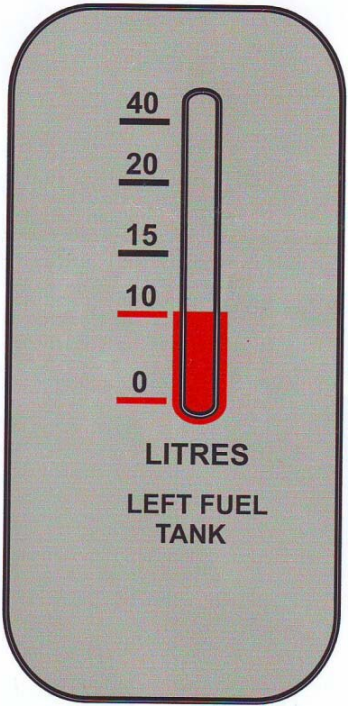
| Instrument | Red arch - lower limit | Yellow arch | Green arch | Yellow arch | Red arch - upper limit |
|---|---|---|---|---|---|
| Tachometer | | | 1400-5500 | 5500-5800 | 5800 |
| Fuel pressure | 0 – 0,7 | 0,7-2,5 | 2,5-5,8 | 5,8-6,5 | 6,5-7,3 |
| Filling pressure (INHG) | | | 0 - 31 | 31 - 32 | 32 – 33,3 |
| Oil pressure (PSI) | 0 - 15 | 15 - 20 | 20 - 90 | 90 - 95 | 95 - 99 |
| Oil temperature (°C) | 0 - 50 | 50 - 90 | 90 - 110 | 110 - 140 | |
| Cylinder temperatur e (°C) | 30 - 40 | 40 - 50 | 50 - 122 | 122 - 130 | 130 - 140 |
| Exhaust fume temperature (°C) | | 150 - 205 | 205 - 815 | 815 - 870 | 870 |

*NOTE:*
*Green arch - normal operation*
*Yellow arch –increased attention range*
*Red arch – lower and upper limits*

**2.6 Other instrument markings**

Fuel level indicator




Minimum start fuel volume 10 litres

Inexhaustible volume 2x1 litres

**2.7 Weight**

| | |
|---|---|
| Maximum take-off weight | 472,5 kg |
| Maximum fuel weight | 93,5 kg |
| Maximum one seat load | 90 kg |
| Maximum load weight behind the seats | 25 kg |
| Minimum crew weight | 60 kg |

**2.8 Centre of gravity position**

Empty aircraft weight determined by weighing kg

Instructions for aircraft centre of gravity determination from the diagram hereunder:

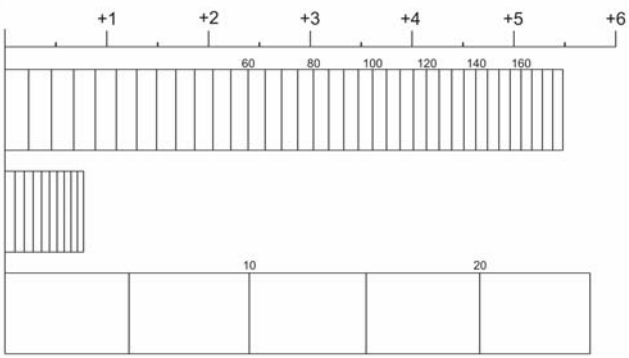
1) Subtract the centre of gravity position shift increment for each individual item (crew, luggage, fuel) on the graduated scale.
2) Sum up so determined increments and add them to the empty aircraft centring.
3) The total gives the aircraft centre of gravity position at the chosen payload of each item given in MAC % and must fit within the allowed centre of gravity position range.

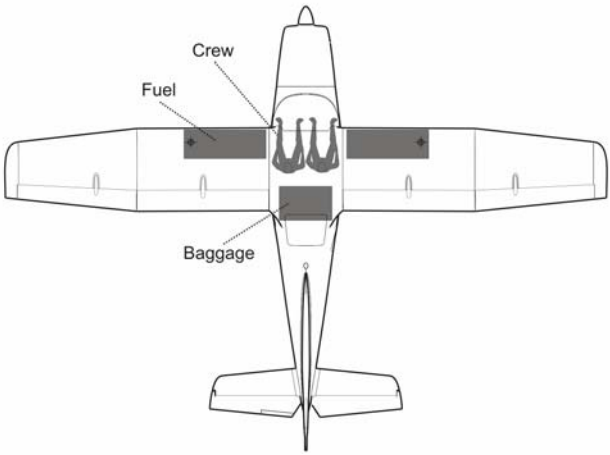
**CAUTION:**
**Aircraft centre of gravity determination from the diagram is only approximate. Precise centre of gravity determination requires aircraft weighing connected with the calculation stated in the chapters 6.3 and 6.4 of this manual.**

| Empty aircraft C.G. position (% MAC) | Date | Signature |
|---|---|---|
| | | |

**Aircraft C.G. movement for individual items (% MAC)**

| Load item | Max. load (kg) | Section valve (kg) |
|---|---|---|
| Crew | 2 x 90 | 5 |
| Fuel | 93,5 | 10 |
| Baggage | 25 | 5 |




**Aircraft C.G. = Empty aircraft C.G. + C.G. Gain from crew + Fuel C.G. Gain + Baggage C.G. Gain**

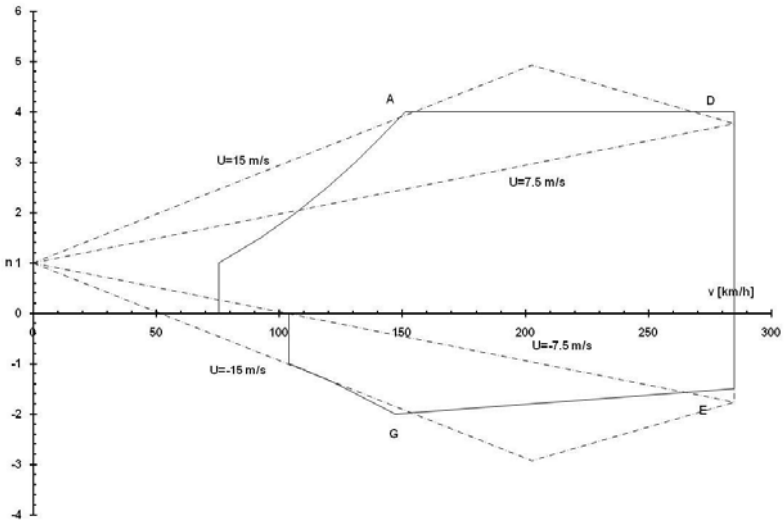
**Allowed C.G. Range 22 up 32,5 % MAC**

### 2.9 Approved turns

This aircraft is approved for the ultra light category. Any turns necessary for the normal flight, stall training up to 30° stalling over the horizon and sharp turns up to 60° tilt.

**WARNING:**
**This aircraft category is allowed only for non-acrobatic operations. Intended spins and drops are forbidden!**

### 2.10 Flight multiples




### 2.11 Crew

The crew consists of 1 or 2 pilots. Minimum crew weight is 60kg. In case this condition is not met, it is necessary to attach appropriate weight to the second seat. Maximum one seat payload is 90 kg.

**WARNING:**
**Watch the maximum take-off weight of 472.5 kg**

### 2.12 Types of operations

The aviation regulations and aircraft equipment limit this aircraft operating only to the VFR flights during the daytime.

**WARNING:**
**IFR flights and flights in the icing conditions are forbidden.**

This aircraft is minimally equipped with the following flight and navigation instruments – airspeed indicator, altimeter, compass, relative pitch indicator – and engine control instruments - manometer, thermometer, tachometer a fuel level indicator for each fuel tank.

### 2.13 Fuel

This aircraft is equipped with 2 fuel tanks; one tank in each wing. Each fuel tank volume is 65 litres. The total fuel volume is 130 litres.
Minimum start fuel volume is 2x10 litres
Inexhaustible volume 2x1litres
Used fuel BA 95 Natural

### 2.14 Other restrictions

It is forbidden to open the cabin door when airborne and smoke onboard.

In case that the aircrarft is being operated while OAT is more than 20 °C dismount the carbon heating cover and hot airintake hose of the cabin heating which is placed in the engine compartment on the radiator (it the aircraft is equipped with it).

### 2.15 Restriction placards



TL Ultralight

| | | | | | |
|---|---|---|---|---|---|
| | | Minimum speed | 65 | Km/h | |
| Registration | | Cruising speed | 100 | Km/h | |
| Manufacturer | TL-Ultralight s.r.o. | Max speed | 220 limited | Km/h | |
| Type | TL 3000 Sirius | Empty weight | | Kg | |
| Serial no. | | Area | 11,154 | m2 | |
| Manufacture year | | No of seats | 2 | | |
| Motor | Sirius | M.T.O.W. | 472,5 | Kg | |
| Operational datas and restrictions | | | | | |
| Registration | | | This aircraft is not | | |
| Empty weight | 0 | Kg | subjected to the | | |
| M.T.O.W. | 472,5 | Kg | approving of CAA CZ | | |
| Max useful load | | Kg | and it is operated on | | |
| Max luggage wei | 25 | Kg | the own risk of the | | |
| Min pilot weight | 60 | Kg | user Intetional spins, | | |
| Vne | 283 | Km/h | stalls and | | |
| Stall speed | 65 | Km/h | acrobatics are | | |
| Max speed with | | | PROHIBITED | | |
| Tape span | 120 | Km/h | | | |
| Weights | | | | | |
| M.T.O.W. | 472,5 | kg | | | |
| Empty weight | 0 | kg | | | |
| Luggage | 25 | kg | | | |
| Fuel tanks | 2 | 3/4 | 1/2 | 1/4 | |
| Capacity in litres | 130 | 97,5 | 65 | 32,5 | |
| Luggage 25kg | | | | | |
| 10kg | | | | | |
| Without luggage | | | | | |
| Fuel for 30 min. | 7 | | | | |

# Section 3
# Emergency procedures

**3.1 Introduction**

Section 3 provides the procedures and special processes in case of emergency that can occur. If the pre-flight preparation and maintenance are properly conducted, the aircraft and engine emergency cases will be exceptional. To cope with emergency, the basic procedures described in this section can be executed.

**3.2 Engine failure**

3.2.1 Engine failure during take-off

1. Engine control lever - turn down to idle run
2. Brake intensively
3. Ignition - switch off

3.2.2 Engine failure during the flight at the altitude up to 200m

1. Speed glide at the speed of 120 km/h
2. Altitude up to 50 m land in the take-off direction
   50 m and above choose an appropriate area without obstacles
3. Flaps as necessary
4. Fuel tap close
5. Ignition 2x switch off
6. Main switch switch off
7. Balancing as necessary
8. Safety belts fasten

3.2.3 Engine failure during the flight at the altitude above 200m and above

1. Start up the engine see section 3.3
2. If the engine fails to start running follow the procedure provided in the paragraph 3.2.2

**WARNING:**
**Never allow the instrument airspeed to drop under 70 km/h**

**3.3 In-flight engine restart**

| | |
|---|---|
| 1. Speed | glide at the speed of 140 km/h |
| 2. Altitude | min. 200m |
| 3. Ignition 2 x | switched on |
| 4. Main switch | switched on |
| 5. Fuel level indicator | check the fuel level |
| 6. Fuel tap | open Left or Right fuel tank |
| 7. Gas lever | set to ¼ of the throttle |
| 8. Balancing | as necessary |
| 9. Starter | push the starter button |

If the engine fails to restart, follow the procedure provided in the paragraph 3.2.2

**3.4 Engine on fire, smoke in the cabin**

3.4.1 A fire on the ground with the engine running

| | |
|---|---|
| 1. Fuel tap | close |
| 2. Gas lever | full throttle |
| 3. Ignition 2x | switch off |
| 4. Main switch | switched off |
| 5. Leave the aircraft and extinguish the fire | |

3.4.2 Inflight fire

| | |
|---|---|
| 1. Heating | close |
| 2. Fuel tap | close |
| 3. Gas lever | full throttle |
| 4. Ignition 2x | switch off after stopping the engine |
| 5. Main switch | switched off |
| 6. Area selection | land at the closest airfield, if the airfield is too distant, choose an emergency landing area |
| 7. Emergency landing | the procedure is described in the paragraph 3.6.1 |
| 8. Leave the aircraft and extinguish the fire | |

*NOTE:*
*Do not start up the engine after fire extinguishing.*

**3.5 Descending flight**

| | |
|---|---|
| 1. Airspeed | 140 km/h |
| 2. Flaps | closed |

**3.6 Emergency landing**

3.6.1 Emergency landing

| | |
|---|---|
| 1. Emergency landing area | suitable area selection |
| 2. Wind direction and strength | choose the optimal landing direction |
| 3. Fuel tap | close |
| 4. Ignition | switch off |
| 5. Main switch | switched off |
| 6. Flaps | as necessary |
| 7. Balancing | as necessary |
| 8. Safety belts | fasten |

3.6.2 Landing with the damaged undercarriage

1. In case of main undercarriage leg failure, land on the undamaged leg side; hold the aircraft on this side above the ground as long as possible by using the elevators.
2. In case of nose gear damage hold the fuselage front elevated as long as possible.

*NOTE:*
*In order to decrease the landing speed as much as possible, try to land in a suitable area and against the wind.*

**3.7 Unintentional spin recovery**

| | |
|---|---|
| 1. Gas lever | idle run |
| 2. Pitch controls | set to the neutral position |
| 2. Rudder direction | step on the pedal against the rotation |
| 3. Roll controls | push and hold till the rotation stops |
| 4. Rudder | set the rudder to the neutral position as soon as the rotation stops |
| 5. Roll controls | pull and recover from the dive |

**WARNING:**
**Intentional spins are forbidden!**

**3.8 Other emergency cases**

3.8.1 Ultimate aircraft control loss

1. Activation handle — pull
2. Safety belts — fasten
3. Fuel tap — close
4. Other switches — Switch off

In case that all previous procedures fail use the rescue system. In general, it is recommended to use the rescue system in case of ultimate aircraft control loss, for example in the event of its destruction.

3.8.2 Vibrations

1. Gas lever — set the engine regime with the lowest vibration level
2. Landing — at the closest airfield or emergency landing according to paragraph 3.6.1

3.8.3 Carburettor icing

1. Airspeed — 140 km/h
2. Gas lever — set to ¼ of the throttle
3. Icing area — leave
4. After leaving the icing area, increase the engine power output gradually.

If the engine power output loss still occurs, land at the closest airfield or choose emergency loading according to paragraph 3.6.1

**CAUTION:**
**Carburettor icing is indicated by the temperature increase or engine power output decrease.**

# Section 4
# Normal procedures

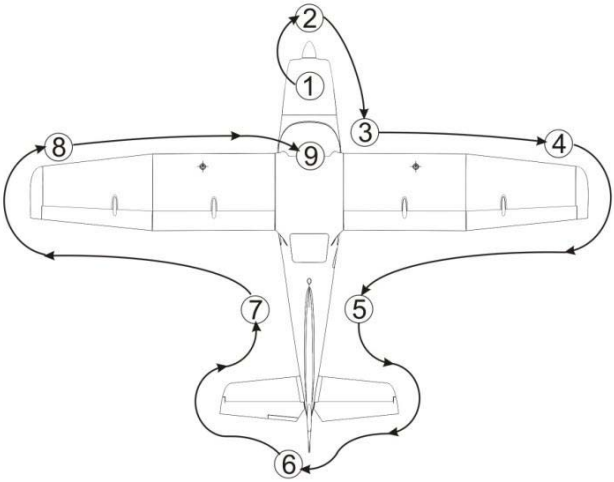
**4.1 Introduction**

Section 4 provides an action list and recommended procedures.

**4.2 Pre-flight inspection**

Execute the inspection systematically so that nothing is omitted. It is recommended to conduct inspection as shown in the picture and further according to the procedure hereunder.

The inspection starts with the engine and continues clockwise around the aircraft.




1. Engine
   - Dismount the engine cowling upper art
   - Engine cowling inspection
   - Engine bedding attachment status
   - Fuel and electrical systems inspection
   - Air and fuel filters inspection

Oil and cooling liquid cooler tightness inspection
Sparkling plug tightness inspection
Carburettor and suction silencer interconnection inspection
Exhaust attachment status inspection
Motor oil level inspection
Expansion flask cooling liquid level inspection
Fuel filter defecation
Assemble engine cowling

2. Propeller:

Attachment and blades status inspection
Propeller cone attachment inspection

In case the engine is cold, conduct several rotations in its rotation sense.

**WARNING:**
**Rotate the propeller only when both ignition circuits and main switch are switched off**

3. Undercarriage:
   - Dismounting the aerodynamic cover lower part and nose gear inspection
   - Inspection of the main undercarriage wheels self -fusing nut and the brake stirrup self -fusing nut above it and their paint securing
   - Main undercarriage aerodynamic covers inspection
   - Inspection of the atmospheric pressure of 25kPa (2.5 kp/cm$^2$) in the tyres and their status

4. Right wing:
   - Surface and leading edge status inspection
   - Centroplane node points and wing struts inspection
   - Landing and positioning lights inspection
   - Flap and aileron attachments inspection
   - Fuel tank cap closure inspection.

5. Airframe right hand side:
   - Surface, airframe or paint cracks inspection
   - Static pressure sensors status and cleanliness inspection

6. Tail-plane:
   - Surface inspection
   - Attachment inspection
   - Tailplane and rudder swivel pins clearance inspection
   - Trim tab controls inspection

7. Airframe left hand side:
   The same as for the airframe right hand side.

8. Left wing:
   The same as for the right wing
   - Pitot tube – cleanliness of the openings

9. Cabin:
   - Ignition – switched off
   - Main switch – switched on
   - Instruments inspection
   - Steering correct function and clearance inspection
   - Mutual flaps lifting inspection
   - Cleanliness inspection
   - Remove or fix the loose objects
   - Safety belts inspection
   - Door and locking inspection

## 4.3 Normal procedures and action list

4.3.1. Cockpit post-boarding actions

| | |
|---|---|
| 1. Foot controls | clearance inspection |
| 2. Hand controls | clearance inspection |
| 3. Balancing | freedom of action |
| 4. Gas lever | freedom of action |
| 5. Fuel tap | closed |
| 6. Fuel level indicators | fuel level check |
| 7. Instruments | status inspection |
| 8. Ignition | switched off |
| 9. Main switch | switched off |
| 10. Other switches | switched off |
| 11. Activation handle | check |
| 12. Activation handle fuse | remove |

*NOTE:*
*Release the flag-fitted rescue system activation handle operational fuse – turn the handle towards both sides approximately 45° around the rotation axis and ensure there is a sliding contact between the handle and console casing*

4.3.2 Pre-start actions and starting up

| | |
|---|---|
| 1. Fuel tap | open |
| 2. Main switch | switch on |
| 3. Ignition 2x | switch on |
| 4. Instruments | switch on |
| 4. Gas lever | idle run, eventually 10 % of power output |
| 5. Balancing | on the centre |
| 6. Choke | according to the engine temperature |
| 7. Area in front of the propeller | check clearance |
| 8. Starter | push |
| 9. After start-up | idle run |
| 10. Other instruments | switch on |
| 11. Choke | push in |
| 12. Engine heating | see paragraph 4.3.3 |

**Caution**: **Continue starting during maximum 10 sec., cool down for 2 min after that.**

4.3.3 Engine test

The engine warm up procedure, and engine and ignition tests are in detail described in the engine manual.

Continue engine warming up for approximately 2 min. at 2000 rpm and continue at
2500 rpm until the oil temperature of 50 °C is achieved.

- Ignition test at 4.000 rpm, each loop rotation speed drop cannot exceed 300 rpm; the rotation speed difference between the loops cannot exceed 120 rpm.
- Gas lever at 5.000 rpm during 30 seconds 3x and smoothly transit from the idle run to the maximum rotation speed (5.800 rpm)
- Set idle run

**Caution**:
**Watch engine pressure and temperature; they must fall within the operating values at all points.**

4.3.4 Taxiing

1. ICOM Radio station switch on

Maximum speed 15 km/h. Execute the turns by the main undercarriage wheels braking.

**Caution**:
**Never taxi with the door open, it could result in the door hinge damage.**

**Caution**:
**While taxiing and systematicly applied brakes could decrease the brake effectivity due to the hydraulic liquid overheating.**

4.3.5 Pre-takeoff actions

1. Brakes brake
2. Balancing on the centre
3. Flaps Level 1 – 10.5°
4. Instruments at operating values
5. Safety belts buckled and fastened

4.3.6 Take-off

1. Brakes release
2. Gas lever smoothly to the maximum
   - Maintain the straight direction by the foot pressure on the rudder pedals
   - relieve the nose wheel slowly at the airspeed of 50 km
   - the aircraft starts to rise at the airspeed of 75 km/hour, push and hold till the airspeed of 130 km/hour is achieved
   - transit smoothly to ascent at the airspeed of 120 km/hour
   - set the engine rotation speed
3. Main undercarriage wheels brake
4. Flaps 50m close

4.3.7 Climb

1. Gas lever permanent maximum power output
2. Airspeed 120 km/hour

| | |
|---|---|
| 3. Balancing | equilibrate |
| 4. Instruments | values checking |

4.3.8 En route flight

| | |
|---|---|
| 1. Gas lever | cruising regime |
| 2. Balancing | equilibrate |

**WARNING:**
**Do not execute sharp turns while flying at a low airspeed under 130 km/hour, Do not execute rapid aircraft controls motions while flying at a high airspeed above 150 km/hour and use maximum 1/3 of their scale.**

4.3.9 Descend

| | |
|---|---|
| 1. Gas lever | idle run |
| 2. Balancing | equilibrate |
| 3. Airspeed | 150 km/h |
| 4. Instruments | at the operating values |

**CAUTION:**
**To prevent engine overcooling when descending from higher flight levels, do not decrease to idle run but descend with a moderate engine thrust at the airspeed of 150 km/hour.**

4.3.10 Pre-landing actions

4.3.10.1 Tailwind position actions

| | |
|---|---|
| 1. Safety belts | fasten |
| 2. Fuel level indicators | check |
| 3. Fuel tap | Shift to the tank with the higher fuel level |
| 4. Brakes | check |
| 5. Space between the round turns 3 and 4 | check |
| 6. Landing area | check |

4.3.10.2 Actions after third turn

| | |
|---|---|
| 1. Airspeed | 140 km/h |
| 2. Flaps | grade 1 - 10.5° |
| 3. Balancing | equilibrate |
| 4. Final area | check |

4.3.10.3 Actions for the final

| | |
|---|---|
| 1. Airspeed | 120 km/h |
| 2. Flaps | grade 2 - 28° |
| 3. Balancing | equilibrate |
| Decision altitude | |
| 4. Airspeed | 105 km/h |
| 5. Flaps | grade 3 - 45° |

4.3.11 Landing

At the speed of 75 km/hour, touchdown with the main undercarriage. Hold the aircraft only on the main undercarriage by pulling as long as possible. The nose wheel will ground by itself at the speed of 60 km/hour.

4.3.12 Repeated landing

| | |
|---|---|
| 1. Gas lever | full throttle |
| 2. Flaps | grade 1 – 10.5° |
| 3. Balancing | equilibrate |
| 4. Airspeed | 130 km/h |
| 5. Flaps | retract |

4.3.13 Post-landing actions

| | |
|---|---|
| 1. Gas lever | as needed |
| 2. Flaps | retracted |
| 3. Balancing | on the centre |

4.3.14 Engine stopping

| | |
|---|---|
| 1. Gas lever | idle run |
| 2. ICOM radio station | switch off |
| 3. Instruments | switch off |
| 4. Ignition | switch off |
| 5. Other switches | switch off |
| 6. Main switch | switch off |
| 7. Fuel tap | close |

**WARNING:**
**Secure the rescue system before leaving the cockpit.**

# Section 5
# Performances

## 5.1 Introduction

Section 5 provides the airspeed indication system calibration data, stall speed, performances and other information. The data contained in this section have been calculated from the results of aircraft and power plant flight tests conducted in a good technical status and using usual piloting techniques.
If not specified otherwise, the performances presented in this section are valid for the aircraft maximum take-off weight and calculated for the conditions of the International Standard Atmosphere (ISA).

## 5.2 Specified values

5.2.1 Airspeed indication system error correction

| IAS (km/h) | Cruising configuration (flaps closed) | Take-off configuration (flaps to 10.5°) | Landing configuration (flaps to 45°) |
|---|---|---|---|
| | CAS (km/h) | | |
| **50** | | 58 | 55 |
| **60** | | 67 | 66 |
| **70** | | 76 | 76 |
| **80** | 85 | 86 | 86 |
| **90** | 93 | 95 | 97 |
| **100** | 102 | 105 | 107 |
| **110** | 110 | 114 | 117 |
| **120** | 119 | 124 | 127 |
| **130** | 128 | 134 | |
| **140** | 136 | 144 | |
| **150** | 146 | | |
| **160** | 155 | | |
| **170** | 164 | | |
| **180** | 174 | | |
| **190** | 183 | | |
| **200** | 193 | | |
| **210** | 203 | | |
| **220** | 213 | | |
| **230** | 223 | | |
| **240** | 234 | | |
| **250** | 244 | | |

5.2.2 Stall speeds

| Drop | Flaps position | Engine power | Warning speed | | Stall speed | |
|---|---|---|---|---|---|---|
| | | | IAS (km/h) | CAS (km/h) | IAS (km/h) | CAS (km/h) |
| Horizontal flight | Closed | Idle run | 68 | 75 | 60 | 69 |
| | Take-off (10.5°) | Idle run | 67 | 73 | 56 | 63 |
| | Landing (45°) | Idle run | 66 | 72 | 53 | 59 |

*NOTE:*
*The stall is indicated by aircraft pitching down, the aircraft is fully under control and horizontal flight can be resumed without a significant altitude loss.*

5.2.3 Take-off

| | Take- off run distance (m) | Take-off distance over a 15-metre obstacle (m) |
|---|---|---|
| **Grass** | 103 | 283 |

*NOTE:*
*The take-off distance stated in the table above is valid in the sea level and International Standard Atmosphere conditions and for the specified runway type.*

5.2.4
Landing

| | Landing distance over a 15-metre obstacle (m) | Of this landing run distance with the brakes braking |
|---|---|---|
| **Grass** | 246 | 85 |

*NOTE:*
*The landing distance stated in the table above is valid in the sea level and International Standard Atmosphere conditions and for the specified runway type.*

5.2.5 Climb

| Optimal climb speed (km/h) | Rate of climb (m/s) |
|---|---|
| 120 | 4,82 |

*NOTE:*
*The climb stated in the table above is valid in the sea level and International Standard Atmosphere conditions and for the specified runway type.*

5.2.6 Cruising flight

| Regime | Economical cruise | Maximum permanen | Maximum Take-off |
|---|---|---|---|
| **Time limitation** | unlimited | unlimited | 5 minutes max. |
| **Engine rotations** | 4500 | 5500 | 5800 |
| **Flight altitude (ft)** | **IAS (km/h)** | **IAS (km/h)** | **IAS (km/h)** |
| **2000** | 178 | 22 | 227 |
| **4000** | 181 | 22 | 228 |
| **5000** | 180 | 22 | 229 |

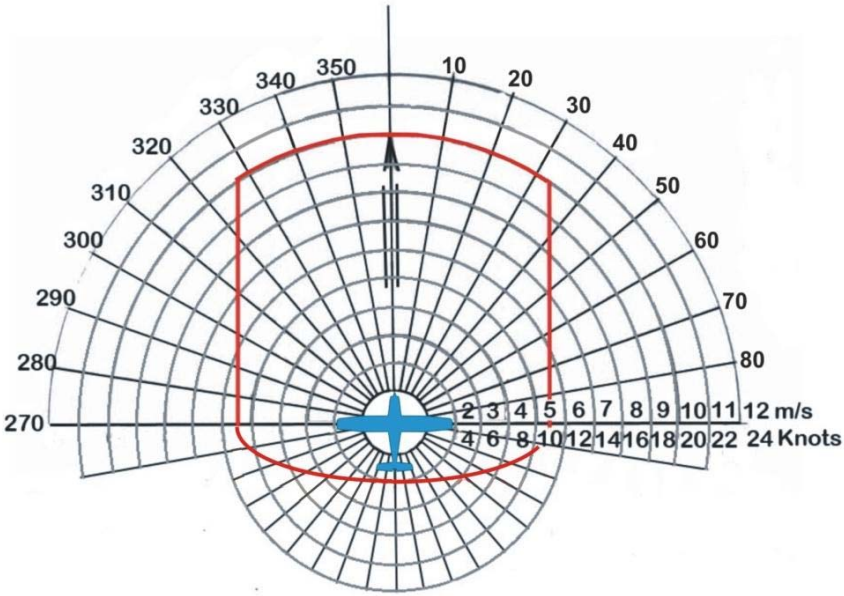
5.2.7 Endurance

| Regime | | Maximum permanent | Economical cruising |
|---|---|---|---|
| **Engine rotations** | **(rpm)** | **5500** | **4500** |
| **Airspeed** | **IAS (km/h)** | **221** | **178** |
| | **CAS (km/h)** | **214** | **172** |
| **Consumption** | **(litres per hour)** | **19** | **11** |
| **Range** | **(km)** | **1400** | **2000** |

*NOTE:*
*The consumption and range values are valid for the aircraft maximum take-off weight and flight altitude of 2000 ft ISA.*

**5.2.8** Wind effect during the take-off and landing

| | |
|---|---|
| Headwind | 10 m/s |
| Crosswind | 5,5 m/s |
| Tailwind | 2 m/s |



# Section 6
# Aircraft weight and centre of gravity position

**6.1 Introduction**

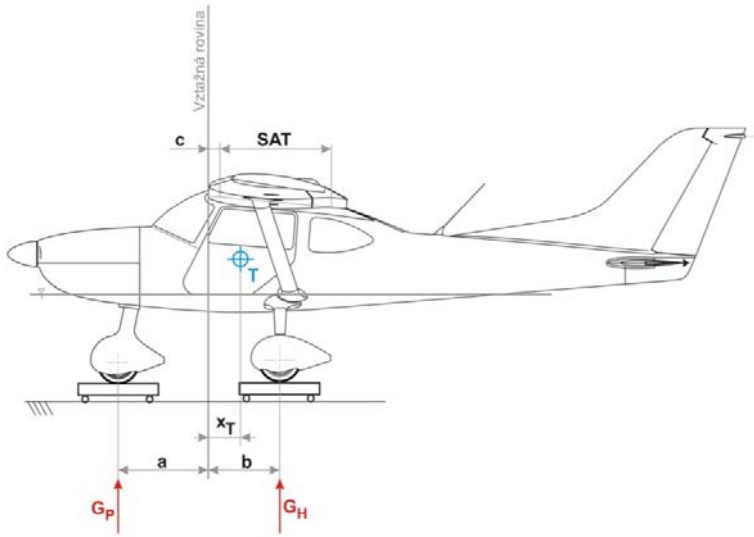
Section 6 includes the allowed centre of gravity positioning and weight ranges and centre of gravity position determination procedure allowing safe aircraft operating.

**6.2 Centre of gravity positioning permitted range and maximum take-off weight**

| | |
|---|---|
| **Aircraft maximum take-off weight (kg)** | 472,5 |
| **Centre of gravity positioning permitted range (% MAC)** | 22 – 32,5 |

**6.3 Empty aircraft centre of gravity determination**

This paragraph defines the correct aircraft weighing procedure and empty aircraft centre of gravity position calculation.




a = 840 mm
b = 690 mm
c = 35 mm
SAT = 1230 mm

1. Empty the aircraft (fuel, luggage and other stuff)
2. Place the aircraft on a triad of scales situated under the nose and main landing gear wheels. Level the aircraft in the horizontal position into the flight position by using suitable supports inserted between the scale and wheel (i.e. the cabin bottom edge must be in the horizontal position).

*NOTE:*
*If you use the supports inserted between the scale and wheel to level the aircraft into the position do not forget subtract their weight from the value indicated by the scale.*

3. Read the $G_P$ and $G_H$ values from the scales ($G_H$ represents the sum of the values indicated by the scales under the wheels).
4. Calculate the total empty aircraft weight by using the following formula

$$G_{LET} = G_P + G_H \ [kg]$$

5. Calculate the empty aircraft centre of gravity distance from the index plane (wing leading edge)

$$x_T = b - \frac{G_P \cdot (a + b)}{G_{LET}} \ [mm]$$

6. Calculate the empty aircraft centre of gravity position in % MAC

$$x_{\%LET} = \frac{(x_T - c)}{SAT} \cdot 100 \ [\%SAT]$$

**6.4 Required configuration aircraft centre of gravity determination**

This paragraph defines the correct procedure for the aircraft centre of gravity position calculation with the different payload configurations.

Find the empty aircraft weight $G_{LET}$ and empty aircraft centre of gravity position $x_{\%LET}$ (see section 2.8 Centre of gravity position or according to the section 6.3 procedure)

1. Determine the weight of the onboard items for the required configuration: $G_{POS}$ (crew weight), $G_{PAL}$ (fuel weight), and $G_{ZAV}$ (luggage weight in the luggage compartment)
2. Calculate the empty aircraft centre of gravity for the required configuration (by inserting the values derived from the step 1 a 2 into the formula)

$$x_{\%KONFIGURACE} = \frac{G_{LET} \cdot x_{\%LET} + G_{POS} \cdot 35{,}4 + G_{PAL} \cdot 23{,}2 + G_{ZAV} \cdot 101{,}5}{G_{LET} + G_{POS} + G_{PAL} + G_{ZAV}}$$

$$\%\ SAT$$

**WARNING:**
**The calculated $x_{\%CONFIGURATION}$ value must fit within the centre of gravity positioning permitted range from 22 to 32.5 %MAC.**

# Section 7
# Aircraft and aircraft systems description

**7.1 Introduction**

Section 7 describes aircraft systems and operations

**7.2 Airframe**

TL – 3000 Sirius aircraft is a two-seat, strut type high-wing, single-engine monoplane with the nose type undercarriage. TL – 3000 Sirius airframe is an all composite shell structure.

7.2.1 Fuselage

The fuselage is made as a pure sandwich shell structure with the struts. The power plant is placed in the front fuselage portion, and the cockpit with the seats next to each other is situated behind the engine wall. The luggage compartment is located behind the pilot seats.

7.2.2 Wing

The wing is all composite with a single strut consisting of a metal tube and composite coating. It is designed as a two-spar sandwich shell structure with a root rib and another rib at the strut attachment point. The wing is equipped with the ailerons and simple flap. The fuel tank is located in the front root portion of the wing.

7.2.3 Horizontal tail plane (VOP)

Stabilizer is an all composite two-spar concept. The divided elevator is a single spar shell structure.

7.2.4. Vertical tail plane (SOP)

The aircraft keel is an integrated part of the fuselage shell structure and is reinforced with the struts. The rudder is a single-spar shell structure.

### 7.3 Cockpit controls – instrument board

| Position number | Instrument name | Position number | Instrument name |
|---|---|---|---|
| 1 | Altimeter | 11 | Starter button |
| 2 | Airspeed indicator | 12 | Switches and fuses |
| 3 | EFIS D100 | 13 | Fuel selector (three-way) |
| 4 | Skid indicator | 14 | Choke control rod |
| 5 | Radio | 15 | Heating control rod |
| 6 | Transponder | 16 | Low battery warning |
| 7 | GPS | 17 | Fuel pump indicator |
| 8 | EMS D120 | 18 | Autopilot instrument AP 74 |
| 9 | Flaps controller | 19 | Rescue system activation |
| 10 | Fuel pressure | | |

**7.4 Undercarriage**

The undercarriage is a nose type with main wheels laminate legs and a spring-loaded nose wheel. The nose gear is towed and unsteerable. The main undercarriage wheels are equipped with brakes. The undercarriage is equipped with the wheels of Ø 400 x 100 in all positions.

**7.5 Steering**

Lateral and longitudinal steering is rod operated, directional steering is cable operated. The cockpit is equipped with dual yoke controls. The longitudinal balancing tab, also serving as surcharging, is Bowden operated. Flaps electric controls are supported by a servomotor with a transmission installed in the wing. The main wheel brakes are operated through the rudder pedals stirrups.

**7.6 Seats and safety belts**

The seats are removable and composed of an upholstered composite seat and backrest. The safety belts are four-point central buckle.

**7.7 Luggage compartment**

The luggage compartment is located behind the pilot seats and designed to accommodate maximum 25 kg of luggage. It is accessible from the pilot cockpit. In order to prevent a possible luggage intrusion into the cockpit, the luggage compartment is equipped with a removable net.

**7.8 Cabin door**

The cabin door opens upwards. To remain in the closed position, the cabin door is equipped with a latch mechanism and secured with an independent espagnolette mechanism. To remain in the open position, they are supported by gas operated springs.

**7.9 Power plant**

The aircraft is powered with Rotax 912 ULS engine. It is a four-cylinder, four-stroke opposite cylinders engine with a central camshaft and OHV distribution. Cooling is combined; the heads of cylinders are liquid-cooled and the cylinders are air-cooled. Lubrication is a dry box type. Ignition is dual non-contact condenser with a magneto. The engine is equipped with an electric starter, alternative current generator and mechanical fuel pump. The propeller is powered through an integrated reducer with mechanical vibration silencer. The propeller with the propeller cone cover is attached to the engine.

**7.10 Fuel system**

The fuel system is composed of two composite fuel tanks with the total volume of 130 litres that are installed in the wing, fuel piping, fuel content gauge and fuel filter. Each fuel tank is equipped with a sludge system. If required by a customer, a fuel pump is included in the system in some cases.

### 7.11 Electrical system

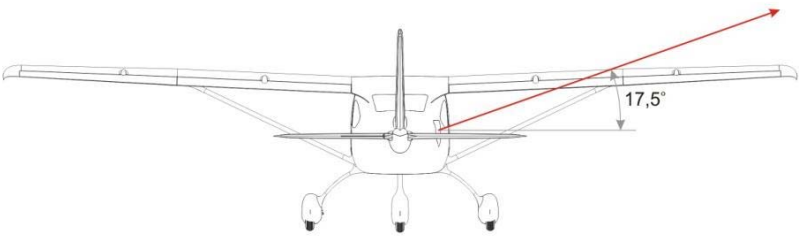
The electrical system uses the direct current voltage of 12V. The electrical system ensures functioning of the onboard instruments, flaps, radio station, and positional a landing lights.

### 7.12 Pitot-static system

The Pitot-static system includes the Prandtl pipe located on the left wing lead edge and static pressure gauges on the fuselage aft part. Static and overall pressure duct is ensured by PE tubes.

### 7.13 Rescue system

TL 3000 aircraft is equipped with the GRS 6/473 rescue system allowing saving the crew up to the speed of 310 km/h at the minimum altitude of 80 m above the ground. The rescue system consists of the projectile, parachute, activation handle, and rescue system anchorage ropes. The parachute and projectile are located behind the luggage compartment, activation handle under the instrument board lower edge to the left from the central console. When activated, the rescue system projectile and parachute are elevated outside the aircraft through the lid on the right hand side of the fuselage. The rescue system ropes are designed to ensure that the aircraft descends under the parachute canopy by its longitudinal axis under the angle approximately 15° to the horizon.



# Section 8
# Aircraft operating, servicing and maintenance

## 8.1 Introduction

This section contains the correct aircraft ground handling and maintenance procedures recommended by the manufacturer. Defines the inspection and maintenance requirements to ensure the aircraft required performances and reliability. Conducting the inspections defined by the manufacturer constitutes one of the terms for the continued aircraft guarantee.

## 8.2 Periodical inspections

Regular and thorough maintenance is a condition for reliable and safe aircraft operating. The guarantee inspection and inspections after 100, 300 and 1000 hours are recorded in the aircraft log.

### 8.2.1 Aircraft periodical inspections

This paragraph describes the inspection and maintenance intervals for the aircraft except the engine and propeller.

| Inspection name | Aircraft flight hours - interval | Conducts |
|---|---|---|
| Guarantee inspection | -after first 25 hours of service | Manufacturer service centre |
| 50-hour inspection | -every 50 ± 5 hours of service | Aircraft user trained by the manufacturer or manufacturer |
| 100-hour inspection | a) every 100 ± 5 hours of service<br>b) 12 month after the last 100-hour inspection | Aircraft user trained by the manufacturer or manufacturer |
| 300-hour inspection | - every 300 ± 5 hours of service | Manufacturer service centre |

| | | |
|---|---|---|
| 1000-hour inspection (evaluation of additional aircraft service life) | a) every 1000 ± 10 hours of service<br>b) 5 years from the production date<br>c) 5 years after the last 1000-hour inspection<br>d) the date determined by the manufacturer according to his experience and actual status evaluation during the previous inspection | Manufacturer service centre |

8.2.2 Engine periodical inspections

See the engine operating and maintenance manual published by the engine manufacturer.

8.2.3 Propeller periodical inspections

See the operating and maintenance manual published by the propeller manufacturer.

**8.3 Airframe service life**

The initial airframe life span is defined up to 8.000 hours or 5 years from the production date. It will be adjusted according to the operational experience and airframe actual status as determined during the manufacturer service centre inspection.

**8.4 Aircraft modifications and repairs**

**WARNING:**
**It is necessary to contact the aircraft manufacturer before every aircraft modification as well as the LAA CR before each significant modification or repair (influencing airworthiness).**

**CAUTION:**
**If the modification influences the weight, it is necessary to perform a new weighing and empty aircraft centre of gravity determination procedure according to section 6 and record the empty aircraft centre of gravity position in the table shown in section 2.8, update the weighing and centre of gravity position determination protocol and update the placards placed in the aircraft.**

8.4.1. Bolt connections repairs

In cases of corrosion, bending, cracking or callosity, such bolt must be changed immediately. In case of a stripped thread, both the bolt and nut must be changed. The bolts can be replaced only by the same quality and norm bolts. Nylon insert self-locking nuts are designed for one-time use only. Full metal nuts can be used maximum 3 times after compressing the locking ring with pliers.

8.4.2. Rivet connections repairs

In case of rivet damage (loose or cut), it is necessary to remove the damaged rivet, check the connected surfaces for damage and install a new rivet. If the connection spots are damaged, it is necessary to change the connected parts or consult their repair with the aircraft producer. Use the rivets of the same quality and type when repairing.

8.4.3 Steering repairs

Rods, connecting parts, Bowden cables, bearings and other steering parts must not be damaged. Individual parts can be replaced only by original parts supplied by the producer. Any significant steering damage or excessive clearance can be repaired only by the manufacturer service centre. Any steering repair must be followed by a testing flight piloted by a testing pilot.

8.4.4. Airframe repairs

**WARNING:**
**The wings, struts, empennage and fuselage are considered to be the parts of the principal structural elements. No intervention in the principal structural elements is allowed by the user without manufacturer's approval.**

In case of minor airframe damage, the damaged surface can be filled with a filler, regrind and repainted. If a non-principal structural element (the lower and upper engine cover, wheel cover, nose wheel leg cover) is perforated, it can be laminated with one or two layers, and again refilled, regrind and repainted. For filling, use two-component automotive body filler according to its use instructions.

*NOTE: The deeper airframe damages must be repaired by the manufacturer who will evaluate their effect on the structural stiffness and define repair method.*

*8*.4.5. Fuel system repairs

If a fuel system leakage or impassability is detected, it must be repaired immediately. A visible defect, such as hose connection collar or fuel filter foulness, can be repaired by the aircraft user. Other repairs can be performed only by the manufacturer service centre.

8.4.6. Engine repairs

Any engine and its aggregates repairs can be performed only by the manufacturer service centre.

8.4.7. Electrical installation and instruments repairs

The user is allowed to perform accumulator recharging, cleaning contacts and reconnecting disconnected connectors. Other electrical installation and instruments repairs can be performed only by the manufacturer service centre.

**8.5 Aircraft ground servicing**

8.5.1. Refuelling

The manufacturer recommends a following safe aircraft refuelling procedure:

**CAUTION:**
**Do not lean the platforms, ladders, hands or fuel containers on the aircraft shell skin, it could result in its damage.**

**CAUTION:**
**When refuelling, use only the containers and filter fillers approved for fuel storing and filling, do not use static electricity generating clothes.**

- Prevent open fire occurrence nearby the aircraft, ensure that nobody is smoking nearby the aircraft
- Prepare a fire extinguisher suitable for flammable liquids extinguishing
- Ensure that the earthing cable attached to the right hand side main wheel leg is touching the ground
- Check if all electro appliances, ignition circuits and main switch are off
- Fuel tap check – fuel closed
- Due to the fuel tank filler tubes emplacement, it is recommended to use an elevated platform when refuelling
- Unlock and unscrew the fuel tank cover lid
- Insert an approved filling funnel with a buckskin filter insert into the fuel tank filling tube
- Pour fuel slowly in and reduce staining the aircraft with the fuel to a minimum

- When the fuel tank is full, take out the emptied funnel filler, screw the fuel tank lid back and lock it
- Wipe the aircraft surface thoroughly to dry out the fuel remnants

8.5.2 Parking

When parking, place the aircraft into a hangar or other sheltered area with stable temperature, sufficient ventilation, low humidity and dust-free environment.

- Fuel tap check – fuel closed
- Switches off check
- Rescue system interlocking check
- Close and lock the cabin door
- Chock off the wheels with chocks from both the front and behind
- Slip the blade covers on the propeller, slip a suitable cover on the Pitot tube
- Cover the cabin with a suitable cover

**CAUTION:**
**In case of parking outside a hangar, it is necessary to anchor the aircraft according to paragraph 8.5.3., in order to protect it against possible wind blast damage.**

8.5.3. Anchorage

It is necessary to anchor the aircraft when parked outside of hangar. To anchor the aircraft, use the triad placed on the wing tip portion bottom and fuselage rear portion. Anchor the aircraft to sufficiently strong anchors.

- All instruments, switches and fuel tap off check
- Block the steering surfaces
- Check the rescue system securing and locking
- Close the ventilation windows
- Close and lock the cabin door
- Anchor the aircraft in the designated places to the ground

*NOTE:*
*If long-term anchorage is expected, it is appropriate to cover the transparent cabin parts or eventually entire aircraft with a suitable canvas attached to the aircraft structure, especially in unfavourable climatic and weather conditions.*

8.5.4. Lifting the aircraft

The aircraft can be lifted by these parts:

- The front fuselage portion can be lifted by pushing the rear fuselage portion downwards at the point in front of the keel surface. The front fuselage portion can be then supported under the designated fixtures on the engine bed. These support points are accessible after the lower power plant cowling removal.

**CAUTION:**
**Chock off the wheels with chocks from both directions when supporting the aircraft in the described points.**

- The rear portion of the fuselage can be lifted by holding the keel bulkhead area and pushing upwards. The rear fuselage portion can be then supported in the rear luggage compartment bulkhead.

**CAUTION:**
**When lifting the fuselage rear portion, do not push the fuselage pivot point and rear fuselage cover. They are not designed to this purpose and could be damaged.**

- The wing can be lifted by pushing the wing upwards at the main spar area.

**CAUTION:**
**Do not lift the wing by grabbing the wing tip curves.**

**8.6 Aircraft ground transport**

8.6.1. Towing the aircraft

The aircraft can be handled primarily through the tow bar that can be attached by opening to the pin placed on the nose gear leg.

The manufacturer also approved following aircraft handling:

- Push the leading edge of the rectangular wing plan form portion
- Lift the nose wheel by pushing the rear fuselage portion downwards and turn the aircraft.

**CAUTION:**
**It is necessary to avoid excessive pressure effect on the airframe structure and propeller, especially on the wing tips, struts, empennage, etc.**

*NOTE:*
*Passing through the narrow places requires assistance by instructed personnel ensuring aircraft wing tips handling.*

8.6.2. Aircraft assembly and disassembly for the land transport

The aircraft can be transported on the land communications when loaded on a trailer. It is necessary to disassemble the aircraft beforehand.

*NOTE: The aircraft assembly and disassembly do not require a special qualification.*

*NOTE: After cleaning off the grease, all connecting points must be again greased with grease.*

8.6.2.1 Aircraft disassembly procedure

- Remove the centroplane interior roof cover and assembly openings covers
- Unscrew the aileron control rods bolts
- Disconnect the Pitot-static system PE hoses
- Disconnect the wing electrical wiring
- Disconnect the wing fuel piping
- Disconnect and disassemble the connecting flap torsion drive in the fuselage
- Access the strut attachments by moving the aerodynamic fairings down the strut.
- Unscrew the main and auxiliary wing attachment and strut pins
- Take out the strut pins (the wing must be held by an assistant)
- Take out the main and support spar pins
- Push the wing out off the centroplane

**CAUTION:**
**While the wings are dismounted, ensure that the flap torsion drives are not turned. To prevent undesirable flap torsion drives turning, secure them.**

- Disassemble the fuselage tail cone
- Disassemble the trim tab drive lead
- Disconnect the elevator rod
- Remove the tailplane hinge vertical bolt
- Take out the tailplane from the front hinges by pulling backwards

8.6.2.2 Aircraft assembly procedure

The aircraft assembly procedure is identical with the disassembly procedure except that it is performed in vice versa order.

**WARNING:**
**After the aircraft assembly, it is necessary to check the steering functions, flaps mutual synchronisation, electrical, fuel and other systems.**

### 8.7 Aircraft lubrication plan

To lubricate the engine, use only an engine manufacturer prescribed oil according to the engine operating instructions. The motor oil exchange frequency is every 100 flight hour.

For the other lubrication points, practically any grease or transmission oil can by used. To make the difficult accessible points (hinges) lubrication easier, fill the oil in a syringe with a larger diameter hypodermic needle. 1 or 2 oil drops are sufficient to lubricate. The oil serves also as a conservator to several points.

| Place | Lubricant | Lubrication frequency |
|---|---|---|
| Nose gear leg | Grease | Once per year |
| Aileron hinges, flaps | Transmission oil | After 50 flight hours |
| Rudder upper and lower hinge | Transmission oil | After 50 flight hours |
| Elevator hinge, balancing tab | Transmission oil | After 50 flight hours |
| Steering joints | Transmission oil | After 50 flight hours |
| Aileron joints | Transmission oil | After 50 flight hours |

Some lubrication points are accessible after the cabin seats removal.

**8.8 Cleaning and care**

This section describes the procedures for cleaning and servicing the aircraft components

8.8.1 Aircraft skin

To wash the aircraft, use lukewarm water. The aircraft parts listed below must be washed and then dried out. To clean the flies, the car cleaning agents can be used.

Conserve the aircraft with the car body cleaning and conservation agents roughly 1 time per month.

Wait with the new aircraft first conservation approximately 1 month to let the new painting harden properly.

- Propeller blades and cone
- Wings and empennage
- Wing struts
- Undercarriage
- Engine cowling suction slots
- fuselage

8.8.2 Aircraft transparent parts

Wash, dry out and polish the cabin glass parts, use only buckskin which must be often washed in a clean water.

**CAUTION:**

**Do not clean the glass cabin parts without moisturizing and do not use the chemical solvents or gasoline for cleaning.**

8.8.3 Aircraft interior

Clean the cabin interior from the dirt and remove the garbage from the stowage space.

The seats can be removed from the cabin and brush the upholstery or clean it with warm water and detergent.

# Section 9
# Amendments

### 9.1 Introduction

This section contains the amendments necessary for safe and effective the aircraft operating and for the cases of aircraft equipping with different optional systems and equipment not provided within the standard aircraft configuration.

### 9.2 Inserted amendments list

| Date | Name of the inserted amendment |
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**9.3 Inserted amendments**