# Flight Manual
# for
# DV-1 SKYLARK

Serial Number:
Registration Mark:
Classification: **ULLa**

Date: October 2012


This UL is not liabel to ÚCL ČR and its using is on user risk!

Manufacturer:
**DOVA AIRCRAFT, s.r.o.**
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739 21 Paskov
Tel./fax: 558 671 081 558 671 139

**OWNER – OPERATOR OF AIRCRAFT:**

Name:
Address:
Registration Mark:

**CHANGE OF OWNER:**

Name:
Address:

**SUMMARY**

## Introduction

**Validity:** This flight manual is valid only for aircraft with the registration mark mentioned above on the first page.

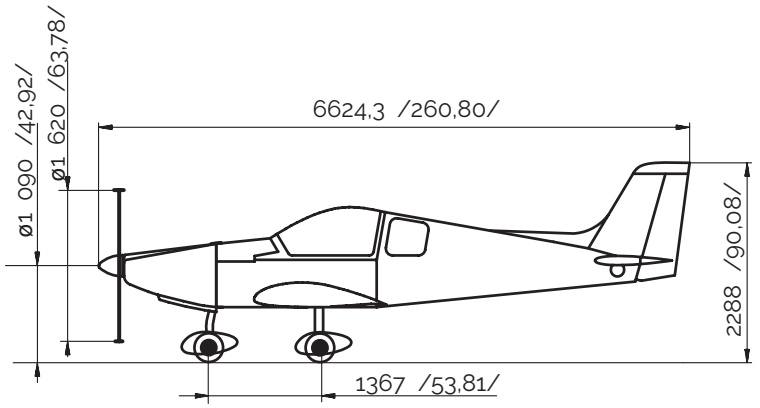
**Warning:** The crew has to know contents of this manual before flight!

## ABREVIATIONS AND DEFINITIONS

| | |
|---|---|
| **CAS** | calibrated airspeed. (CAS=TAS at sea level) |
| **IAS** | indicated airspeed |
| **TAS** | true airspeed |
| **MSA** | international standard atmosphere |
| **mac** | mean aerodynamic chord |
| **SOP** | vertical tail surfaces |
| **VOP** | horizontal tail surfaces |
| **$V_A$** | Maneuver Speed |
| **$V_{SO}$** | stall speed in landing configuration |
| **$V_{s1}$** | stall speed |
| **$V_{NE}$** | maximum speed |
| **$V_{FE}$** | maximum speed with flaps |
| **$V_{RA}$** | max. speed in turbulence |
| **VPD** | runway |

**Note:**
Indicated airspeed is used, unless otherwise noted **.**

## THREE VIEW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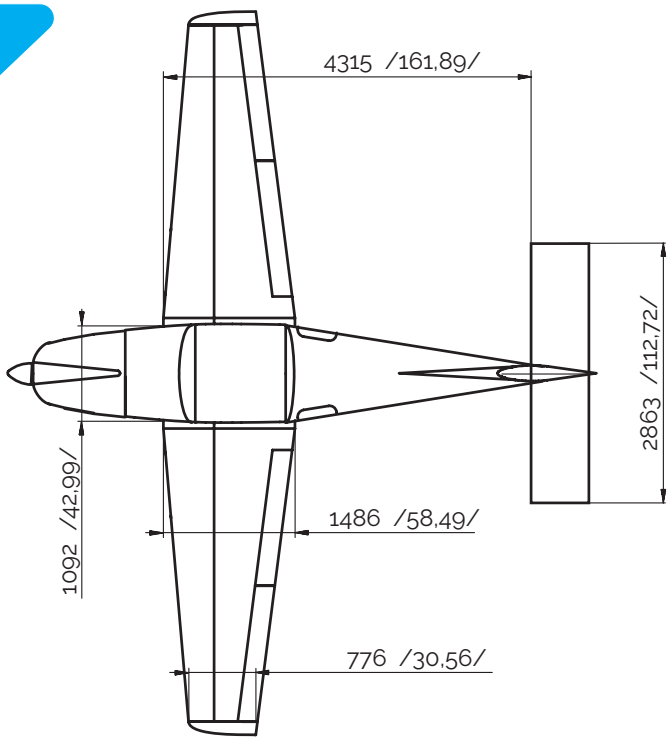
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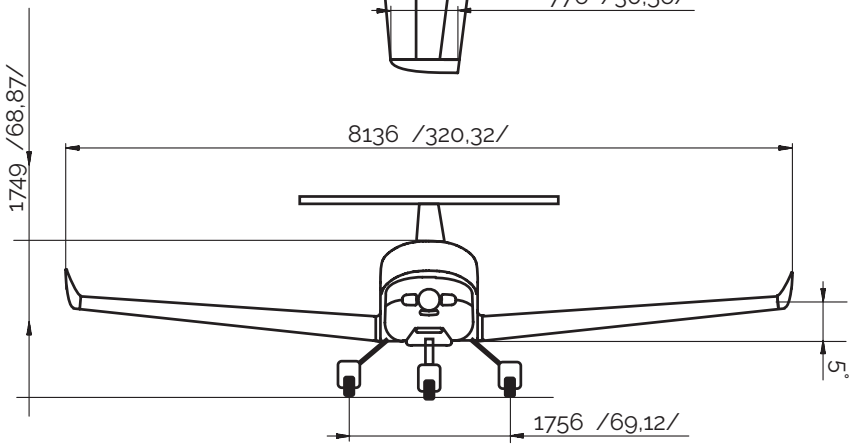
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## BASIC TECHNICAL DATA

## DESCRIPTION

Aircraft DV-1 Skylark is a light sport, two-seater, all metal low-wing aircraft, with a tri-gear undercarriage and stearable nose wheel.

## DIMENSIONS

| | | |
|---|---|---|
| Span | 8,14 m | 26 feet |
| Length | 6,62 m | 21.7 feet |
| Height | 2,28 m | 7.5 feet |
| Wing Area | 9,44 $m^2$ | 102 feet |
| Mean aerodynamic chord | 1,19 m | 3.9 feet |
| Dihedral | 5 ° | |
| Tires size | 4,00" x 6 | |
| Wheel spacing | 1,76 m | 5.8 feet |
| Wheel base | 1,36 m | 4.5 feet |
| Tire Pressure for front wheel | 160 ± 10 kPa | |
| Tire Pressure for main wheels | 180 ± 10 kPa | |

## CONTROL DEFLECTIONS

| | | |
|---|---|---|
| Ailerons: | up | 15° ± 1° |
| | down | 10° ± 1° |
| Flaps: | Position -1 | -10° ± 2° |
| | Position 0 | 0 |
| | Position 1 | +10° ± 2° |
| | Position 2 | +21° ± 2° |
| | Position 3 | +40° ± 2° |
| Elevator: | up | 30° ± 2° |
| | down | 20° ± 2° |
| Rudder: | right | 30° ± 2° |
| | left | 30° ± 2° |

## WEIGHTS

| | |
|---|---|
| Empty weight from | 285 kg |
| MTOW | 600 kg |
| Baggage | 20 kg |

## PROPULSION SYSTEM

### ENGINE

| | |
|---|---|
| Type | Rotax R 912 S |
| RPM for take-off | 5800 1/min (for 5min.) |
| Max. RPM | 5500 1/min |
| Idling speed | 1400 1/min |

Warning:
**The pilot of the aircraft is responsible for the consequences of engine failure. It is recomended that the aircraft be operated at a height and speed to ensure the most safety in an emergency landing in case of engine failure.**

### PROPELLER

| | |
|---|---|
| Type, manufacturer | Kašpar KA 1/3, Kalmar, s.r.o. |
| Diameter | 1620 mm |
| Turning to | right |

### LIQUIDS

The recommendations of the engine manufacturer should be followed.

| | |
|---|---|
| Fuel | Premium unleaded 91 Octane |
| Max. volume of fuel | 90 litres |
| Oil type | Castrol GTX 5 10W-40 |
| Max. volume of oil | 2,5 litres |
| Cooling liquid | ARAL Antifreeze<br>+distilled water 1:1 ratio |
| Max. volume of cooling liquid | 2,7 l |

### FUEL TANKS

Fuel tanks are placed in root of both wings.

| | |
|---|---|
| Max. volume | 2 × 45 litres |
| Unused volume | 2 × 1,5 litres |
| Expansion volume | 2 % |

| Flight Instruments | Type | Serial number |
|---|---|---|
| | | |
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| Engine Instruments | Type | Serial number |
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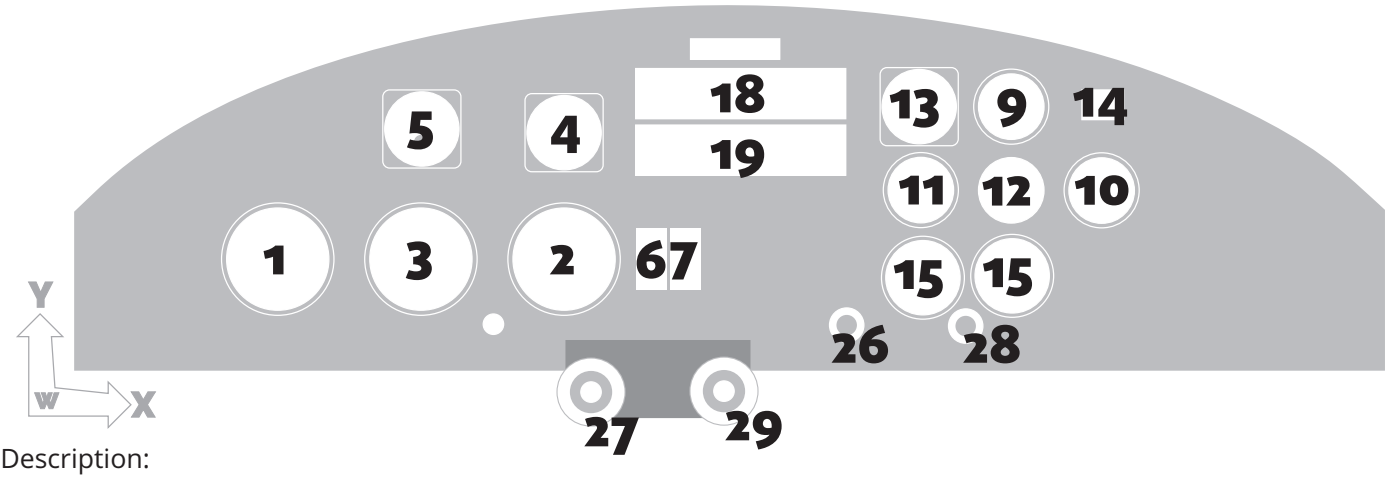
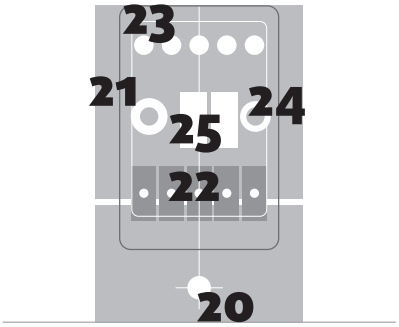
## INSTRUMENT PANEL Standard version




Description:

1. Airspeed
2. Altimeter
3. Variometer
4. Compass
5. Sideslip Ball 1
6. Trim control
7. Trim indicator
8. Manifold pressure
9. Fuel pressure
10. Oil pressure
11. CHT
12. Oil Temperature
13. Tachometer
14. Engine-clock

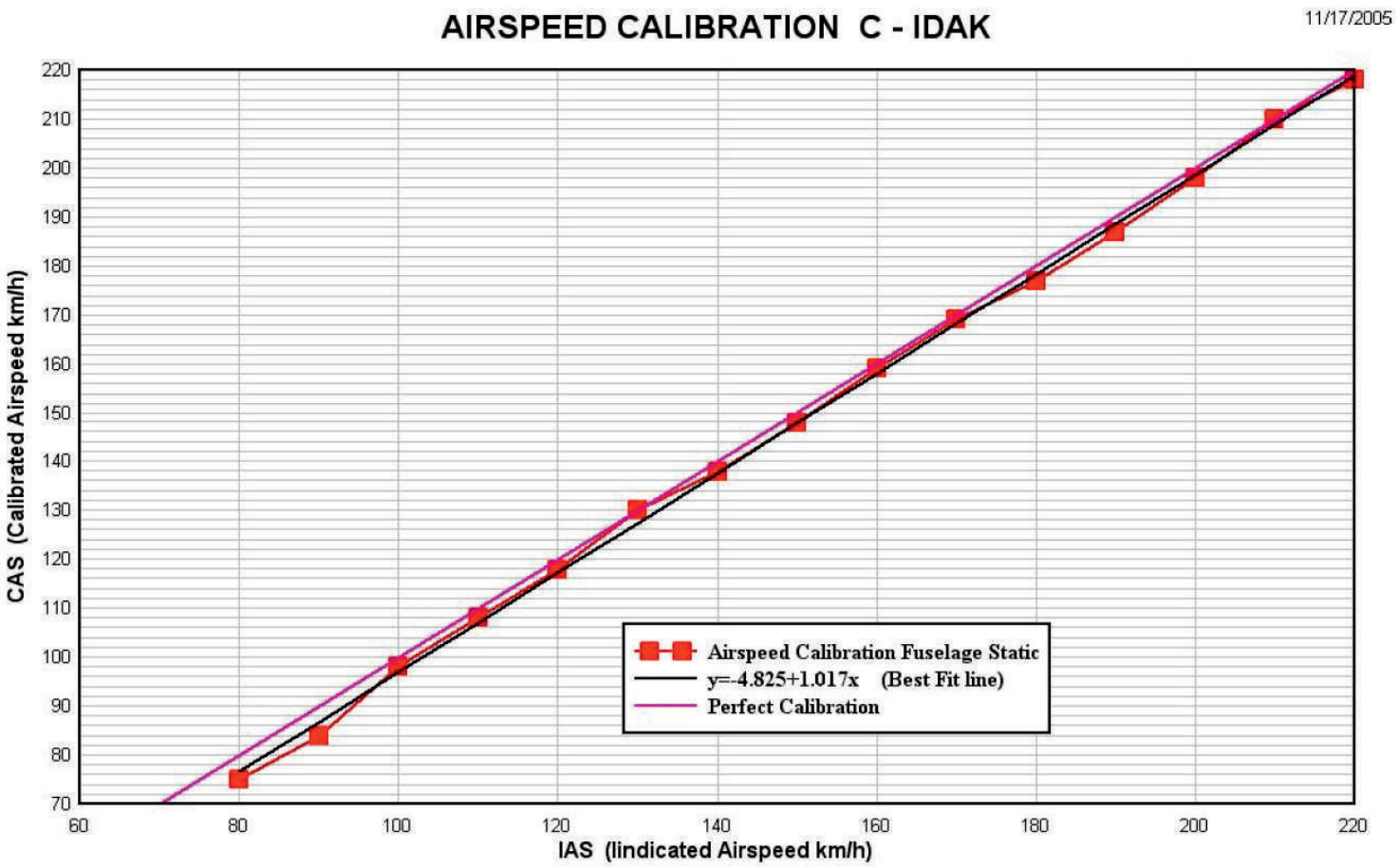



15. Fuel Gauge
18. Radio
19. Transponder
20. Fuel valve
21. Master Switch
22. Switches
23. Fuses
24. Starter
25. Magnetos
26. Choke
27. Throttle
28. Cabin Heat
29. Propeller


DV-1
SKYLARK

Aircraft DV-1 Skylark passed Ul-2 requirements for construction, material, and performance.

## AIRSPEED CALIBRATION



## AIRSPEED LIMITATION

Described speeds are for MTOW and Sea Level conditions. All speeds are Indicated Airspeeds (IAS). Calibrated Airspeeds can be found from the above calibration.

| Speed | Abbreviation | IAS /Km/h) |
|---|---|---|
| Maximum speed - Can only be exceeded in smooth air and with -10 degree flap deflection. | $V_{NE}$ | 250 |
| Max. cruise speed<br>- Can only be exceeded in smooth air and with -10 degree flap deflection | $V_{NO}$ | 210 |
| Max. Maneuvering speed | $V_A$ | 158 |
| Max. speed with flaps | $V_{FO}$ | 120 |
| Max. speed in turbulence | $V_{RA}$ | 180 |
| Stall speed | $V_{s1}$ | 80 |
| Stall speed with landing configuration | $V_{SO}$ | 64 |

## COLOURED MARKINGS ON THE AIRSPEED INDICATOR

| Sign | [IAS km/h] | Importance |
|---|---|---|
| white stripe | 64÷120 | -flaps |
| green | 80÷210 | -normal |
| yellow | 210 – 280 | -smooth air and -10° flaps |
| first red | 72 | -minimal speed |
| second red | 280 | -maximal speed |

## ENGINE OPERATING LIMITATIONS

The recommendations in the Rotax engine manual are to be followed.

| | |
|---|---|
| Oil pressure | max. 7 bar, min. 0,8 bar<br>normal 2-5bar |
| Oil temperature | min. 50°C, max. 130°C<br>normal 90-110°C |
| CHT | max. 135°C |
| Exhaust gas temperature | max. 880°C –start<br>max. 850°C – flight |
| normal | 800°C |
| Fuel pressure | max. 0,4 bar<br>normal 0,15-0,4 bar |
| RPM | idling 1650 rpm<br>Maximum Continuous 5500 rpm<br>Maximum for 5 minutes 5800 rpm |

**Note:**

- take-off is prohibited if values indicated on the engine instruments are not within the allowed range or the engine is not working properly.

## WIND LIMITATIONS

| | |
|---|---|
| Maximum value of wind in the direction: | |
| - of the runway (against or with ) | 12m/s |
| - 90° to the runway | 5m/s |

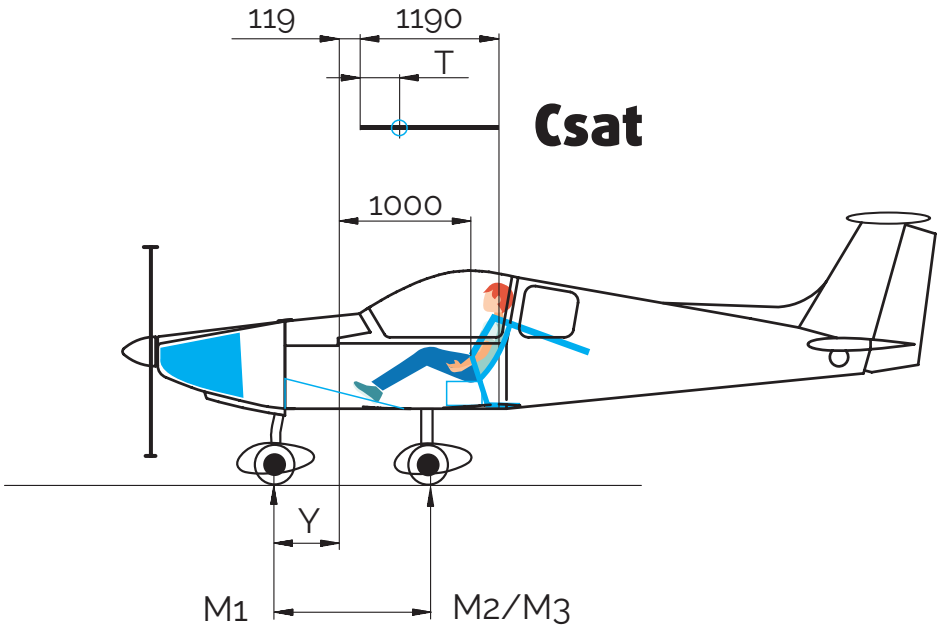
## FUEL VOLUME

| | |
|---|---|
| Maximum volume of one tank | 45 litres |
| Volume of both tanks | 90 litres |
| Minimum volume for take-off (in one tank) | 10 litres |

## WEIGHT

| | |
|---|---|
| Empty | 285 kg |
| MTOW | 600 kg |
| Baggage | 20 kg |
| Min. pilot weight | 60 kg |
| Max. Pilot weight | 120kg |
| | |
| Center of gravity position: | |
| Front | 24% SAT |
| Rear | 36% SAT |

**Weighing Procedure:**
Aircraft is placed on three scales in a horizontal position (upper edge of front fuselage to be level).Note the values and the dimensions X and Y. Count as follows.




## Center of gravity position:

T = ( X * ( M2+M3)/(M1+M2+M3) – Y – 119 ) / 11,9 (% mac)

Examples of C.G. position for Aircraft with BRS

1. Empty

| | |
|---|---|
| Fuel (l) | = 0 |
| Left pilot (kg) | = 0 |
| Right pilot (kg) | = 0 |
| **C.G. position (%mac)** | **= 13.5 %** |
| Weight (kg) | = 297 |

2.With pilot 86 kg

| | |
|---|---|
| Fuel (l) | = 0 |
| Left pilot (kg) | = 86 |
| Right pilot (kg) | = 0 |
| **C.G. position (%mac)** | **= 25 %** |
| Weight (kg) | = 383 |

3. With pilot 60 kg

| | |
|---|---|
| Fuel (l) = 0 | |
| Left pilot (kg) | = 60 |
| Right pilot (kg) | = 0 |
| **C.G. position (%mac)** | **= 22 %** |
| Weight (kg) | = 357 |

4. With 2 pilots 86 + 47kg + 20kg baggage

| | |
|---|---|
| Fuel (l) | = 0 |
| Left pilot (kg) | = 86 |
| Right pilot (kg) | = 47 |
| baggage = 20 | |
| **C.G. position (%mac)** | **= 35 %** |
| Weight (kg) | = 450 |

5. With 2 pilots of 86kg

| | |
|---|---|
| Fuel (l) | = 0 |
| Left pilot (kg) | = 86 |
| Right pilot (kg) | = 86 |
| **C.G. position (%mac)** | **= 32 %** |
| Weight (kg) | = 469 |

**With following MTOW lies center of gravity from 21 to 36% of mac.**

## ALLOWED TURNS (VIZ UL-1)

Allowed rolling up to 60° and climbing or descending till 30° from horizontal. Acrobatic turns and intended spins are prohibited.

| Turn | Max. speed v IAS (km/h) |
|---|---|
| Roll 60° | 160 |
| Slip | 100 |

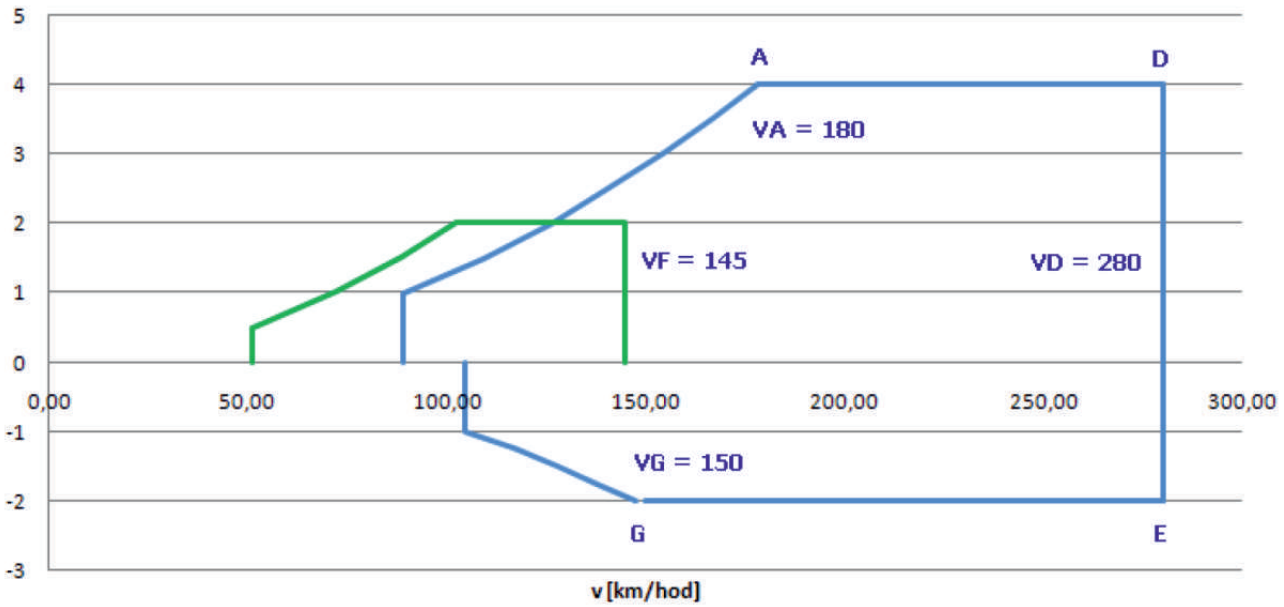
**Acrobatic turns and intended spins are prohibited!**

## LOADS

| | |
|---|---|
| Max. load | + 4 |
| Max. negativ load | - 2 |
| Max. load with flaps | 2 |

## FLIGHT ENVELOPE

For MTOW 600 kg A



## LIMITATION

**VFR day-flight only without freezing condition!**

## TEMPERATURE LIMITATION

| | |
|---|---|
| max. temperature on ground | 40° C |
| min. temperature on ground | -5° C |

## OTHERS

- Do not push or pull on any laminate covers, control surfaces, or the ends of the propellers blades
- In case of leaving aircraft fix its position by ropes to the ground

- Locking of canopy and fuel tanks is recommended when leaving the aircraft

- No smoking in the aircraft!

## FAILURE DURING START ON THE GROUND

1. throttle set to idle
2. Braking
3. Magnetos OFF
4. Stop fuel
5. master OFF

## FAILURE DURING START IN AIR

1.Speed 90- 95 km/h
2. Landing on runway or on place ahead with possibility of turning
3. Magnetos OFF
4. Stop fuel
5. Master OFF
6. Tightening of safety belts
7. flaps if needed

## FAILURE DURING FLIGHT

Insufficient height for turning engine On:
1. Speed 90-95km/h
2. Choose place for landing (direction, surface, wind, angle)
3. Magnetos OFF
4. Stop fuel
5. Master OFF
6. Tightening of safety belts
7. Flaps if needed

Enough height for turning engine ON:
1. Speed 90-95km/h
2. Choose place for landing (direction, surface, wind, angle)
3. Check:- magnetos ON
   - fuel open, enough volume
   - turning on fuel pump
   - Master ON
4. throttle open, choke if needed
5. Start – if engine start it running check proper function near to a chosen place
6. If engine works properly and instruments shows allowed values continue to the nearest airfield, land and check the engine
7. If engine do not want to start or instrument shows border values continue with emergency landing on chosen place
8. Magnetos OFF
9. Stop fuel
10. Master OFF
11. Tightening of safety belts
12. Flaps if needed

## EMERGENCY LANDING

1. Speed 90-95km/h
2. Choose place for landing (direction, surface, wind, angle)
3. Magnetos OFF
4. Fuel stop
5. Master OFF
6. Tightening of safety belts
7. Flaps if needed

## INTERUPTED LANDING

1. If aircraft is equipment by adjustable propeller set the smallest angle of attack
2. Trim if needed
3. After reaching of 90 km/h start climbing
4. After reaching height 30 m set flaps to start position
5. hide flaps after reaching safety height
6. repeat landing

## FIRE ON GROUND, ENGINE OFF

1. Fuel Off
2. Heating Off
3. Evacuate aircraft and quench the fire (if possible)

## FIRE IN AIR

1. Fuel OFF
2. Throttle to maximum power
3. Heating OFF
4. Master OFF
5. Magnetos Off after burning the fuel in the carburetor and stopping the engine
6. Speed 90-95 km/h
7. Carry out an emergency landing

**After quenching the fire do not try to start the engine!**

**Note:**
Time needed to burn the rest of the fuel in the carburetor is about 30s.

## CARBURETOR ICING

Loss of power and rising temperature ( The engine may stop).

1. Speed 110-120km/h
2. Throttle to idle or to minimum depending on flight conditions
3. Leave the area of icing conditions(change altitude)
4. After 1 or 2 min slowly increase power to the cruise setting
5. If the engine is not working properly (lower power) land at the nearest airfield or a safe place

## VIBRATION OF ENGINE OR PROPELLER

If some vibration occurs, then it is necessary to:

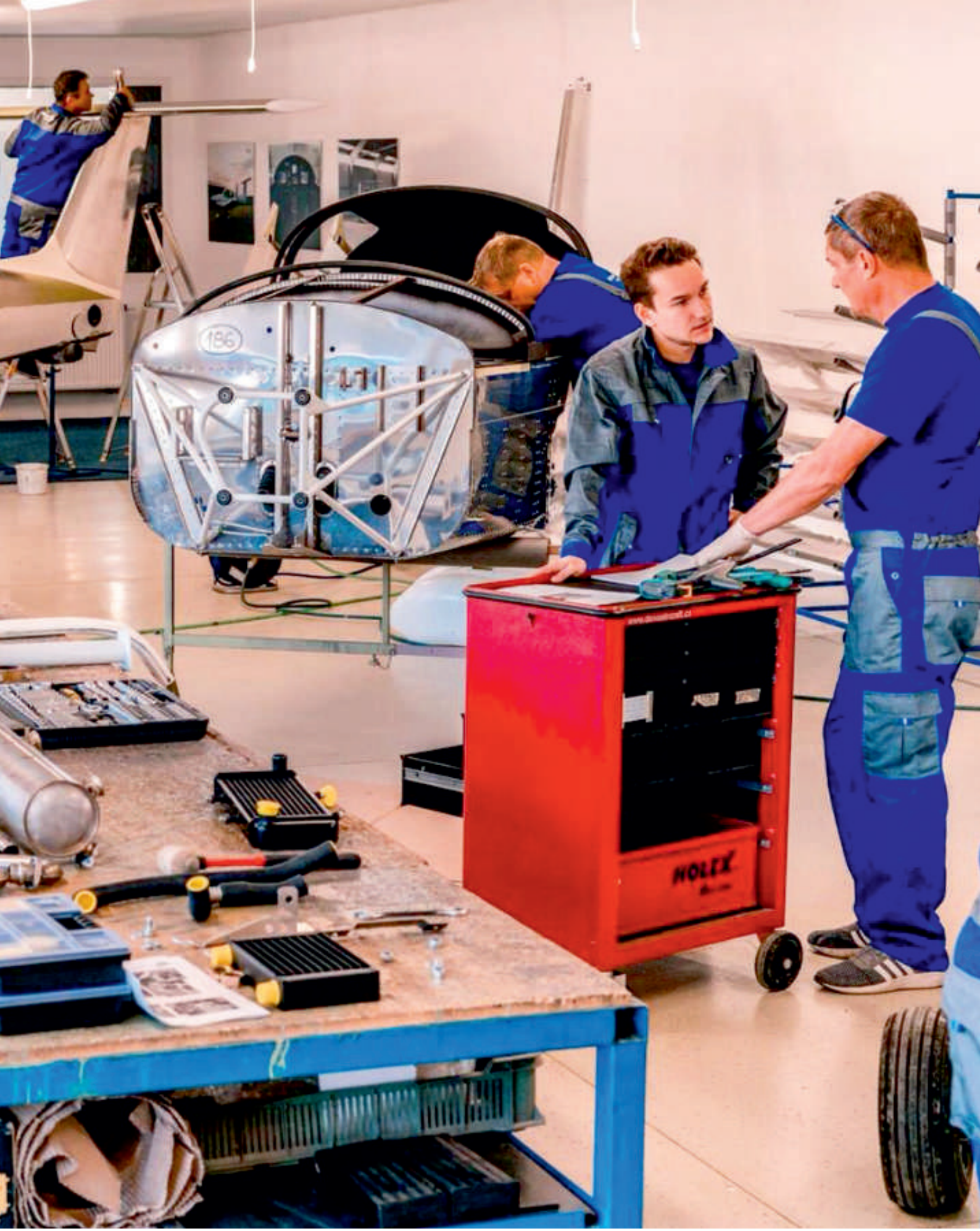
1. Set the rpm of the engine to value with minimum vibrations.
2. Carry out an emergency landing on nearest airfield
3. If vibrations are increasing – carry out an emergency landing at the nearest safe place

## USING BALLISTIC RESCUE SYSTEM

1. Fuel OFF
2. Magnetos OFF, Master OFF
3. Tighten safety belts
4. Activate rescue system by pulling the trigger

**Note:**

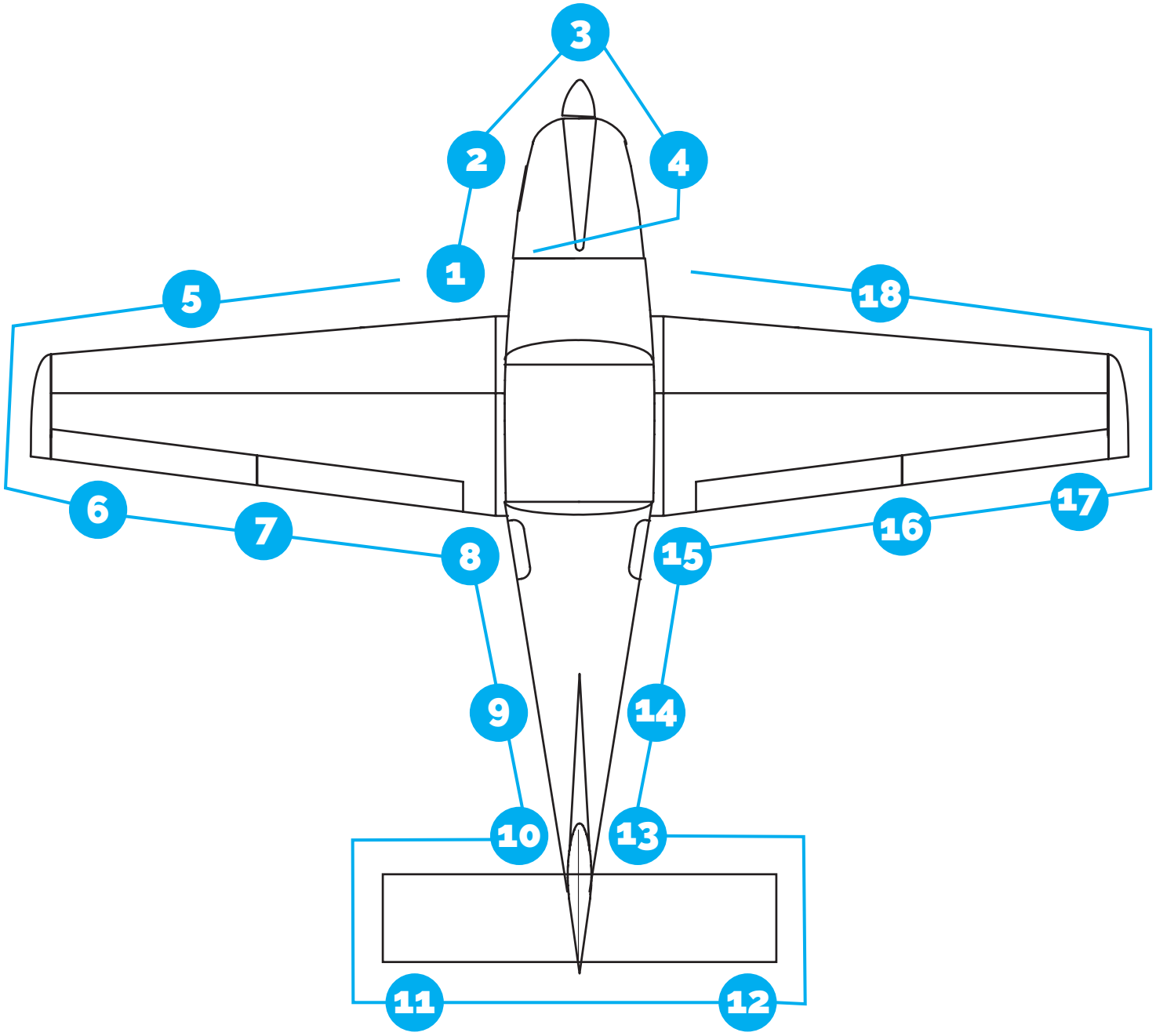
**In emergency, go at once to point 4.**
**The Trigger must be unlocked before flight! Use of the ballistic rescue system can result in damage to the aircraft and injury to the crew.**




DOVA aircraft

## PRE-FLIGHT CHECK

Remove upper engine cover, any canopy cover, pitot-static tube cover.




Important places on the aircraft are shown in the above diagram (with numbers). Some checks will require the removal of covers.

The aircraft should be check as follows:

a) Canopy
- Master ON, check sufficient volume of fuel
- Master, Magnetos and other switches OFF!
- Fuel OFF
- Visual check of the interior, remove all free-moving objects
- Check for the free-movement of controls

b) Engine (2. 3. 4.)
- remove upper cowling, visual check of engine and accessories
- check the status and fixation of units, tightening and locking of screws, condition of tubes (look for cracks), condition and fixation of electric-installation.
- check the volume of oil and cooling liquid
- check propeller blades, fixation of propellers cone
- Replace the cowling and lock it

c) Front Landing gear (2. 4.)
- check the tire pressure, and condition of each gear

d) Wings (5.18)
- visual check of leading and trailing edge
- visual check of fuel tanks, check the volume of fuel
- check the Pitot tube (status, fixation, direction)

e) Ailerons (6. 17.)
- visual check of condition
- check easy and free movement
- check the hinge-line of the ailerons

f) Flaps (7.16.)
- visual check of condition
- check free movement, locking of each flaps position
- check hinge-line of flaps

g) Main landing gear (8. 15.)
- check pressure of tires
- check fixation

h) Fuselage ( 9.14. )
- visual check for any damage
- check antenna (condition, fixation)

i i) Horizontal Tailplane ( 11. 12. )
- visual check of condition
- check the connection to vertical tail surfaces
- check hinge of elevator and trim surfaces
- check free movement, easy to control

k) Vertical Tailplane (10. 13. )
- visual check of condition
- check the rudder hinges
- check condition of control cables (strain, secure, free-movement)

## PROCEDURES AFTER ENTERING THE AIRCRAFT

1. check the locking of the ballistic rescue system (if there is one)
2. set your position of seats
3. canopy – closed and locked
4. safety belts –lock and tight
5. controls – free movement
6. flaps – check function
7. brakes – check function
8. Master ON
9. instruments – check the values, settings
10. trim – check the function, start position neutral
11. fuel valve – open (left or right)

## STARTING THE ENGINE

1. fuel levels – check the volume of fuel in tanks
2. radio Off
3. fuel valve open to the tank with the larger volume of fuel
4. throttle (idle position for cold engine with choke combination, 1 turn for warm engine)
5. choke depends on the temperature of the engine (full for cold, not needed if the engine is warm)
6. set minimal pitch to propeller blades for start (if adjustable propeller)
7. check the space around propeller to be sure that it is clear
8. Magnetos ON – both circuits
9. electric pump - On
10. starter
11. rpm after start 2500 rpm
12. check oil and fuel pressure
13. switches ON (radio, strobe, ...)

Warnings:
Maximum time for trying to start up the engine is 10s. Another start can be repeated after cooling down of the starter, about 2 minutes.
Oil pressure must rise in 10 seconds after start. After reaching stable values of oil pressure (above 2 bar) rpm can be increased.
Aircraft is using integral fuel tanks in wings. It is controlled by three-way valve (opening left or right side and off position). Lateral balance can be maintained by using fuel from the left and right tanks to keep fuel levels in both tanks equal.

Warning:
**- Before starting you will have carefully read the Manual for the Rotax Engine!**
**- Before warm up or testing the engine the airplane has to be:**
  **- in position against the wind**
  **- wheel chocks in place**
  **- assistant with a fire extinguisher nearby**
  **- The engine must not be started without pilot in the aircraft!**
**- Getting In or Out with the engine running is strictly prohibited!**

## WARMING UP AND PRE-FLIGHT CHECK OF THE ENGINE

1. brake the aircraft by chocks
2. all controls in neutral position
3. minimum pitch on propeller
4. set rpm as 2000 rpm and let it run for 2 min, then continue warming with 3000 rpm until oil temperature reaches 50°C
5. slowly increase rpm to maximum ( or at least to 4000 rpm), for 5s, slow to the idle, and repeat 2 or 3 times
6. Set to 3850 rpm, check magnetos by turning them off separately. The rpm should NOT decrease by more than 300 rpm.

The difference in rpm drop should be not more then 115 rpm.

**Warning:**

- After testing of engine, let it cool down with idle rpm
- Do not carry out an engine test on dusty or powdery terrain. (damage of propeller or engine can occurs)

## PROCEDURES BEFORE TAXING

1. Unlock the rescue system
2. Turn on and lock gyroscope, turn-coordinator, gyrocompass, ...)
3. Minimum pitch for propeller
4. Flaps neutral
5. Report to tower (info, radio)
6. During taxi check brake function and free-movement of rudder/front wheel steering
7. Taxi speed depends on the terrain and weather conditions

**Warning:**

Maximum taxi speed is 15 km/h.

## PROCEDURES BEFORE TAKE-OFF

1. Brake to a stop
2. rpm to idle
3. check controls (free-movement)
4. trim - neutral
5. flaps to take-off position
6. check fuel gauges for enough fuel, open the tank with more fuel
7. switches ON, check instruments
8. minimum pitch for propeller
9. magnetos ON
10. master ON
11. check engines instruments
12. set altitude or QNH
13. safety belts locked and tight
14. canopy locked
15. gyroscope - unlock
16. space of circuit – free
17. report to tower (info, radio)

## TAKE OFF

1. runway free
2. notice time
3. throttle to maximum
4. from speed 60 km/h start to rise front wheel by using elevator
5. Aircraft will take off from 70 km/h - depends on conditions
6. hold altitude 100 km/h
7. start climbing from speed of 110-120 km/h, rpm set to a maximum of 5500 rpm.
8. flaps to neutral in safety height
9. check instruments
10. trim if needed
11. **Let the electric pump switched ON during flight! (if installed)**
12. **ATTENTION! During the flight switch over the cock alternately to right and left fuel tank - always after 30 min of the flight**

## DOWNWIND POSITION

1. check the fuel volume, use the tank with more fuel
2. fuel pump on, check instruments
3. safety belts locked, tight
4. check runway and space of 3. and 4. turn of circuit
5. report to tower (info, radio)

## BASE-LEG, AFTER 3. TURN OF CIRCUIT

1. speed 120 km/h, rpm 3500 rpm.
2. minimum pitch for propeller
3. flaps – take-off position
4. trim if needed
5. check runway and space of 4. turn

## FINAL

1. speed 110 km/h, close to idle, max. rate of decent 2,7 m/s
2. flaps in landing or take-off position...depends on weather condition and pilot decision
3. trim if needed
4. check runway,
5. report to tower (info, radio)
6. in altitude of 5m above ground, set rpm to idle, align to 1m
7. by using elevator slowly decrease the speed, and softly land on main landing gear first
8. brake if needed, hold direction

## AFTER LANDING

1. leave runway, note the time
2. rpm to idle
3. trim – neutral
4. flaps - neutral
5. fuel pump OFF

## TURNING OFF THE ENGINE

1. cool down engine with rpm 2000 1/min
2. throttle to idle
3. all switches OFF
4. magnetos OFF
5. master OFF

## LEAVING AIRCRAFT

1. magnetos, master, switches OFF - check
2. fuel off
3. lock ballistic rescue system
4. canopy - lock
5. tie down aircraft – ropes, chocks
6. cover canopy

# PART 5: Performances

**Valued only for R912S with adjustable propeller**

**Note:**

Measured 0m MSA atmosphere. TAS = IAS ± 8 km/h

## CRUISE SPEED AND HIGHER– USE NEGATIVE -10° DEFLECTION OF THE FLAPS

| | m=370 kg | m=600 kg |
|---|---|---|
| Cestovní Cruise speed 75 % power | 210 km/h | 200 km/h |

## STALL SPEEDS

| | m=370 kg | m=600 kg |
|---|---|---|
| Without flaps $V_{S1}$ | 75 km/h | 80 km/h |
| Landing configuration $V_{S0}$ | 65 km/h | 64 km/h |

**Note:**

You can loose altitude of 60m during a stall!. Measured with idle rpm.

## TAKE-OFF AND LANDING DISTANCE

Take-Off

| Pavement | m=370 kg | m=650 kg |
|---|---|---|
| Distance for 15m of altitude | 150 m | 290 m |
| Ground distance | 75 m | 100 m |

**Note:**

Valued for short grassed terrain, no wind.

Landing

| Pavement | m=370 kg | m=650 kg |
|---|---|---|
| Landing distance from 15m of altitude | 200 m | 300 m |
| Ground distance | 95 m | 130 m |

**Note:**

Valued for gently braking.

## CLIMBING

ROTAX 812 ULClimbing speed with full power of ROTAX 912 UL

| | m=370 kg | m=650 kg |
|---|---|---|
| Climbing [m/s] | 7 | 5 |
| With speed [km/h] | 100 | 100 |

## GLIDE PERFORMANCES

With idle

| | m=370 kg | m=650 kg |
|---|---|---|
| Optimum glide speed [km/h] | 100-110 | 110-130 |
| Rate of decent [m/s] | 1,8 | 3,2 |

Engine off, flaps in take-off position

| | m=370 kg | m=650 kg |
|---|---|---|
| Optimum glide speed [km/h] | 100-110 | 120-130 |
| Rate of decent [m/s] | 2 | 3,4 |

## RANGE

| | |
|---|---|
| With 75 % power of Rotax 912ULS | 1000 km |
| Endurance (75 % power of Rotax 912ULS) | 5 h +30 min |

## CEILING

| | |
|---|---|
| Theoretical | 3650 m |

## FUEL CONSUMPTION

Engine ROTAX 912 ULS

| | |
|---|---|
| 5500 rpm | 22 l/h |
| 5000 rpm | 20 l/h |
| 4300 rpm | 16 l/h |

# PART 6: Periodical

## AFTER EACH FLIGHT

- wash the aircraft with water
- use vacuum cleaner if needed
- check tires
- check surfaces
- check canopy glass
- check volume of liquids

## PERIODICKÁ ÚDRŽBA

- Engine maintenance provide as written in Engine Manual for Rotax 912 ULS.
- check important parts of the aircraft, record any defects in the aircraft log book.
- after first 100 flight hours checking by manufacturer is recommended

## WINGS

**Note:**

Assemble on place with possibility to fly! During carrying part of aircraft hold it close to the rivets lines (ribs). Replace old self-blocking nuts with new ones. Do not loose some parts!

**Procedure**

- remove covers of controls and floor
- disconnect aileron push rods to the wing
- disconnect fuel tubes from the wing
- disconnect pitot-static tubes – left wing
- disconnect wires to the wings
- remove the main spar bolts (3+3 pcs) and remove the rear spar bolt, leave one main spar bolt up and one main spar bolt down
- hold the end of the wing and carefully remove last two bolts
- pull out the wing carefully – hold the flaps (it will automatically disconnected when the wing is pulled out)
- put the wing on soft clean surface
- same procedure for second wing

## PUTTING ON

- opposite procedure
- carefull to connect the flap control. It is better to set the neutral position to easy fit in.

Horizontal tail surfaces

**Procedure:**

- remove covers
- disconnect the wires to trim and to strobe light in front socket. In rear one disconnect the rod for controlling elevator
- remove 4 screw of attachment to vertical tail surfaces
- put it on soft clean surface

Putting on:

- opposite procedure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