Pilot Operating Handbook
for aeroplane VL-3TE-915
powered by ROTAX 915 engine

Registration number :

Serial number : **VL-3**

Date :

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Table of Contents

1. General

1.1 Introduction

This Pilot operating handbook provides information useful for the safe and efficient operation of VL-3TE-915 Evolution aeroplane. It also contains supplemental data supplied by the aeroplane manufacturer.

1.2 Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes in the flight manual.

Warning

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

Caution

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

Note

Draws the attention of any special item not directly related to safety but which is important or unusual.

1.3 Descriptive data

1.3.1 Aeroplane description

VL-3TE-915 Evolution aeroplane is intended for recreational and cross-country flying. It is not approved for aerobatic operation.

VL-3TE-915 Evolution is a single engine, composite aeroplane with two side-by-side seats. The aeroplane is equipped with retractable tricycle landing gear with a steerable nose wheel. The fuselage is a carbon shell with carbon/kevlar seats integrated.

The wing is a monospar construction with a sandwich skin composed of two layers of carbon and special foam. Control surfaces and empennage is of the same construction.

The aeroplane is controlled by dual push-pull control system, rudder drive is controlled by cables and on the right elevator is trim connected by 2 cables with trim lever. The ailerons and elevator are controlled by the control stick located between the pilot's legs (copilot's). The rudder is controlled by the rudder pedals, flaps are manually operated by a control lever located between the pilots on the fuselage main spar.

1.3.2 Basic Technical data

Wing

span …… 8.44 m

area of wing …… 9.8 m²

M.A.C. …….. 1,236 m

loading …….. 46 kg/m²

Ailerons

area ……... 0.207 m²

Flaps

area ……0.8 m²

Fuselage

length ..…… 6.2 m

width ……... 1.15 m

height ……... 1.5 m

Horizontal tail unit

span ……... 2.68 m

area ……1.69 m²

elevator area …….. ……..... 0.73 m²

Vertical tail unit

height …… 1.03 m

area ……..…….. 0.876 m²

rudder area ……... .0.309 m²

Landing gear

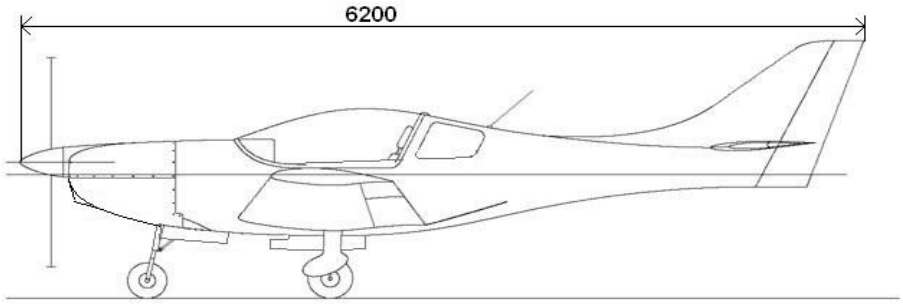
wheel track ……..1.83 m

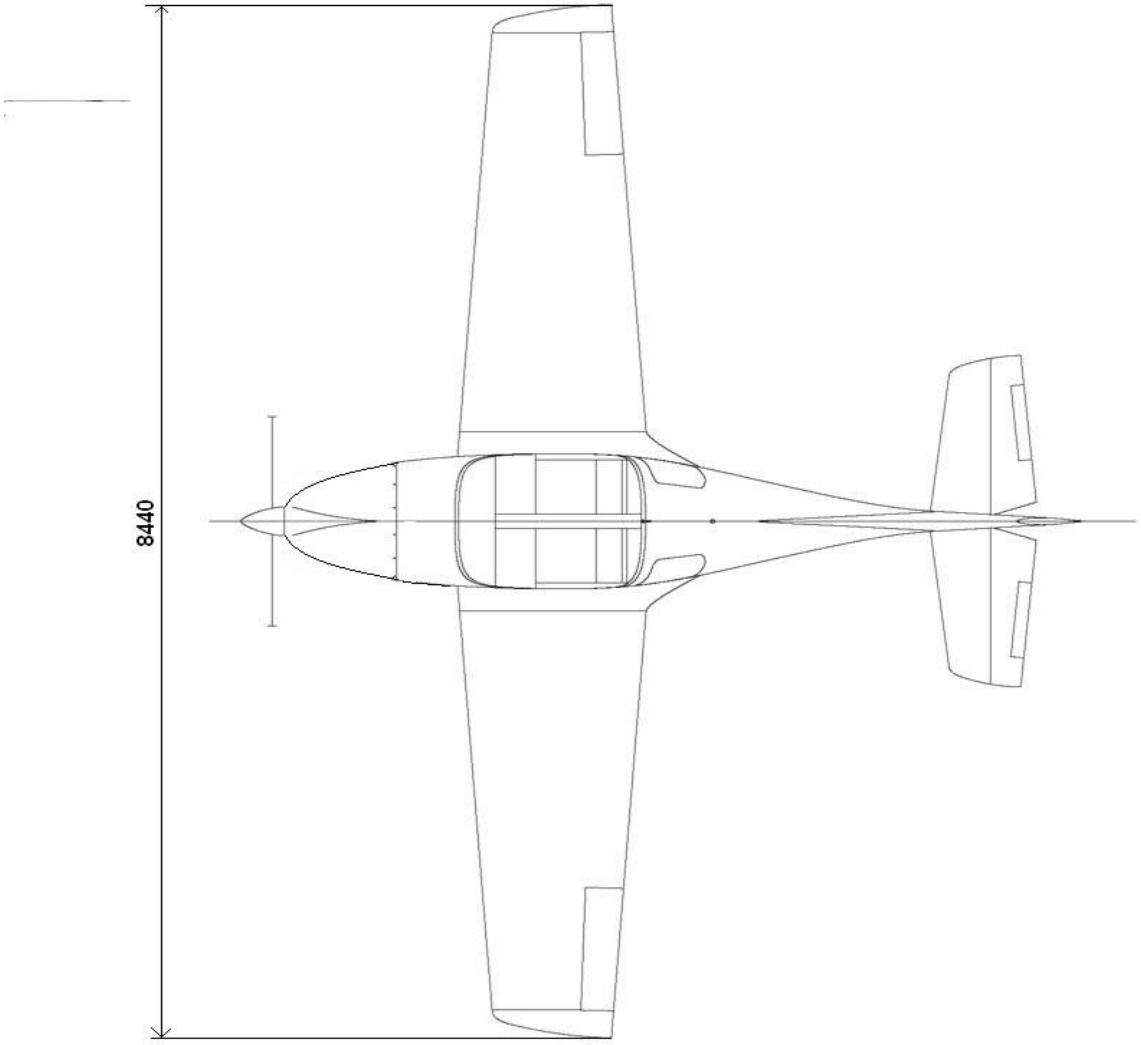
wheel base ……..1.285 m

main wheel diameter ……0.35 m

nose wheel diameter …… 0.3 m

1.4 Two-view drawing





2. Limitations

2.1 Introduction

Section 2 includes operating limitations, instrument markings, and basic placards necessary for safe operation of the aeroplane, its engine, standard systems and standard equipment.

2.2 Airspeed

Airspeed limitations and their operational significance are shown below:

Airspeed		IAS	Remarks
V_{NE}	Never exceed speed	**340 km/h** (183 kts)	Do not exceed this speed in any operation.
V_A	Manoeuvring speed	**190 km/h** (103 kts)	Do not make full or abrupt control movement above this speed, because under certain conditions the aircraft may be overstressed by full control movement.
V_{NO}	Maximum structural cruising speed	**280 km/h** (150 kts)	Do not exceed this speed except in smooth air, and then only with caution.
V_{FE}	Maximum flap extension speed	**125 km/h** (67 kts)	Do not exceed this speed with flaps extended
V_{LE}	Maximum landing gear extension speed	**150 km/h** (81 kts)	Do not exceed this speed with undercaridge extended

2.3 Airspeed indicator markings

Airspeed indicator markings and their colour-code significance are shown below:

Marking	Range or value	Significance
White arc	**82 – 125 km/h** (44 – 67 kts)	Positive Flap Operating Range
Green arc	**95 – 280 km/h** (51 – 150 kts)	Normal Operating Range
Yellow arc	**280 – 340 km/h** (150 – 183 kts)	Manoeuvres must be conducted with caution and only in smooth air.
Red line	**340 km/h** (183 kts)	Maximum speed for all operations.

2.4 Powerplant

Warning
For the proper use of ROTAX 915 read thoroughly the engine Operating Manual

Engine Manufacturer : BRP Powertrain GmbH
Engine Model : Rotax 915

Power:
Max. take - off : 104 kW / 142 HP
Max. Continuous : 99 kW / 135 HP in 5500 RPM

Engine RPM:
Max. take-off : 5800 RPM max 5 min
Max. Continuous : 5500 RPM

Cylinder head temperature:
Minimum : 74 °C
Maximum : 120 °C

Oil temperature:
Minimum : 50 °C
Maximum : 130 °C
Operating : 90 °C – 100 °C

Fuel pressure: (if the fuel gauge and sensor are instaled):
Minimum : 2,5 bar
Maximum : 3,5 bar

Fuel : see chapter 2.13
Oil : (refer to engine Operating Manual).

Warning
This engine has not been certified as an aircraft engine and its failure may occur at any time. The pilot is fully responsible for consequences of such a failure.

2.5 Engine instrument markings

Function	Minimum Limit	Normal Operating Range	Maximum Range
Engine speed (RPM)	1400	1400-5500	5800
Cylinder Head Temperature (CHT) [°C]	74	90-110	120
Oil Temperature [°C]	50	90-120	130
Oil Pressure [bar]	2,0 0,8 if RPM < 3500	2,0 – 5,0	7,0 cold engine starting

2.6 Miscellaneous instrument marking

Fuel Level Indication

Used floater fuel indication system does not allow to indicate exact fuel level in whole range (the floater contacts the upper wall of the tank before the tanks is filled full). From this reason the following states of fuel in the tanks are recognised:

	Left tank		Right tank	
	Liter	US gallon	Liter	US gallon
Full tank	59	15.6	59	15.6
Upper indicating limit	40	10.5	40	10.5

The following colour ranges are marked in EMS diagrams for both tanks

	minimum		maximum	
	Liter	US gallon	Liter	US gallon
Green range	16	4.2	maximum	
Yellow range	8	2.1	16	4.2
Red range	0	0	8	2.1

Low fuel level indicators (yellow LEDs on instrument panel):
When low fuel level indicator (yellow LED) on the instrument panel starts to light up – in the fuel tank is min. 5 liters (1,32 US gallon) of fuel.

2.7 Weight

Empty weight (standard equipment) …….. xxx kg

Max. take-off weight ……..……..… 600 kg

Max landing weight ……..……... 600 kg

Max. baggage weight ……..……. 15 kg

2.8 Centre of gravity

Empty aeroplane C.G. position (undercarriage retracted)…... xxx mm

Empty aeroplane C.G. position (undercarriage extended)…... xxx mm

Operating C.G. range …….……. 323 – 478 mm

2.9 Approved manoeuvres

2.9.1 Aeroplane category and approved manoeuvres

Aeroplane Category: NORMAL
The aeroplane is approved for normal category and manoeuvres listed below:

- Steep turn not exceeding 60° bank

Warning
Aerobatics, intentional spins and power-ON stalls are prohibited!

Remember that an airplane can stall at any airspeed and altitude (high speed stalls) but the recovery is always the same: stick forward and add power! Training of stalls have to be practiced at least 4000 ft AGL. The rudder is effective in keeping the wings level throughout the stall. Be familiar with standard spin recovery procedures in the event of an inadvertent spin entry while practicing stalls – **see chapter 3.6 Recovery from unintentional spin**

2.9.2 Power-OFF stall recovery

The following procedure must be used for stall recovery:

1. Control stick - push forward
2. Rudder pedals - use to keep the horizontal position
3. Throttle - increase smoothly as necessary
4. Wing flaps - after reaching 125 km/h (67 kts) IAS in normal flight position slowly close wing flaps
5. Control stick - after reaching 140 km/h (75 kts) IAS pull slowly back

NOTE: Wing drop is possible during stall – in this case push control stick forward and rudder pedals push to opposite side of wing drop

2.9.3 Power-OFF stall training

When practicing power-OFF stall, hold the nose up in a slight climb attitude, gradually bringing the stick back as the speed bleeds off (approximately 2 km-h/s = 1 kts/s), until the plane begins to stall. Practice power-OFF stall at next wing flap and gears setting to get the feel of the each stall mode:

1. Gears retracted + wing flaps closed
2. Gears extended + wing flaps take-off position
3. Gears extended + wing flaps landing position

Before reaching the stall, use rudder to keep the airplane in the horizontal flight position!

NOTE: 1) For practice of power-OFF stall we strictly recommend you check, that quantity of fuel in both main fuel wing tanks is appoximately same!

Note
If wing flaps are extended with the gear retracted, the gear warning horn will sound unless an override breaker has been installed in the gear warning circuit and the breaker is opened for practicing stalls.

2.10 Manoeuvring load factors

Airspeed	Load factor	Airspeed range	
V_A - V_{NE}	+4 / -2*	103 – 183 kts IAS	190 – 340 km/h IAS
V_{S0} - V_{FE}	+2 / 0	44 – 67 kts IAS	82 – 125 km/h IAS

* ROTAX 915 limitation: -0,5 for no more than 5s

2.11 Crew

Numer of seats…… 2

minimum crew weight …… 60 kg

maximum crew weight …… 200kg

Warning
Never exceed Maximum Take-off Weight

2.12 Kinds of operation

Day VFR flights only.
Instruments and equipment for VFR flights:
1 Airspeed indicator (marked according to 2.3)
1 Altimeter
1 Vertical speed indicator
1 compass
2 Safety harnesses

2.13 Fuel

WARNING!

Based on experience from the operation of aircraft VL-3 we strongly recommend to use quality prescribed fuel only! Using the poor quality fuel can cause a major failure in the fuel system!

Don't use fuels than contain more then 10% of ethanol! These fuels have not been tested by ROTAX company and are not permited for use!

Recommended fuel:

- Automotive premium grade gasoline, leaded, according to DIN 516000,Ö-NORM C 1103
- EUROSUPER RON 95 unleaded accord. to DIN 51607,Ö-NORM 1100
- AVGAS 100 LL. Due to higher lead content in AVGAS, the wear of valve seats and deposits in the ombustion chamber will increase.Therefore, use AVGAS only if other fuel types are not available
- Mogas European standart EN 228 Super, EN 228 Super Plus
- BA 95 Natural is recommended for Czech Republic

For other suitable fuel types refer to the engine ROTAX Operator's Manual and ROTAX Service instruction SI-912-016 for selection of the correct fuel.

2.14 Other limitations

- No smoking aboard the aeroplane.

2.15 Limitation placards

Caution

The owner (aeroplane operating agency) of this aeroplane is responsible for placards readability during aeroplane service life.

EMPTY WEIGHT	xxx	KG
MAX.TAKE-OFF WEIGHT	600	KG
MIN.CREW WEIGHT	60	KG
MAX. BAGGAGE WEIGHT	15	KG

NEVER EXCEED SPEED	V_{NE} = 340 KM/H
MANOEUVERING SPEED	V_A = 190 KM/H
STRUCTURAL CRUISING SPEED	V_{NO} = 280 KM/H
MAX. LANDING GEAR EXTENSION SPEED	V_{LE} = 150 KM/H
MAX. FLAP EXTENSION SPEED	V_{FE} = 125 KM/H
STALL SPEED	V_{S0} = 82 KM/H

Power settig	Performance (kW)	Performance (hp)	Engine speed (RPM)	Manifold pressure (inHG)
Take-off	104,4	142	5800	44,8
Max. continuous	99,2	135	5500	42,7
80%	83,5	114	5500	36,6
70%	73,1	99	5000	34,0
60%	62,6	85	5000	29,9
50%	52,2	71	5000	26,1
40%	41,8	57	5000	22,3

3. Emergency procedures

3.1 Introduction

Section 3 provides checklist and amplified procedures for coping with emergencies that may occur. Emergencies caused by aeroplane or engine malfunctions are extremely rare if proper pre-flight inspections and maintenance are practised. However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

3.2 Engine failure

3.2.1 Engine failure during take-off run

1. Throttle - retard to idle
2. Ignition - off

3.2.2 Engine failure immediately after take-off

1. Speed - gliding at 110km/h (60 kts)
2. Altitude - below 50 m (165 ft) : land in take-off direction
   - over 50 m (165 ft) : choose landing area
3. Wind - evaluate direction and velocity
4. Landing area - choose free area without obstacles, into wind
5. Flaps - extend as needed
6. Fuel valve - off
7. Fuel pumps - off
8. Lane A, Lane B - off
9. Safety harness - tighten
10. Master switch - switch off before landing
11. Land

3.2.3 Engine failure in flight (Forced landing)

1. Speed - gliding at 140km/h (75 kts)
2. Altitude - below 50 m (165 ft) : skip points 3.4 and land in flight direction
   - over 50 m (165 ft) : skip points 3 and 4, select a suitable area for landing above 300 m (1000 ft): select a suitable landing area
3. Fuel - fuel level check
4. Engine start - try to start the engine according to 3.2.4 „Starting the engine in flight“ in the event of a successful attempt to start the engine, convert the airplane to climb with speed of 140km/h and omit points 5 to 13
5. Airspeed - gliding 120km/h (65 kts)
6. Wind - evaluate direction and velocity
7. Landing area - choose free area without obstacles
8. Flaps - extend as needed
9. Fuel valve - off
10. Fuel pumps - off
11. Lane a, Lane B - off
12. Safety harness - tighten
13. Master switch - off before landing
14. Land

3.2.4 In-Flight start

1. Speed - gliding at 140km/h (75 kts)
2. Altitude - check
3. Landing area - choose according to altitude (safest area)
4. Master switch - on
5. Fuel valve - open
6. Throttle - for 1/3 power
7. Lane A, Lane B - on
8. Starter - turn ingnition box key

3.3 Smoke and fire

3.3.1 Fire on ground

1. Fuel valve - off
2. Fuel pumps - off
3. Throttle - full
4. Master switch - off
5. Lane A, Lane B - off
6. Abandon the aeroplane
7. Extinguish fire if possible or call fire department.

3.3.2 Fire during take-off

1. Fuel valve - off
2. Fuel pumps -off
3. Throttle - full
4. Speed - 120 km/h (65 kts)
5. Master switch - off
6. Lane A, Lane B - off
7. Land and brake
8. Abandon the aeroplane
9. Extinguish fire if possible or call fire department.

3.3.3 Fire in flight

1. Fuel valve - off
2. Fuel pumps - off
3. Throttle - full
   Before continuing on, wait until the engine stops!
4. Lane A, Lane B - off
5. Choose of area - heading to the nearest airport or choose emergency landing area
6. Emergency landing - perform according to par.3.6.1
7. Abandon the aeroplane
8. Extinguish fire if possible or call fire department.

Note
Estimated time to pump fuel out of carburettors is of 30 sec.

3.4 Glide

Gliding may be used in case of engine failure.

1. Speed - ~ 140 km/h (75 kts)
2. Flaps - retracted
3. Instruments - within permitted limits

3.5 Landing emergencies

3.5.1 Emergency landing

An emergency landing may be carried out due to engine failure and when engine can not be restarted.

1. Speed - 110 km/h (60 kts)
2. Trim - trim the aeroplane
3. Safety harness - tighten
4. Landing gear - go to the down position - see 4.3.12.
   If landing gears can not go to down position, or field is not acceptable for landing with landing gear in down position,don't extend landing gear
5. Flaps - as needed
6. COMM - if installed - report your location if it is possible
7. Transponder - if installed – if necessary set transponder to 7700 (ICAO worldwide emergency code)
8. Fuel valve - off
9. Fuel pumps - off
10. Lane A, Lane B - off
11. Master switch - off

3.5.2 Precautionary landing

A precautionary landing may be carried out due to low fuel and/or bad weather conditions.

1. Choose landing area, determine wind direction
2. If a COMM is installed - report your plan to land and land area location to nearest ATC
3. Perform low-altitude passage into wind over the right-hand side of the chosen area with flaps extended to the take-off position at a speed of 110km/h (60 kts) to thoroughly inspect the area
4. Perform flight around the chosen area
5. Landing gear go to the down position - see 4.3.9.
   If landing gear can not be extended, or field is not acceptable for landing with open landing gear, do not extend the landing gear!
6. Perform an approach at increased idling with fully extended flaps
7. Reduce power to idle when over the runway threshold and touch-down at the very beginning of the chosen area
8. After stopping the aeroplane switch off all switches, shut off the fuel valve, lock the aeroplane and look for a help

3.5.3 Landing with a flat tire

1. Approach - normal
2. Touch down - good tire first, keep the damaged wheel above ground as long as possible using ailerons
3. Maintain the direction at landing run, applying braking control

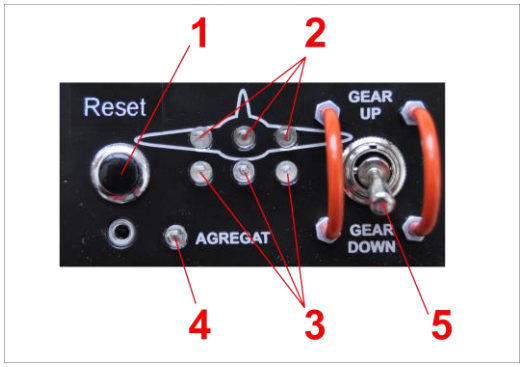
3.5.4 Landing with a defective landing gear

1. If the main landing gear is damaged, perform touch-down at the lowest speed possible and maintain direction during landing run, if possible.
2. If the nose wheel is damaged perform touch-down at the lowest speed possible and hold the nose wheel off the runway by means of the elevator control as long as it is possible

3.5.5 Landing with landing gear in retracted position

1. Approach - normal
2. Touch down - touch down with minimum speed.

3.5.6 Landing gear emergency extension



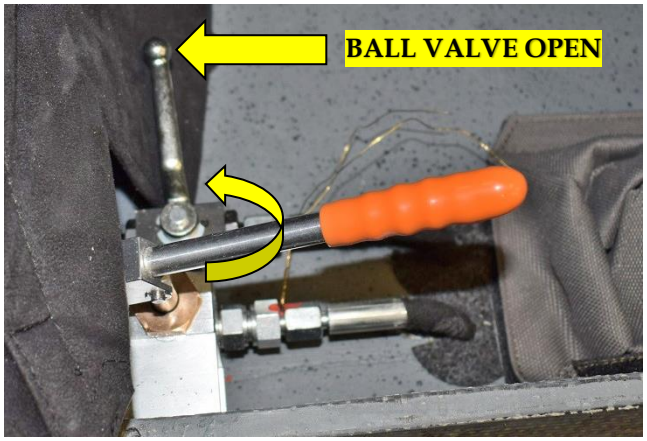
Landing gear controler:

(1) – „Reset“ button
(2) – Three red lights for „GEAR UP“ position
(3) – Three green lights for „GEAR DOWN“ position
(4) – Red light „hydraulic power unit“
(5) – Switch for retraction and extension of landing gears

This procedure is necessary to use if you don't see the three green lights on the „Landing gear controler“ during the landing gears extension. The hydraulic system for landing gears opening is programmed to run 30 sec. If after this period the „Landing gear controler“ don't indicate all three landing gear sensors in the right position, the red light „Hydraulic power unit“ (4) start flashing and the system will set himself into „standby status“. In this case push once again the button „Reset“ (1) on the „Landing gear controler“ and the system will start new cycle of landing gears opening. If the three green lights appears, landing gears are open and in the right position. After landing of airplane is necessary make detail inspection of undercarriage opening system and find a cause of the defect!

If after reset of „Landing gear controler“ you don't see the three green lights you must use the hand pump for „Emergency releace of gears“ (see chapter 7.3 pos.xx) for manuel opening of landing gears – follow next steps:

1. Check fuel level - for estimating the time, you have for an emergency landing
2. Airspeed 125 km/h (67 kts)
3. Switch (5) of „Landing gear controler“ toggle to position „gear down“
4. Landing flaps open to „15°“
5. By the right hand, hold the control stick to fly the plane and by the left hand OPEN ball valve of hydraulic hand pump = turn the grip of ball valve to the left (see picture below).
6. Grasp handle of hand pump and by pulling handle up tear off safety wire!
7. Start pumping down untill the hand pump stops (min.50 cycles of compression) and until the three green lights appears on „Landing gear controller“- it indicate, that landing gears are open and in the right position.
8. When appears three green lights on the „Landing gear controller“ you can safely land.
9. If THREE green lights will not appears, ask air traffic control tower for visual inspection of landing gears position. If the air traffic control tower confirm you right position of all three open landing gears you can safely land.
10. If the air traffic control tower does not confirm you right position of all three landing gears, is the best solution retract all wheels and make emergency landing without landing gear



3.6 Recovery from unintentional spin

There is no tendency of spontaneous uncontrollable spin entry if normal pilot techniques are used

Warning
Intentional spins are prohibited !

Should an inadvertent spin occur, the following recovery procedure should be used:

1. Throttle - retard to idle
2. Control stick - hold ailerons neutralized
3. Rudder pedals - apply full opposite rudder
4. Control stick - forward elevator control as required to break the spin
5. Rudder pedals - immediately after the stoppin of a rotation neutralise the rudder
6. Recover from dive

3.7 Other emergencies

3.7.1 Vibration

If vibrations appear:

1. Set airplane speed and engine speed to power setting where the vibrations are the lowest.
2. Land at the nearest airfield or perform a precautionary landing according to 3.5.2

3.7.2 Erors indicated by EMS

Warning Indicator (A)	Warning Indicator (B)	Action on ground	Action during flight
0V	Oscillating 0–12 V	One way flight to maintenance Hangar permissible	Flight is possible to your destination at your own discretion.
Oscillating 0–12 V	0V	One way flight to maintenance hangar permissible	Flight is possible to your destination at your own discretion.
0V	12V	Flight not permissible	Land the aircraft*
Oscillating 0–12 V	Oscillating 0–12 V	Flight not permissible	Land the aircraft*
Oscillating 0–12 V	12V	Flight not permissible	Land the aircraft*
12V	0V	Flight not permissible	Land the aircraft*
12V	Oscillating 0–12 V	Flight not permissible	Land the aircraft*
12V	12V	Flight not permissible	Land the aircraft*

* Take the next landing opportunity (airfield, airport) at your own discretion.

HIC A: Voltage between Terminal 2 and Terminal 8
HIC B: Voltage between Terminal 2 and Terminal 10

NOTE

If a warning indicator flashes, it indicates an error with lower severity (Fault) that has been detected by the internal testing procedures of the ECU. In this case the ECU will continue to operate normally. There will be no transfer of control of the ignition and injection to the error-free Lane.

If a warning indicator remains on permanently, it indicates that a fatal error with higher severity (Failure) has been detected by the internal testing procedures of the ECU. In this case, the ECU will continue to operate in an alternative control mode, which will transfer the control of ignition and injection to the error-free Lane. Regular operation as well as alternative control modes of the ECU are able to represent the full engine power. Differences arise only in the efficiency of the engine.

3.7.3 Generators failure (Generator 1/Generator 2)

A failure of both Generators (Generator 1/Generator 2) will result in engine stoppage unless the EMS is not powered by an external power source.

1. Switch off immidiately all electric instruments which are not important for flight.
2. Turn on the emergency power of the EMS
3. Perform the in-flight engine failure procedure (see 3.2.3)

3.7.4 Power supply

1. Switch off immidiately all electric instruments which are not important for flight.
2. Check the battery voltage and land at the nearest airport!

3.7.5 Cabin opening in flight

1. Reduce speed - to 110 km/h (60 kts)
2. Landing flaps - on „15°“
3. Trim the plane
4. Close cabin again and resume flight if no damage is observed.
5. Control cabin frame and lock before next flight.

3.7.6 Tranceiver communication failure

In the case of radio communication failure follow next steps:

1. Check power supply – status of fuse
2. Check communication with another UTC
3. In the case of no communication set tranceiver to 7600 (ICAO worldwide emergency code) to inform UTC, that your transceiver is out of order.
4. To land soonest on the nearest airport!

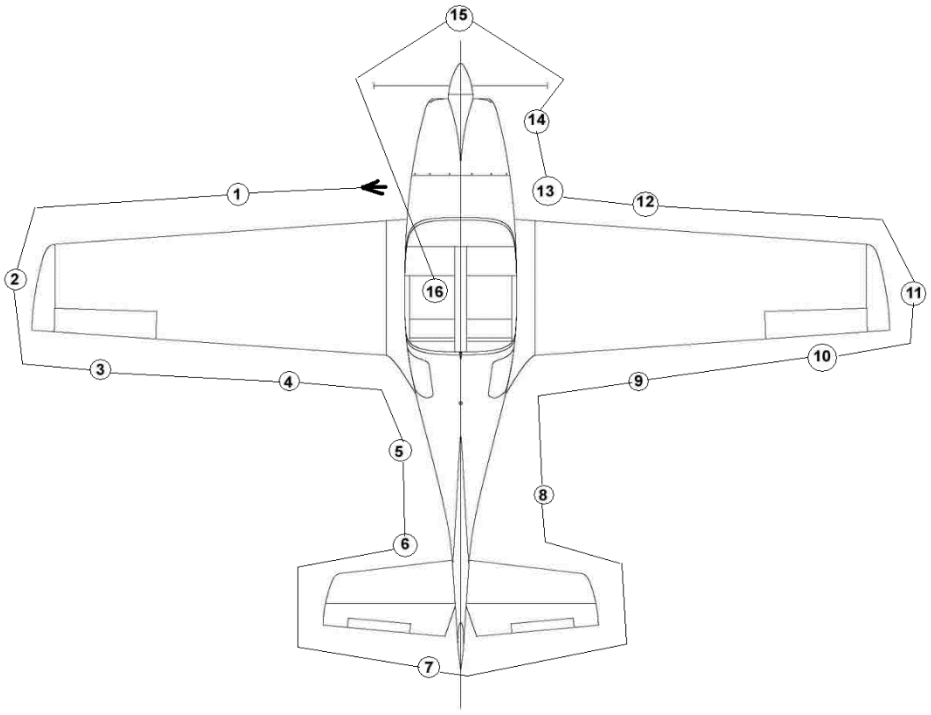
4. Normal procedures

4.1 Introduction

Section 4 provides checklist and amplified procedures for the conduct of normal operation.

4.2 Pre-flight inspection

The pre-flight inspection is very important because an incomplete or careless inspection could allow aeroplane failure. The following pre-flight inspection procedure is recommended by the aeroplane manufacturer:



1. Wing
   - Wing surface condition
   - Leading edge condition
   - Check if the flap and aileron controls are correctly connected
   - Check if the gap between the wings and the fuselage is covered by plastic tape
   - Pitot-static tube condition
2. Wing tips
   - Surface condition
   - Check of tips attachment
   - Condition and attachment of position lights (if installed)
3. Aileron
   - Surface and controls condition
   - Attachment
   - Play
4. Flap
   - Surface and controls condition
   - Attachment
   - Play

5. Fuselage rear
   - Surface condition
6. Vertical tail unit
   - Surface and controls condition
   - Play
   - Free movement
7. Horizontal tail
   - Surface and controls condition
   - Attachment
   - Play
   - Free movement
   - check if the elevator control is correctly connected
8. see item 5.
9. see item 4.
10. see item 3.
11. see item 2.
12. see item 1.
13. Landing gear
    - Check of main and nose landing gear attachment
    - Nose wheel steering
    - Condition and inflation of tires
    - Condition and attachment of wheel fairings
    - Condition and attachment of hydraulic parts and undercarridge mechanisms
14. Engine
    - Engine cowlings condition
    - Engine mount condition
    - Engine attachment check
    - Oil quantity check (after 1 minute engine run)
    - Fuel and Electrical system visual check
    - Hydraulic system visual check and check quantity of hydraulic fluid in main and emergency hydraulic system
    - Fuel system drain – main wing fuel tanks+gascolator in the fuselage (see 7.9 Fuel system)
    - Oil, coolant and fuel leaks
    - Coolant level in the overflow bottle
15. Propeller
    - Propeller attachment
    - Blades, Hub, Spinner condition
16. Cockpit
    - Ignition box - off and key pull out
    - Master switch - off
    - Instruments - check of condition
    - Fuel selector - check free movement up to the stops - right/left fuel tank
    - Fuel gauge - check fuel quantity (for check of fuel quantity switch-on Master switch and Avionic master switch, if airplane is equiped by „glass cockpit“, then both master switches turn-off!)
    - Controls - visual check
      - check for proper function
      - check of plays
      - check of flaps extension
      - check of free movement up to the stops
    - Check for loose items - secure papers
    - Canopy - condition of attachment, cleanliness
    - Emergency rescue system - check if safety pin is removed before flight!

4.3 Normal procedures

4.3.1 Before entering cockpit

1. Aeroplane surface - check of covers and caps
2. Cockpit - items inside the cockpit
3. Ignition - off
4. Master switch - off

4.3.2 After entering cockpit

1. Rudder control - free movement check
2. Brakes - check of function
3. Hand control - free movement check
4. Trim - check control movement
5. Flaps - check of function
6. Undercarridge - **GEAR DOWN!**
7. Engine controls - throttle and choke lever movement
8. Fuel valve - off
9. Fuel pumps - off
10. Fuel gauge - fuel quantity check
11. Switch box - off
12. Circuit breakers - off
13. Lane a, Lane B - off
14. Instruments, COMM - condition check
15. Safety harness - check of integrity and attachment
16. Cockpit - condition and canopy lock function

4.3.3 Engine starting

1. Fuel valve - on left or right tank (acc.pilot request)
2. Circuit breakers - on
3. Propeller - minimum propeller pitch angle
4. Throttle - set for idling
5. Control stick - fully pulled
6. Check of free area - clear
7. Master switch - on
8. Avionic master switch - on
9. Electric fuel pump – on
10. Brakes - fully applied
11. LAne A, Lane B - on
12. Start power switch - on
13. Throttle - set by 3.3 Fig in Operating Manual for Rotax 915
14. Starter - hold
15. Throttle - set for 2000 rpm
16. Oil pressure - increasing engine speed is only permitted at steady oil pressure readings above 3bar
17. Engine instruments – ensurance with the operating limits
18. Generator switching – increase engine speed above 2400rpm and hold minimum 8s. Check on the instruments whether generators supply voltage
19. Warming up - set engine runs on approx. 2500rpm until oil temperature resaches 50°C

Warning
Do not start the engine if there is any person near the propeller or engine!

Warning

Before engine start (before you push the start button) wait until fuel pressure is at the maximum allowed level and stable! Depending on the outside temperature set the throttle position to 50% (OAT < 15°C) and 45% (OAT >15°C). If you don't respect this procedure very strong vibration may occur after engine start!!! To avoid vibrations push engine throttle lever to position full and return it back to 50% of throttel within 1 sec – if it's necessary try it once again until vibrations disappear!

4.3.4 Ground test, Lane and ignitron check, wastegate and PCV check, fuel pumps Cheb

1. Secure the aircraft against movement before the engine test
2. Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits
3. Set full throttle
4. Set linearized throttle position so that engine speed is approx 2500 rpm.
5. Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits
6. Deactivate Lane A
7. Observe engine speed (not drop/increase more than 250rpm)
8. Activate Lane A
9. Await warning indicator A to extinguish and consider slack time
10. Deactivate Lane B
11. Observe engine speed (not drop/increase more than 250rpm)
12. Activate Lane B
13. Await warning indicator B to extinguish and consider slack time

NOTE

Lane A and Lane B have different sensor inputs. During Lane and Ignition check, some sensor values are not displayed, depending on the activation of the Lanes

Following sensor values are not available if Lane A is turned OFF and Lane B is activated:

- Coolant temperature
- Exhaust gas temperatures from cyl. 1-4
- Ambient temperature
- Throttle lever position

Following sensor values are not available if Lane B is turned OFF and Lane A is activated:

- Oil temperature
- Oil pressure

14. Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits
15. Set linearized throttle position to 100%. Governor must be set in a way that engine speed > 4700 rpm
16. Deactivate Lane A
17. Wait 15s
18. Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits
19. Activate Lane A

20. Await warning indicator A to extinguish and consider slack time
21. Deactivate Lane B
22. Wait 15s
23. Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits
24. Activate Lane B
25. Await warning indicator B to extinguish and consider slack time
26. Set linearized throttle position so that engine speed is approx 2000 rpm.
27. Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits
28. Deactivate fuel pump 1
29. Observe fuel presure
30. Activate fuel pump 1
31. Deactivate fuel pump 2
32. Observe fuel presure
33. Activate fuel pump 2

Hydraulically controlled propeller with governor:

If the aeroplane is equipped by hydraulically controlled propeller with governor check control of the hydraulic propeller governor to specifications of the manufacturer.

NOTE: Cycling the propeller governor puts relatively high load on the engine. Unnecessary cycling or additional check should be avoid.

Caution
Engine check should be performed with the aeroplane pointing upwind and not on loose terrain (the propeller will pick up debris which can damage the propeller).

4.3.5 Taxiing

The maximum recommended taxiing speed is 15km/h (8 kts). The direction of taxiing can be controlled by the steer able nose wheel and rudder or by brakes.

Warning
If outside temperature is high, when the airplane is waiting to taxi and **temperature of coolant** exceeds the permitted limit, decrease the coolant temperature to allowed limit by setting engine throttle on 3000 RPM! To increase effectiveness turn airplane into the wind if possible.

4.3.6 Before take-off

1.	Brakes	- fully applied
2.	Rudder control	- check of free movement
3.	Hand control	- check of free movement
4.	Trim	- neutral position
5.	Undercarridge	- three green lights, switch „GEARS DOWN“ position
6.	Propeller	- minimum propeller pitch
7.	Governor	- set 4000 rpm and pull 3 times the propeller control lever from min. to max. angle of attack (rpm drop will appear at each time)
8.	Flaps	- "15°" position
9.	Engine controls	- choke off

10. Fuel valve	- open
11. Fuel gauge	- fuel quantity check
12. Circuit breakers	- in
13. Instruments, COMM	- within limits, frequency set
14. Safety harness	- secured and tightened
15. Cockpit	- canopy condition, lock

4.3.7 Take-off

Gradually increase the throttle to set the aeroplane into motion. For achieving the take-off power move the throttle lever max. forward up to 100% position, The direction of take-off run can be controlled by steer able nose wheel and rudder. Slightly pull the stick to lift the nose wheel. The aeroplane takes-off at a speed above 90km/h (48 kts), then slightly push forward the stick to reach climb speed of 120 km/h (65 kts). Refer to the par. 5.2.5 for optimum climb speed. Max. flaps extended speed is 125 km/h (67 kts).

Warning

The take-off is prohibited if:

- the engine run is unsteady
- the engine instruments values are beyond operating limits
- the engine choke is on
- the crosswind velocity exceed permited limits 5.3.2
- three green lights on Landing gear controler don't shine, switch is in "GEAR UP" position or red light „hydraulic power unit" is shining

4.3.8 Climb

1.	Throttleand propeler	- max.continuous power
2.	Speed	- 150 km/h (80 kts)
3.	Trim	- adjust as needed to reduce stick pressure
4.	Landing gear	- up see 4.3.9. Max.speed for landing gear in down" position is 150 km/h (80 kts)
5.	Instruments	- CHT, Oil temp. and pressure within limits.

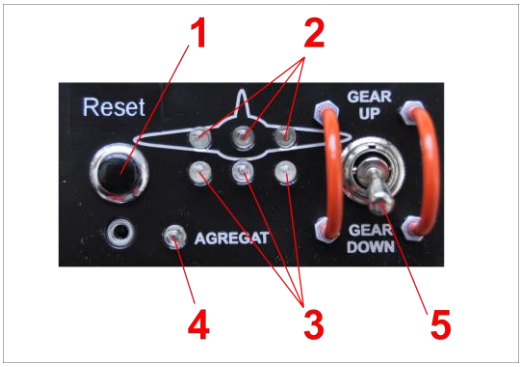
Caution

If cylinder head or oil temperature exceed limits, reduce the angle of climb to increase airspeed and allow better cooling..

Warning

If outside temperature is high, during airplane climb and **temperature of coolant** exceeds the permitted limit, decrease the coolant temperature to allowed limit by decrease rate of climb!

4.3.9 Retraction and extension of the landing gears



Landing gear controler:

(1) Reset" button
(2) Three red lights for „GEAR UP" position
(3) Three green lights for „GEAR DOWN" position
(4) Red light „hydraulic power unit"
(5) Switch for retraction and extension of landing gears

For retraction and extension of the landing gears follow next steps:

1. Airspeed max. 150 km/h (80 kts)
2. Toggle switch (5) of „Landing gear controler" to required position (gear up – gear down). Red light „hydraulic power unit" (4) start shining and hydraulic power unit start to extends or retracts landing gears.
3. If the three red lights (2)/three green lights (3) appears on the „Landing gear controler", landing gears reached the required end position – retracted/extended.

To avoid landing with recracted landing gears, are landing flaps connected with landing gears. If the landing gears are closed and pilot open landing flaps, three red lights on „Landing gear controler" start flashing and sound alarm turns on. After toggle „switch" (5) to position „gear down" sound alarm turns off and landing gears are going to „down" position – three red lights are still flashing! When landing gears reached the required end position, on the „Landing gear controler" appears three green lights.

For turning off alarm during flight with open landing flaps push the button „Reset" (1).

If is not possible extend landing gears by this normal procedure use emergency procedure - see chapter **3.5.6. Landing gear emergency extension**

4.3.10 Cruise

The aeroplane flight characteristics are very forgiving within permitted limits of airspeeds, configurations and C/G range. The aeroplane can be controlled very easily.

Caution

Avoid operation below normal operation oil temperature (90° to 110°C), as possible formation of condensation water in the lubrication system badly influences the oil quality. To evaporate accumulated condensation operate engine at over 100°C oil temperature for a minimum of 10 min. every flight day.

Warning

If outside temperature is high, during airplane cruise and **EGT** exceeds the permitted limit, decrease the EGT by increasing fuel flow - to cool the engine!

4.3.11 Descent

1. Throttle - idling
2. Speed - 140 km/h (75 kts)
3. Trim - as necessary to reduce stick pressure
4. Instruments - within limits

Caution

When on long final or descending from a very high altitude, it is not advisable to reduce the engine Throttle control lever to idle. The engine becomes overcooled and a loss of power occurs. When descending, apply increased idle so that engine instrument readings stay within the limits for normal use.

4.3.12 Check before landing

1. Fuel - fuel quantity check
2. Safety harness - tightened
3. Undercarridge - open - see 4.3.8. max.speed for open is 150 km/h (80 kts)
4. Propeller - minimum propeller pitch
5. Brakes - check function
6. Trim - adjust as required
7. Landing area check - runway
8. Base leg

4.3.13 On base leg

1. Speed - 120 km/h (65 kts)
2. Flaps - extend to "15°“ position
3. Trim - adjust as required
4. Throttle - as necessary
5. Instruments - within limits

4.3.14 On final

1. Speed - 120 km/h (65 kts)
2. Flaps - 38° position (or 55° position for short landing)
3. Trim - adjust as required
4. Throttle - as necessary
5. Instruments - within limits

4.3.15 Landing

The airspeed during final is slowly reduced, so that the touch down speed is about 80 km/h (43 kts). Gradually pull the stick after touch down to hold the nose wheel up as long as possible. Push the control stick forward when the nose wheel touches. The landing run can be shortened by braking.

4.3.16 Balked landing or „go around“

1. Throttle - full
2. Engine speed - 5700 rpm
3. Flaps - set at the "15°" position at a speed of 110 km/h (60 kts)
4. Trim - as necessary
5. Flaps - retract at a height of 50 m (165 ft)
6. Trim - as necessary
7. Engine speed - max. continuos power
8. Instruments - within limits
9. Climb - at 120 km/h (65 kts)
10. Landing gear - go to the up position

4.3.17 After landing

1. Engine speed - set as necessary for taxiing
2. Flaps - retracted and locked
3. Trim - neutral position

4.3.18 Engine shut-down

1. Engine speed - idling
2. Instruments - engine instruments within limits
3. COMM + intercom - off
4. Lane A, Lane B - off
5. Fuel pumps - off
6. Fuel valve - off
7. Circuit breakers - off
8. Avionic master switch - off
9. Master switch - off

GENERAL NOTE: Normaly the cooling down of the engine during descending and taxiing will be sufficient to allow the engine to be shut off as soon as the aircraft is stopped. At increased operating temperatures make an engine cooling run o fat least min. 2 minutes.

4.3.19 Emergency rescue system

1. Rescue system - secure emergency rescue system by safety pin!

4.3.20 Flight in rain

When flying in the rain, no additional steps are required. Aeroplane qualities and performance are not substantially changed.

5. Performance

5.1 Introduction

Section 5 provides approved data for airspeed calibration, stall speeds and take-off performance and additional information.

The data in the charts has been computed from actual flight tests with the aeroplane and engine in good condition and using average piloting techniques.

If not stated otherwise the performance data given in this section is valid for max. take-off weight and under International Standard Atmosphere (ISA) conditions

5.2 Performance

5.2.1 Airspeed indicator system calibration

IAS [km/h]	CAS [km/h]	IAS [kts]	CAS [kts]
80	77	43	41
90	87	49	47
100	97	54	52
120	117	65	63
140	137	76	74
160	158	86	85
180	178	97	96
200	198	108	107
220	218	119	118
240	238	130	129
260	259	140	140
280	279	151	150
300	299	162	161
305	304	165	164
315	314	170	170
320	319	173	172
340	339	183	183

5.2.2 Stall speeds

Stall	Flaps position	Engine Power	Stalling Speed	
			IAS	CAS
Wing level stall	RETRACTED	idling	**95 km/h** (51 kts)	**92 km/h** (50 kts)
	"TAKE-OFF“	idling	**90 km/h** (48 kts)	**87 km/h** (47 kts)
	"LANDING“	idling	**82 km/h** (44 kts)	**78 km/h** (42 kts)

Warning
Aerobatics, intentional spins and power-ON stalls are prohibited!

5.2.3 Density Altitude (DA)

The density altitude is the altitude relative to standard atmospheric conditions at which the air density would be equal to the indicated air density at the place of observation

To get Density Altitude (DA) we have to know Pressure Altitude first.

Pressure Altitude (PA) is the indicated altitude obtained when an altimeter is set to an agreed baseline pressure.

The baseline used universally, is 1013.25 hectopascals (hPa), which is equivalent to 1013.25mb or 29.92 inches of mercury (inHg).

We have two metod how to get Pressure Altitude (PA):

a) Set Altimeter to 1013hPa (29.9inHG) and read Pressure Altitude (PA) from Altimeter.

b) Calculation

		Altitude					QNH (hPa)		
Pressure Altitude	**PA =**		**+ 30 x (**	**1013**	**-**		**) =**		**ft**

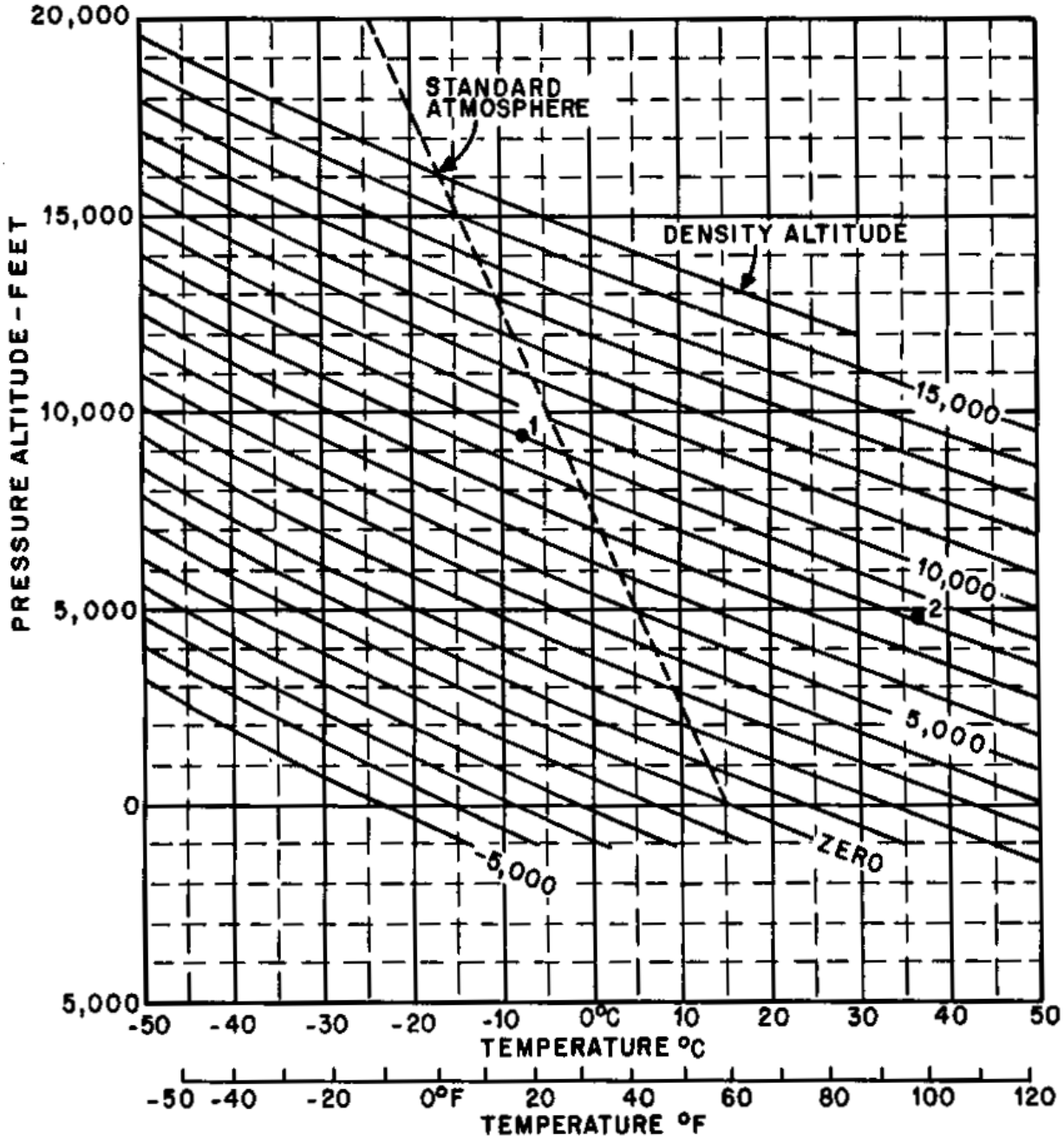
		Altitude					QNH (inHg)		
Pressure Altitude	**PA =**		**+ 1000 x (**	**29,9**	**-**		**) =**		**ft**

We have two metod how to get Density Altitude (DA) Calculation :

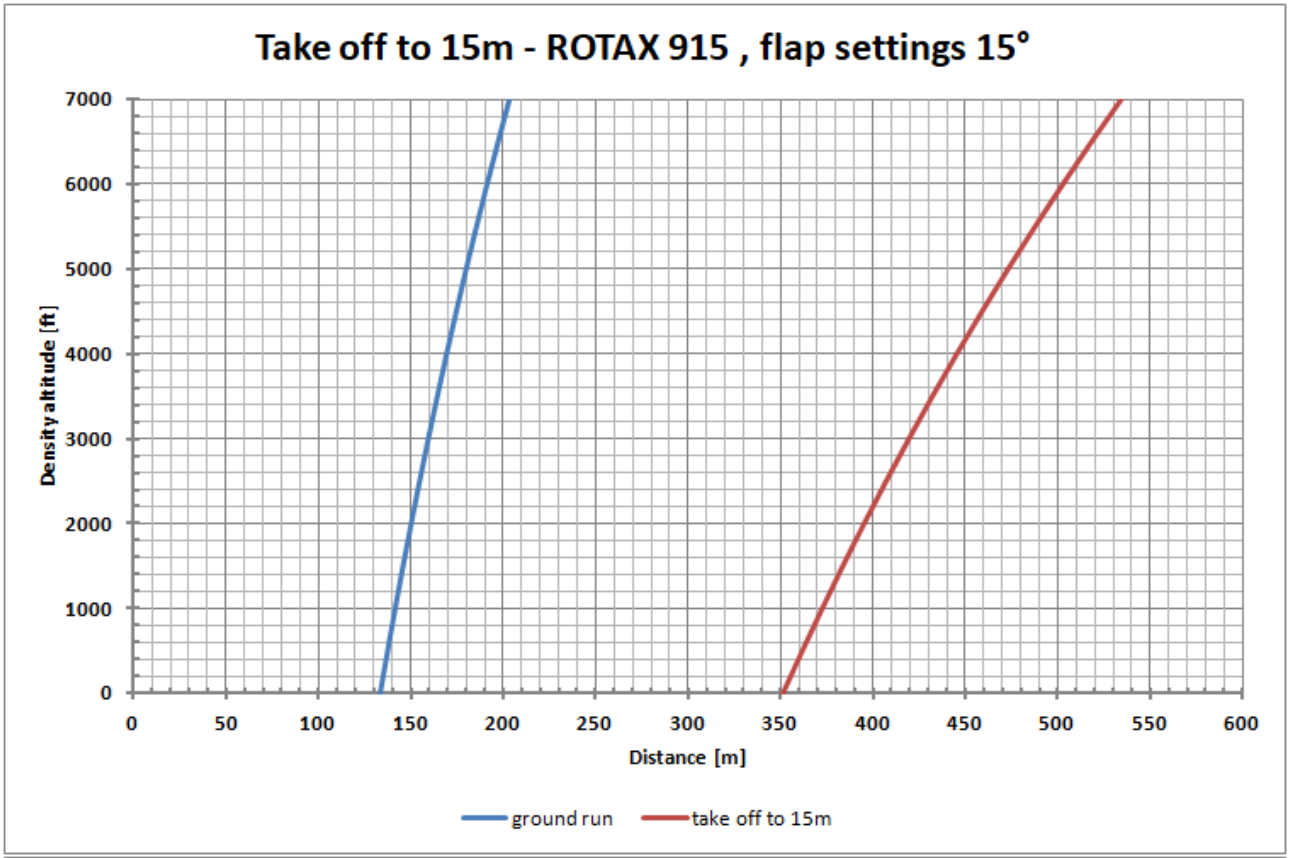
a) Calculation

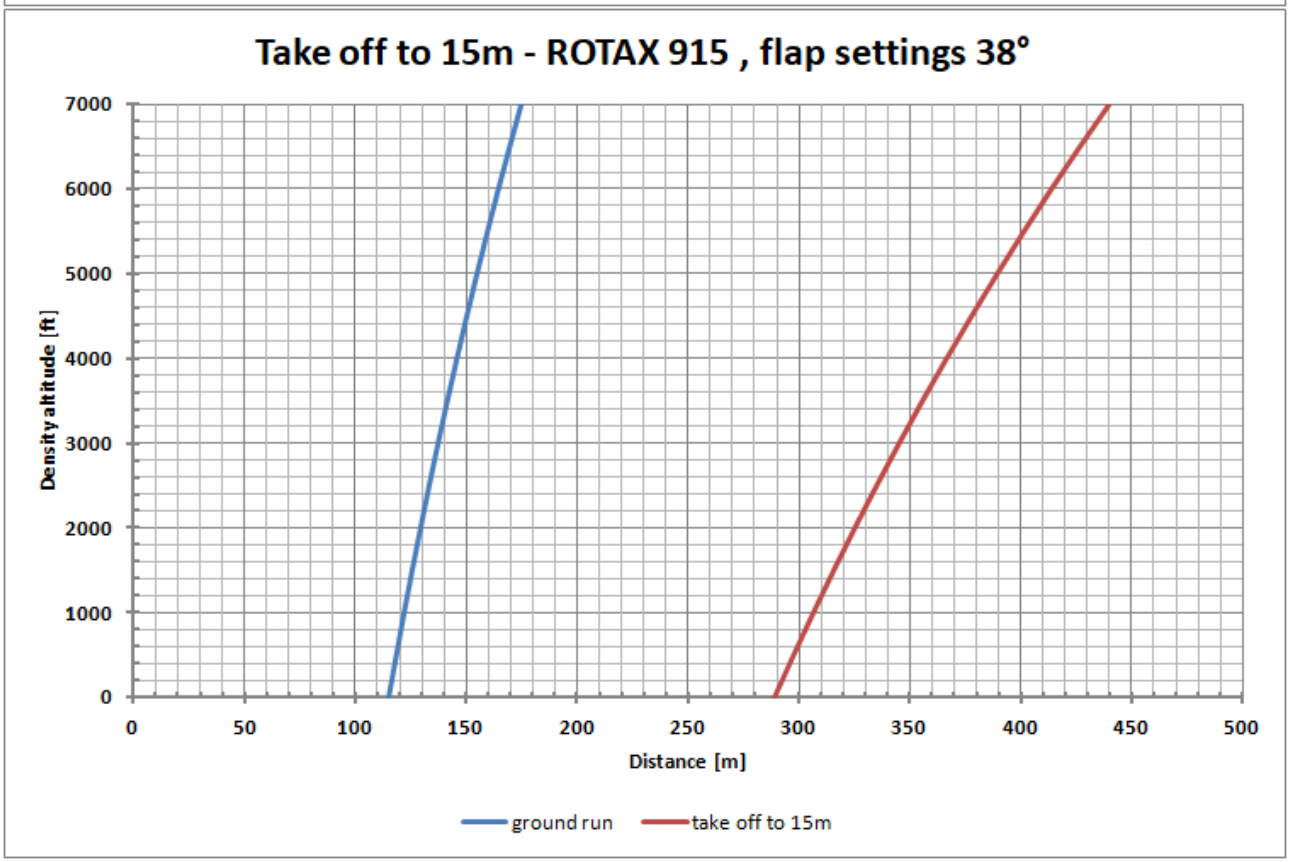
			PA (ft)			OAT (°C)		
Density altitude	**DA = (** **1,2376** **x**		**)**	**+ (188,8 x**		**) - 1782 =**		**ft**

b) **Density Altitude Diagram**

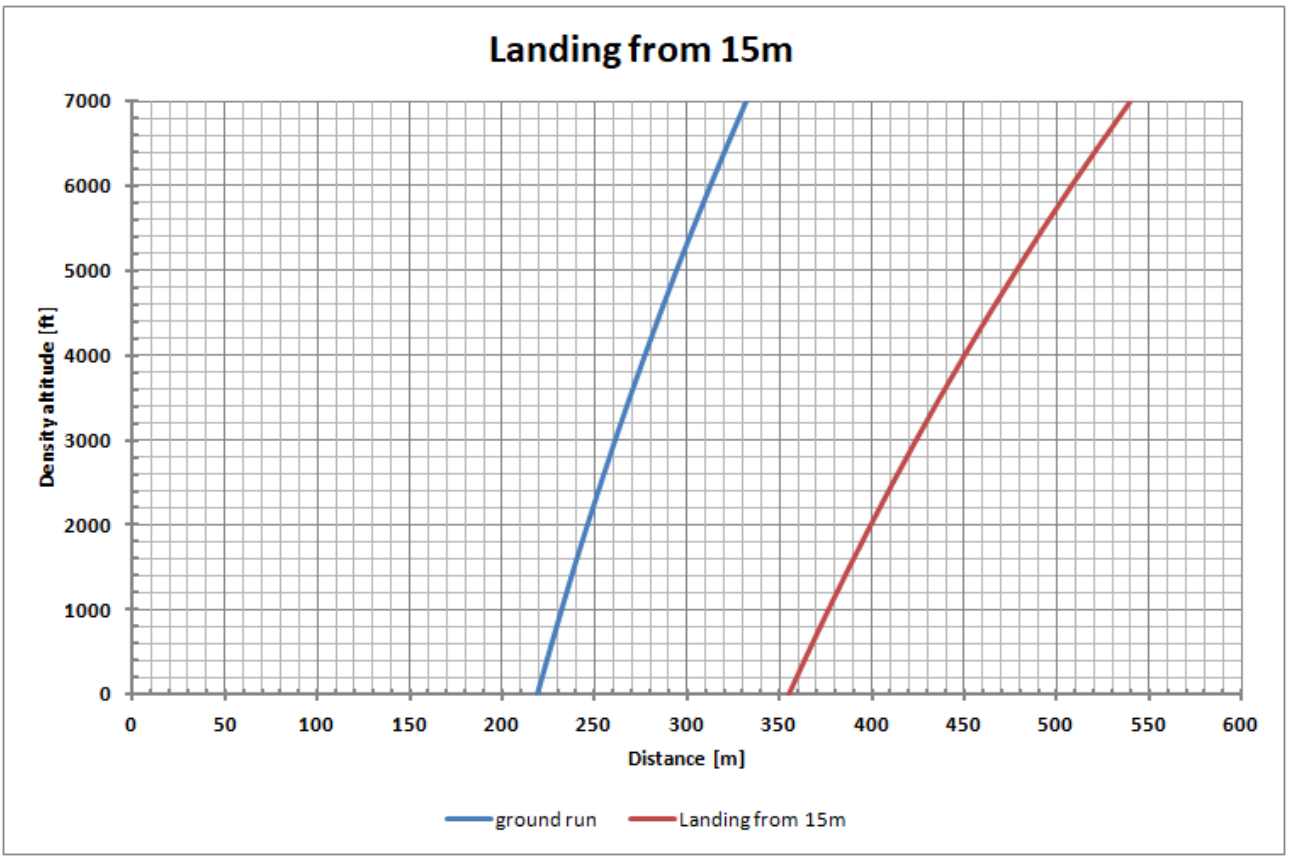


5.2.4 Take-off performance





5.2.5 Landing

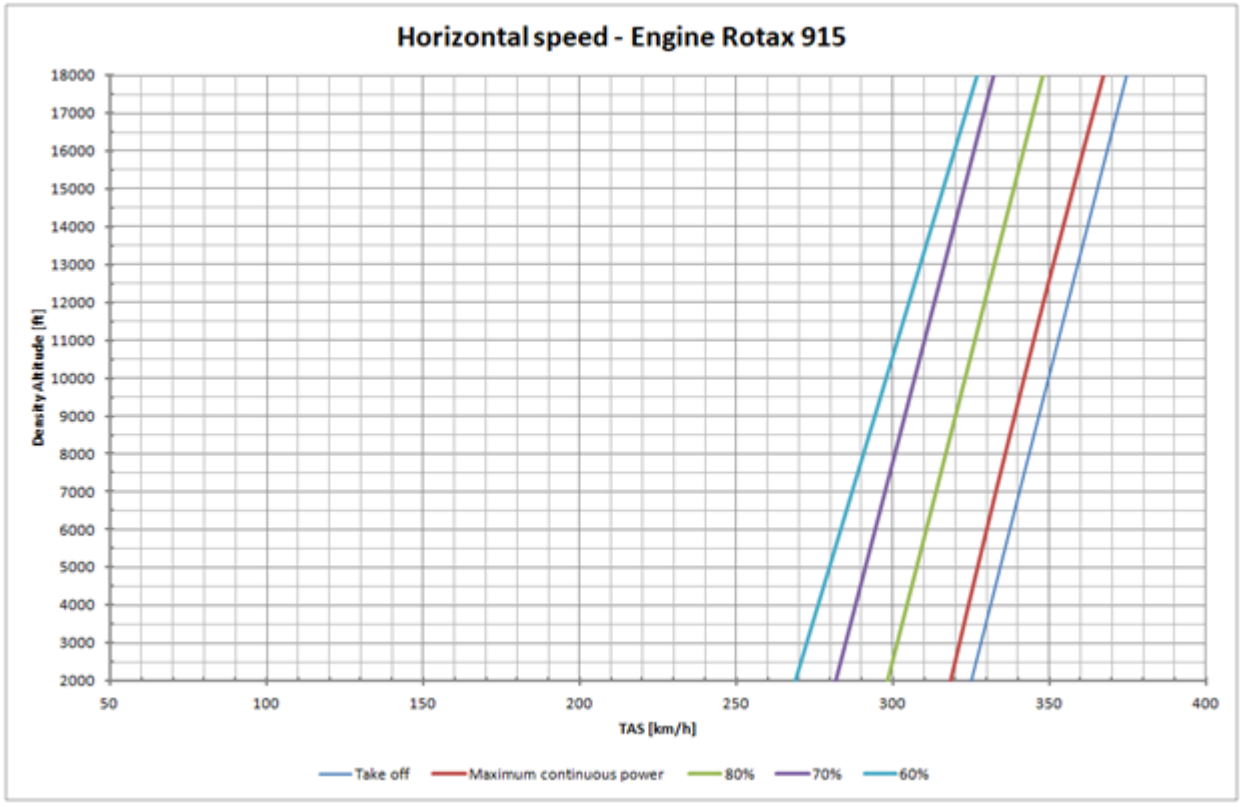

Landing from 15m
Density altitude [ft]
7000
6000
5000
4000
3000
2000
1000
0
0
50
100
150
200
250
300
350
400
450
500
550
600
Distance [m]
ground run
Landing from 15m

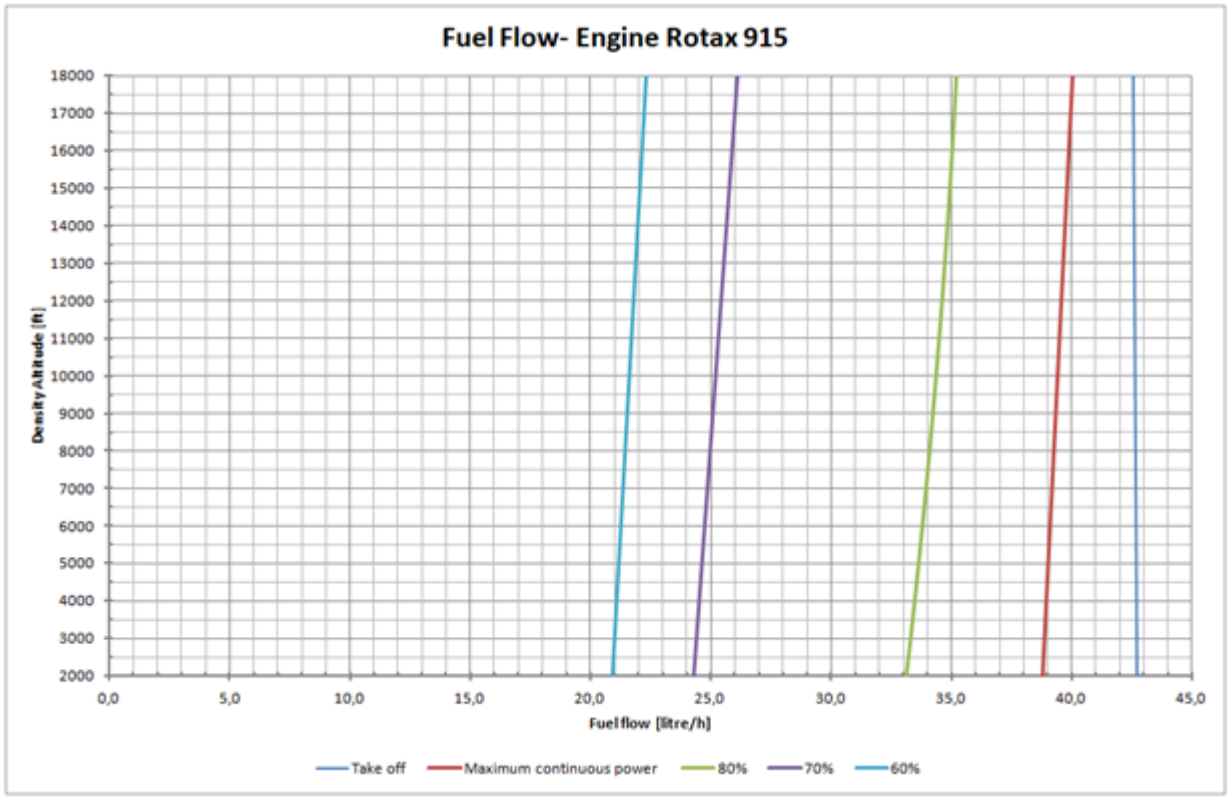
5.2.6 Climb performance

Flaps	0°	VL-3TE-915	
Undercarriadge	Up		
Engine setting	Max. continuous power		
MTOW	600kg		
Density Altitude (ft)	**Vy (km/h)**	**Vz (m/s)**	**Vz (fpm)**
0	151	10,1	1980
1000	150	9,6	1895
2000	148	9,3	1821
3000	147	9,0	1768
4000	146	8,8	1725
5000	144	8,6	1690
6000	143	8,4	1659
7000	142	8,3	1632
8000	141	8,2	1610
9000	139	8,1	1591
10000	138	8,0	1576
11000	136	7,9	1554
12000	135	7,8	1536
13000	134	7,7	1520
14000	133	7,6	1505
15000	132	7,6	1490
16000	132	7,5	1477

Vy - speed for best rate of climb
Vz – climb speed

5.2.7 Cruise


Horizontal speed - Engine Rotax 915
Density Altitude [ft]
18000
17000
16000
15000
14000
13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
50
100
150
200
250
300
350
400
TAS [km/h]
Take off
Maximum continuous power
80%
70%
60%


Fuel Flow- Engine Rotax 915
Density Altitude [ft]
18000
17000
16000
15000
14000
13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
0,0
5,0
10,0
15,0
20,0
25,0
30,0
35,0
40,0
45,0
Fuel flow [litre/h]
Take off
Maximum continuous power
80%
70%
60%

5.3 Additional information

5.3.1 Demonstrated crosswind performance

Max. permitted crosswind velocity for take-off and landing

- for open wing flaps in position (1) = 15° and (2) = 37°…….12 m/s (25 kts)
- for open wing flaps in position (3) = 54°……...5 m/s (10 kts)

6. Weight and Balance

6.1 Introduction

This sections contains the payload range within which the VL-3TE-915 Evolution aeroplane may be safely operated. Procedures for weighing the aeroplane and the calculation method for establishing the permitted payload range are contained in the Maintenance Manual for VL-3TE-915 Evolution aeroplane.

6.2 Permitted payload range

6.2.1 Weight limitations

Maximum take-off weight …….. 600 kg

Operating C.G. range ……... 323 – 478 mm

6.2.2 C.G. calculation

	weight [kg]	lenght [mm]	hmt * lenght [kg*mm]
Empty airplane (see 2.8)			
Pilot		750	
Copilot		750	
Fuel (kg = 0,72*litr)		283	
Luggage		1535	

	Total weight	moment
Suma		

C.G.position
(from leading edge root rib)

$$\frac{\text{moment}}{\text{Total weight}} = \frac{\qquad}{\qquad} = \boxed{}\ \text{mm}$$

Warning

If C.G. position and take-off weight are not in operating range (see 6.2.1.) Do not fly !

The Center of the Gravity must be inside operating range (see 6.2.1.) during the whole flight!

Example

	weight [kg]	lenght [mm]	hmt * lenght [kg*mm]
Empty airplane (see 2.8)	301	288	86688
Pilot	100	750	75000
Copilot	0	750	0
Fuel (kg = 0,72*litr)	33	283	9339
Luggage	10	1535	15350

	Total weight		moment
Suma	444		186377

C.G.position
(from leading edge root rib)

$$\frac{\text{moment}}{\text{Total weight}} = \frac{186377}{444} = 420 \text{ mm}$$

Warning

If C.G. position and take-off weight are not in operating range (see 6.2.1.) Do not fly !

The Center of the Gravity must be inside operating range (see 6.2.1.) during the whole flight!

7. Aeroplane and Systems Description

7.1 Introduction

This section provides description and operation of the aeroplane and its system. Refer Section 9, Supplements, for details of optional systems and equipment.

7.2 Airframe

VL-3 Evolution airframe is all-carbonfibre monocoque construction. For more information see Maintenance Manual VL-3TE-915 Evolution.

7.2.1 Fuselage

The fuelage is all-composite sandwich construction. For more information see Maintenance Manual VL-3TE-915 Evolution.

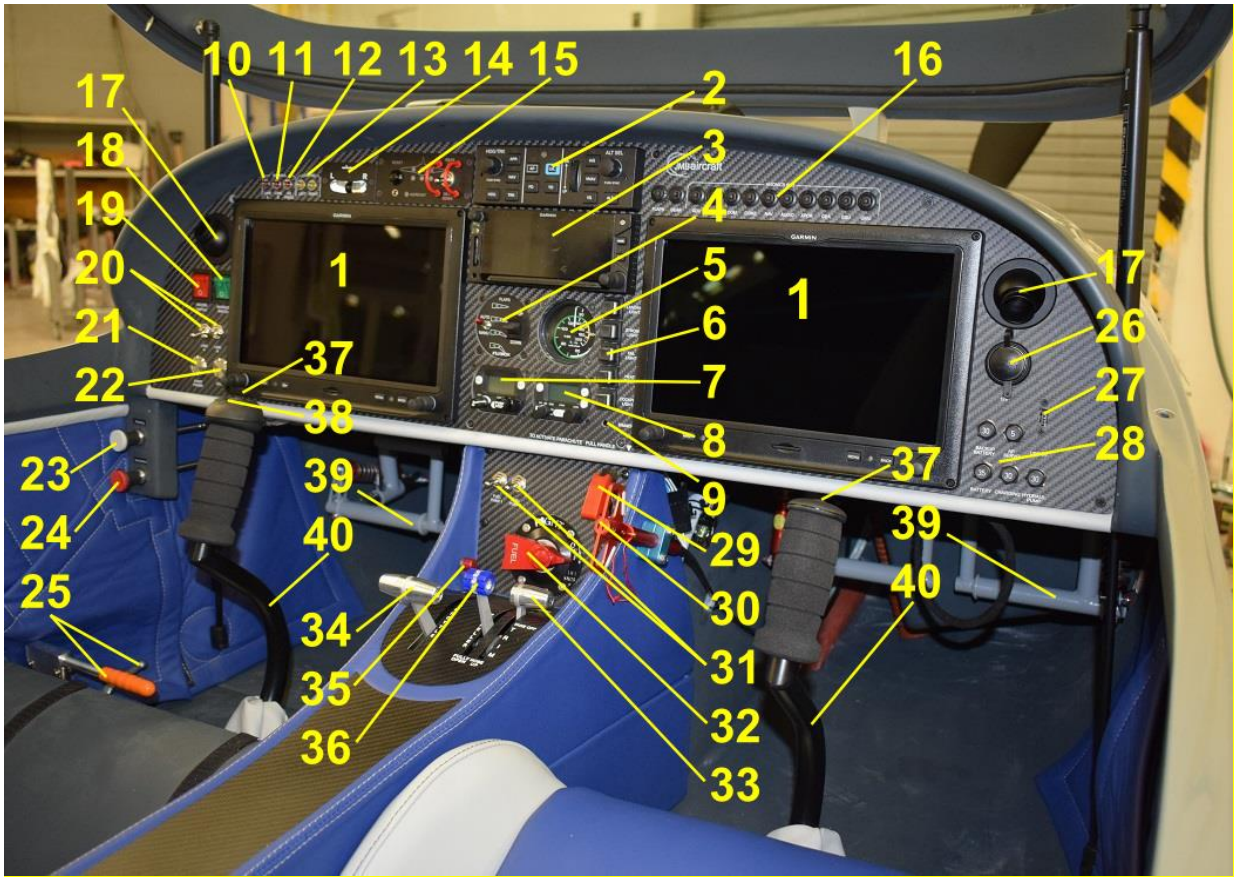
7.2.2 Wing

The composite wing has one main spar with carbon flanges, no ribs; the stressed skin is of sandwich construction with a foam core. For more information see Maintenance Manual VL-3TE-915 Evolution.

7.2.3 Horizontal Tail Unit

The composite tail units have same construction like wing. For more information see Maintenance Manual VL-3-TE-915.

7.3 Instrument panels and controls in the cockpit



1	Efis – Garmin GDU460	15	Landing gears controler	29	Backup battery switch
2	Autopilot panel GMC 507	16	Circuit breakers	30	Parachute rescue system
3	GPS/NAV/COMM GTN650	17	Ventilation outlet	31	Fuel pump 1,2 switches
4	El.wing flaps controler	18	Avionic master switch	32	Main fuel tank selector
5	Airspeed indicator	19	Master switch	33	Trim lever
6	Switches	20	Lane A,B switch	34	Throttle control
7	Transponder	21	EMS start POWER button	35	Parking brake control
8	Transceiver	22	Engine START button	36	Hydr.propeller control
9	Dimmer switch	23	Ventilation control	37	PTT switch
10	Lane A warning indicator	24	Heating control	38	Autopilot disc switch
11	Lane B warning indicator	25	Emergency relace of gears	39	Rudder pedals
12	Low oil pressure indicator	26	12V socket	40	Control stick
13	Low fuel indicator	27	5V USB socket		
14	Turn and bank indicator	28	Fuses		

7.4 Landing gear

The airplane has a tricycle retractable landing gear with a nose wheel. The main fibreglass legs, main wheel size 350x100, hydraulically operated brakes. The steer able nose wheel of 300 x 100 size has a shock absorber and is controlled by the rudder pedals.

Recommended pressure for BERINGER wheels:

- main wheels **3,0+-0,3 bars (44 psi)**
- nose wheel **2,5+-0,3 bars (36 psi)**

7.5 Seats and Safety harness

The seats and back rests are formed by a composite skeleton covered with upholstery. Four points safety harness with a central lock

7.6 Baggage compartment

Baggage compartment is space behind seats.

7.7 Canopy

Canopy is made from the clear Plexiglas. The canopy frame is formed by a composite profile. The canopy is tilted forward.

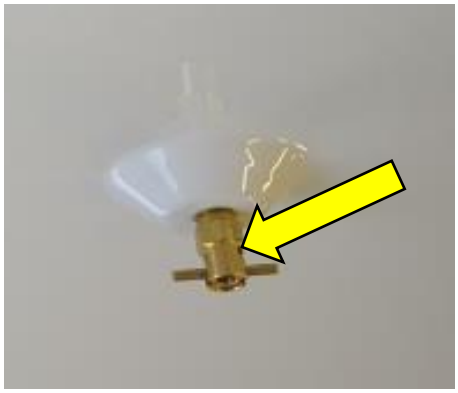
7.8 Engine

There is installed ROTAX 915 engine in VL-3TE-915 Evolution aeroplane. Rotax 915 is 4-stroke, 4-cylinder horizontally opposed, spark ignition engine with turocharger unit.

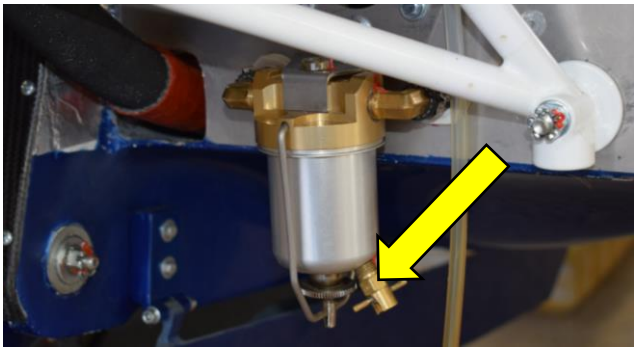
7.9 Fuel system

The main fuel tanks are an integral part of the wings, a fuel quantity sensor is located inside the wing. Further a coarse filter, fuel valve, and fine filter are parts of the fuel system.

For draing of main fuel tanks use drain valves located on the bottom side of the wing, for draining of fuel system use gascolator on left side bottom of lower engine cowling



Drain valves on the bottom of wing



Gascolator on left side bottom of lower engine cowling

7.10 Electrical system

Complete electric documenation you can find in the „Airplane electric documentation“

7.11 Hydraulic system

The hydraulic system of aircraft consist of hydraulic power unit, 3 hydraulic cylinders, emergency hand pump and hydraulic hoses. The hydraulic system is filled with hydraulic liquid Shell Aerofluid 41. For the proper functioning of the hydraulic system during the aircraft operation must be periodically checked correct level of hydraulic liquid!

Maintenance of hydraulic system is mentioned in Maintenance Manual VL-3TE-915. In case of problems with the hydraulic system immediately contact VL-3 service center.

7.12 Pitotstatic system

The pitot-static system consists of a pitot-static tube with angle of attack indication under the wing, static pressure ports on both sides of fuselage, static pressure lines (plastic pipes) for connection with airspeed indicator, altimeter and avionic pressure transducer. For more informantion please see aeroplane VL-3TE-915 Maintenance Manual.

7.13 Miscellaneous equipment

Besides the standard instruments the VL-3TE-915 Evolution aeroplane is fitted with the following equipment:

see chapter 7.3 Instrument panel Instrument panels and controls in the cockpit

7.14 Avionics

Flight instruments :

see chapter 7.3 Instrument panel Instrument panels and controls in the cockpit

Engine instruments :

see chapter 7.3 Instrument panel Instrument panels and controls in the cockpit

8. Aeroplane handling, servicing and maintenance

8.1 Introduction

This section contains factory-recommended procedures for proper ground handling and servicing of the aeroplane. It also identifies certain inspection and maintenance requirements which must be followed if the aeroplane is to retain that new-plane performance and dependability. It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered.

8.2 Aeroplane inspection periods

For more information about servicing, Maintenance and periodical inspections of aeroplane see VL-3TE-915 Maintenance Manual.

8.3 Aeroplane alterations or repairs

It is essential that the aeroplane manufacturer be contacted prior to any alternations on the aeroplane to ensure that airworthiness of the aeroplane is not compromised.

WARNING!
If the aeroplane weight is affected by an alternation, a new weight and balance measurement must be done! A revised "Weight and Balance Record / Permitted payload range" and Placard "LOAD LIMITS" must be filled out and attached to the aeroplane!

8.4 Ground handling / Road transport

8.4.1 Towing

It is easy to tow the aeroplane a short distance by holding the wings or fuselage, because the empty weight of this aeroplane is relatively low. Suitable surfaces to hold the aeroplane airframe are the rear part of the fuselage before the fin and wing roots.

You can also use hand towing bar for aeroplane moving.

Caution
Avoid excessive pressure at the aeroplane airframe - especially at the wing tips, elevator, rudder, trim etc.

Caution
Handle the propeller by holding the blade root - never the blade tip! If starting the engine manually - always handle the propeller on a blade surface i.e. do not hold only an edge

8.4.2 Parking

It is advisable to park the aeroplane inside a hangar or eventually inside other weather proof space (such as a garage) with a stable temperature, good ventilation, low humidity and dust-free environment. It is necessary to tie-down the aeroplane when parking outside.

When the plane must be tied-down outdoors for extended periods, it is advisable to cover the canopy, and if possible, the entire aeroplane using a suitable cover. For parking use parking brake.

8.4.3 Tying-Down

The aeroplane is usually tied-down after a flight day or when needed. The tying-down is necessary to protect the aeroplane against possible damage caused by wind gusts. For this reason is the aeroplane equipped by 2 tying lugs on the wing tips.

Procedure of tying-down:

1. Check the following:
   Fuel valve - off
   Circuit breakers - off
   Master switch - off
   Avionic master - off
   Ingnition box - off
2. Block the control stick up (by means of safety harness)
3. Close and lock cockpit
4. Close all the ventilation windows
5. Tie-down both wings of the aeroplane to the ground by the strips. It is also necessary to tie-down the fuselage rear and nose wheel landing gear (lace a rope through the wheel and fork).

> Note
> It is advisable to cover cockpit canopy, if possible the whole aeroplane, by means of a suitable covering material attached to the airframe for long term outside parking.

8.4.4 Lifting

Because the empty weight of this aeroplane is relatively low it is easy to lift the aeroplane using 2 persons. On the aeroplane are 3 supporting point – 2 points on the front of fuselage, on the lower side of engine frame and 1 point back on the underside of the fuselage.

> **Caution**
> Never lift the aeroplane by the wing tips or tail units!

Procedure of lifting:

1. Prepare 3 suitable jacks for aeroplane support.
2. Press-down the rear of the fuselage in front of the fin, lift the nose of the aeroplane and support under the firewall by 2 jacks.
3. To lift the rear of the fuselage grab the fuselage near the auxiliary tail skid, lift it upward and support end of fuselage by 1 jack.

8.4.5 Road transport

The aeroplane may be transported in a suitable trailer. It is necessary to dismantle the aeroplane before loading - the wings (and also tail units - if it is necessary) must be disassambled according the procedures described in aeroplane Maintenace Manual. The aeroplane wings and tail units must be safely placed to prevent their damage during transport.

8.4.6 Aeroplane disassembly and assembly

For disassembly and assembly of the aeroplane - see the VL-3TE-915 Maintenance Manual.

9. Supplements

9.1 Introduction

This section contains the appropriate supplements necessary to safely and efficiently operate the aeroplane when equipped with various optional systems and equipment not provided with the standard aeroplane.

9.2 List of inserted supplements

Date	Title of inserted supplement

9.3 Supplements inserted