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Aircraft Operating Instructions

BRISTELL LSA

Airplane Registration Number: **ZK-TOW**

Airplane Serial Number: **718/2024**

This airplane must be operated in compliance with information and limitations contained in herein.
This AOI must be available on board of the airplane.

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SECTION 0

0 NUMBERING

0.1 Record of revisions

0.2 List of effective pages

0.3 Table of contents

0.1 Record of revisions

Any revision of the present manual (except actual weighing data, cockpit description and list of instruments and avionics) must be recorded in the following table.

Revision No.	Affected Section	Affected Pages	Date of Issue	Approved by	Date of approval	Date inserted	Sign.
-	ALL	ALL, Initial	03/2024	Ivan Gabáni	03/2024	03/2024	I. Gabáni

0.2 List of effective pages

Section	Page	Rev.	Date of Issue	Section	Page	Rev.	Date of Issue
					2-3		03/2024
	i		03/2024		2-4		03/2024
	ii		03/2024		2-5		03/2024
					2-6		03/2024
					2-7		03/2024
0	0-1		03/2024		2-8		03/2024
	0-2		03/2024		2-9		03/2024
	0-3		03/2024		2-10		03/2024
	0-4		03/2024		2-11		03/2024
	0-5		03/2024		2-12		03/2024
	0-6		03/2024				
				3	3-1		03/2024
1	1-1		03/2024		3-2		03/2024
	1-2		03/2024		3-3		03/2024
	1-3		03/2024		3-4		03/2024
	1-4		03/2024		3-5		03/2024
	1-5		03/2024		3-6		03/2024
	1-6		03/2024		3-7		03/2024
	1-7		03/2024		3-8		03/2024
	1-8		03/2024		3-9		03/2024
					3-10		03/2024
					3-11		03/2024
					3-12		03/2024
2	2-1		03/2024		3-13		03/2024
	2-2		03/2024		3-14		03/2024

Section	Page	Rev.	Date of Issue	Section	Page	Rev.	Date of Issue
	3-15		03/2024		4-15		03/2024
	3-16		03/2024		4-16		03/2024
	3-17		03/2024		4-17		03/2024
	3-18		03/2024		4-18		03/2024
	3-19		03/2024		4-19		03/2024
	3-20		03/2024		4-20		03/2024
	3-21		03/2024		4-21		03/2024
	3-22		03/2024		4-22		03/2024
	3-23		03/2024		4-23		03/2024
	3-24		03/2024		4-24		03/2024
	3-25		03/2024		4-25		03/2024
	3-26		03/2024		4-26		03/2024
					4-27		03/2024
					4-28		03/2024
4	4-1		03/2024				
	4-2		03/2024				
	4-3		03/2024	5	5-1		03/2024
	4-4		03/2024		5-2		03/2024
	4-5		03/2024		5-3		03/2024
	4-6		03/2024		5-4		03/2024
	4-7		03/2024		5-5		03/2024
	4-8		03/2024		5-6		03/2024
	4-9		03/2024		5-7		03/2024
	4-10		03/2024		5-8		03/2024
	4-11		03/2024		5-9		03/2024
	4-12		03/2024		5-10		03/2024
	4-13		03/2024				
	4-14		03/2024				

Section	Page	Rev.	Date of Issue	Section	Page	Rev.	Date of Issue
6	6-1		03/2024		7-10		03/2024
	6-2		03/2024		7-11		03/2024
	6-3		03/2024		7-12		03/2024
	6-4		03/2024				
	6-5		03/2024				
	6-6		03/2024				
	6-7		03/2024	8	8-1		03/2024
	6-8		03/2024		8-2		03/2024
	6-9		03/2024		8-3		03/2024
	6-10		03/2024		8-4		03/2024
	6-11		03/2024		8-5		03/2024
	6-12		03/2024		8-6		03/2024
	6-13		03/2024				
	6-14		03/2024				
	6-15		03/2024				
	6-16		03/2024	9	9-1		03/2024
					9-2		03/2024
					9-3		03/2024
					9-4		03/2024
7	7-1		03/2024		9-5		03/2024
	7-2		03/2024		9-6		03/2024
	7-3		03/2024				
	7-4		03/2024				
	7-5		03/2024				
	7-6		03/2024	10	10-1		03/2024
	7-7		03/2024		10-2		03/2024
	7-8		03/2024		10-3		03/2024
	7-9		03/2024		10-4		03/2024

0.3 Table of contents

SECTION 1

1 GENERAL INFORMATION

1.1 Introduction

1.1.1 Certification

1.2 Warnings, cautions and notes

1.3 Descriptive data

1.3.1 Aircraft description

1.3.2 Power plant

1.3.3 Aircraft dimensions

1.3.4 Aircraft layout

1.4 Definitions and abbreviations

1.5 Summary of performance specifications

1.1 Introduction

This Aircraft Operating Instructions have been prepared to provide the pilots, instructors, owners and operators with information for safe and efficient operation of BRISTELL aircraft. It also contains supplemental data supplied by the Aircraft Flight Training Supplement.

It is the pilot's responsibility to be familiar with this handbook, the special characteristics of this aircraft, and all other information and legal requirements relevant for the operation in his country. The pilot is responsible to determine the aircraft is safe for flight, and to operate the aircraft with respect to the procedures and limitations provided in this manual.

It is the owner's/operator's responsibility to have the airplane registered and insured, according to country-specific regulations. The aircraft owner/operator is also responsible for maintaining the aircraft in airworthy condition.

1.1.1 Certification

BRISTELL LSA is a light sport category airplane made by
BRM AERO s.r.o., Letecká 255, 686 04 Kunovice, Czech Republic,
phone: +420 773 984 338, e-mail : info@brmaero.com
based on the following airworthiness requirements:

- ASTM Consensus Standards:
  F2245
  F2279
  F2295
  and other to LSA category applicable ASTM Consensus Standards.
- Czech LAA UL-2 Standards
- EASA CS-VLA Standards

BRISTELL LSA has been Type certified by the Technical committee of the Light Aircraft Association of the Czech Republic.

Type Certificate No.: ULL 06/2019 issued on: 30.10.2019

1.2 Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes in the Pilot Operating Handbook.

WARNING

Means that the non-observation of the corresponding procedure leads to an immediate or important degradation of the flight safety i.e. to injury or death of persons.

CAUTION

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

NOTE

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

1.3 Descriptive data

1.3.1 Aircraft description

BRISTELL LSA is an airplane intended especially for recreational and cross-country flying, basic flight training, with limitation to non-aerobatics operation.

BRISTELL LSA is a single-engine, all metal, low-wing monoplane of semi-monocoque construction with two side-by-side seats. The airplane is equipped with a fixed tricycle undercarriage with steerable nose wheel.

1.3.2 Power plant

The standard power plant is composed of ROTAX 912 ULS, 4-cylinder, 4-stroke engine and FITI three blade ground adjustable propeller.

BRISTELL LSA, S/N 718/2024 is fitted with:

- Rotax 915 iS 2 A engine
- DUC Flashblack, in-flight hydraulic variable pitch propeller with carbon/titanium blades, carbon/aluminum hub and with a constant speed regime.

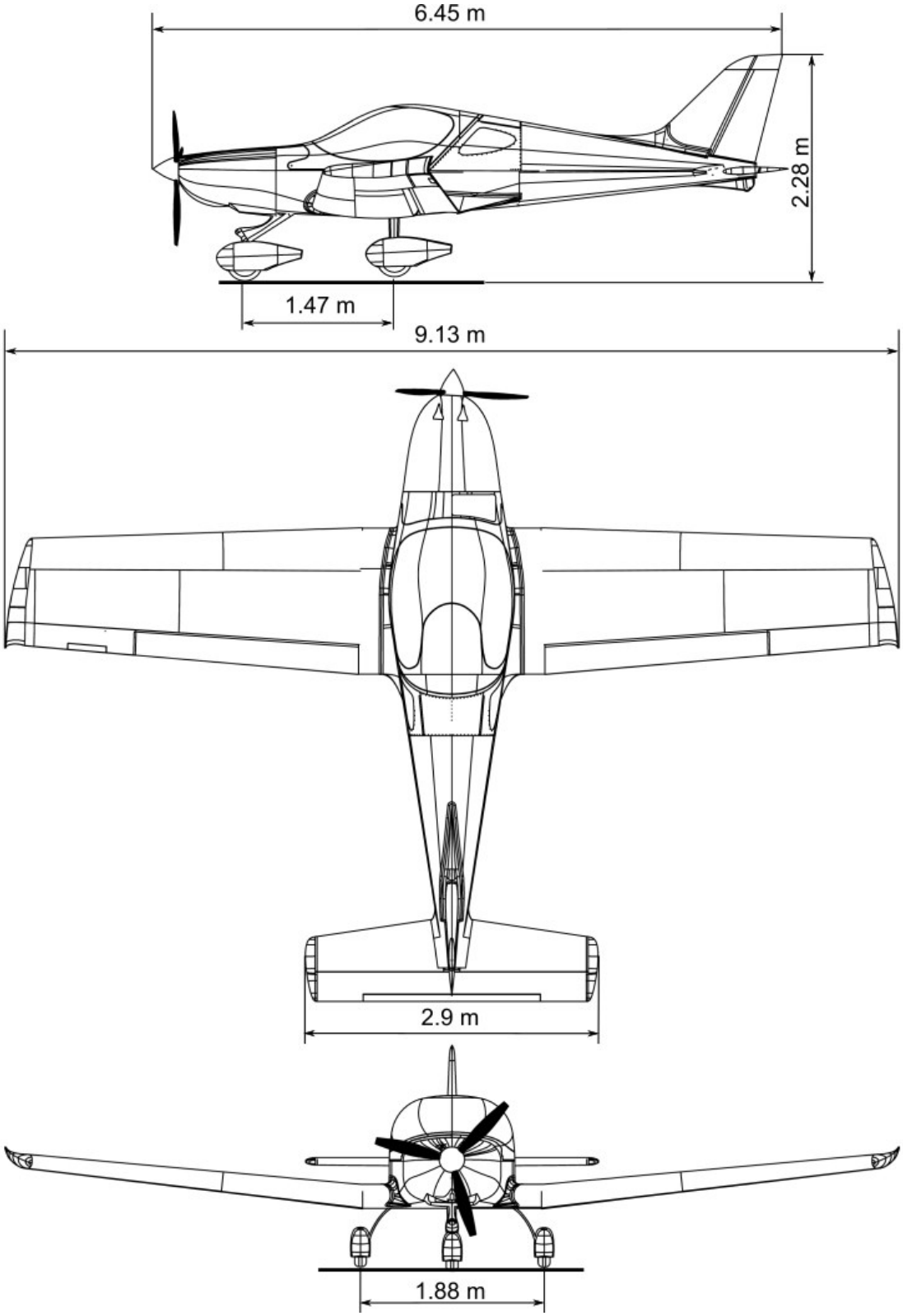
1.3.3 Aircraft dimensions

Wing span	9.13	m	29.95	ft
Length	6.45	m	21.10	ft
Height	2.28	m	7.48	ft
Wing area	11.5	m^2	123.79	sq ft
Wing loading	52.17	kg/m^2	10.66	lb/sq ft
Cockpit width	1.3	m	51.17	in

Deflections:

Rudder deflections	30° to each side
Elevator deflections	+ 30°/- 15°
Aileron deflections	+ 24°/-17°
Flap deflections	0°, 10°, 20°and 30°
Aileron trim deflections	+ 15°/- 20°
Elevator trim deflections	+ 10°/- 25°

1.3.4 Aircraft layout



1.4 Definitions and abbreviations

°F	temperature in degree of Fahrenheit
ASI	Airspeed Indicator
ATC	Air Traffic Control
BEACON	anti-collision beacon
CAS	Calibrated Airspeed
CG	Center of Gravity
COMM	communication transmitter
ECU	Engine Control Unit
EFIS	Electronic Flight Instrument System
ELT	Emergency Locator Transmitter
E-LSA	Experimental Light Sport Aircraft
EMS	Engine Monitoring System
ft	foot / feet
ft/min	feet per minute
GPS	Global Positioning System
HIC	Harness Interface Connector (Rotax 915 iS)
hp	power unit
IAS	Indicated Airspeed
IC	Intercom
IFR	Instrument Flight Rules
in	inch
ISA	International Standard Atmosphere
knot	NM per hour
lb	pound
LAA	Light Aircraft Association of the Czech Republic
MAC	Mean Aerodynamic Chord
max.	maximum

min.	minimum or minute
mph	statute miles per hour
NM	Nautical Mile
OAT	Outside Air Temperature
OFF	system is switched off or control element is in off-position
ON	system is switched on or control element is in on-position
POH	Pilot Operating Handbook
psi	pound per square inch - pressure unit
rpm	revolutions per minute
sec.	second
US gal	volume unit
V_A	maneuvering airspeed
V_{FE}	maximum flap extended speed
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
V_{NE}	never exceed speed
V_{NO}	maximum designed cruising speed
V_{S1}	stall speed with wing flaps in retracted position
V_{SO}	stall speed with wing flaps in extended position
V_X	best angle of climb speed
V_Y	best rate of climb speed

1.5 Summary of performance specifications

Performance		US units	Metric units
Gross weight (Maximum take-off weight)		1320 lb	600 kg
Top speed at sea level	MCP: 5550 rpm	141 KCAS	261 km/h CAS
Cruise speed at sea level	75%: 5000 rpm	132 KCAS	245 km/h CAS
Cruise speed at sea level	65%: 4800 rpm	124 KCAS	230 km/h CAS
Full fuel range at 4000 ft pressure altitude, at 75 % MCP (5000 rpm), No fuel reserve		820 NM	1510 km
Rate of climb at sea level .....**Vx**		1350 fpm at 90 KIAS	1350 fpm at 167 km/h IAS
Rate of climb at sea level .....**Vy**		1490 fpm at 100 KIAS	1490 fpm at 185 km/h IAS
Stall speed V_{S1} (flaps retracted)		44 KCAS	82 km/h CAS
Stall speed V_{S0} (flaps fully extended)		39 KCAS	73 km/h CAS
Total fuel capacity		32 US gal	120 liters
Total usable fuel		31.6 US gal	119 liters
Approved types of fuel **ATTENTION:** Obey the latest edition of Service Instruction SI-912-016, for the selection of the correct fuel.		Min. RON 95 (min. AKI4 91) Mogas: EN 228 super Mogas: EN 228 super plus AVGAS 100LL (ASTM D910)	
Engine Maximum takeoff power		104 kW (140 HP) at 5800 rpm, max.5 min.	
Engine Maximum continuous power		99 kW (133 HP) at 5500 rpm (without governor) NOTE: Max. cont. power is available up to the critical altitude	

SECTION 2

2 OPERATING LIMITATION

2.1 Introduction

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

2.2 Airspeed

Airspeed limitations and their operational significance are shown below:

Speed		IAS (km/h)	KIAS	Remarks
V_{NE}	Never exceed speed	***290***	***157***	Do not exceed this speed in any operation.
V_{NO}	Max. structural cruising speed	***240***	***129***	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering speed	***180***	***96***	Do not make full or abrupt control movement above this speed, because under certain conditions full control movement may overstress the aircraft.
V_{FE}	Maximum Flap Extended Speed	***139***	***75***	Do not exceed this speed with flaps extended.

Maximum speed to use ballistic rescue parachute system: Refer to the Manual supplied with the installed parachute to check the speed limits!	IAS		CAS	
	km/h	knots	km/h	knots
BRS-7 LSA	270	145	256	138

2.3 *Airspeed indicator markings*

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

Marking	IAS value or range		Significance
	km/h	*Knots*	
White arc	***72-139***	***39-75***	Flap Operating Range.
Green arc	***81-240***	***44-129***	Normal Operating Range.
Yellow arc	***240-290***	***129-157***	Maneuvers must be conducted with caution and only in smooth air.
Red line	***290***	***157***	Maximum speed for all operations.

2.4 Power plant

2.4.1 Engine operating speeds and limits

Engine Model:		**ROTAX 915 iS** 4-cylinder horizontally opposed, turbocharged engine approved to ASTM F2339, propeller shaft without flange for constant speed propeller and drive for hydraulic governor for constant speed propeller
Engine Manufacturer:		**Bombardier-Rotax GMBH**
Power	***Max Take-off:***	**104 kW (140 HP) at 5800 rpm, max.5 min.**
	Max. Continuous:	**99 kW (133 HP) at 5500 rpm** (without governor) NOTE: Max. cont. power is available up to the critical altitude
Engine speed	***Max. Take-off:***	**5800 rpm (max. 5 min)**
	Max. Continuous:	**5500 rpm**
	Idling:	**min 1800 rpm**
Coolant temperature	***Minimum:***	**- 20°C** ***(-4 °F)*** at ground idle, start, and warm up **40 °C** ***(104 °F)*** at normal operation
	Maximum:	**90°C** ***(194 °F)*** at ground idle, start, and warm up **120 °C** ***(248 °F)*** at normal operation
Oil temperature	***Minimum:***	**- 20°C** ***(-4 °F)*** at ground idle, start, and warm up **50 °C** ***(120 °F)*** at normal operation
	Maximum:	**100 °C** ***(212°F)*** at ground idle, start, and warm up **130 °C** ***(266 °F)*** *at normal operation*
	Optimum:	**90 – 110 °C** ***(194 – 230 °F)*** ATTENTION: Operating the engine below these temperatures may lead to formation of condensation water in the lubrication system. To evaporate possibly accumulated water, at least once a day 100 °C (212 °F) oil temperature must be reached.
Oil pressure:	***Minimum:***	**0.8 bar** ***(11.6 psi)*** *- below 3500 rpm* **2.0 bar** ***(29 psi)*** *- above 3500 rpm*
	Maximum:	**5 bar (72.5 psi)** **7 bar (*102 psi*) - For a short period at cold start**
	Normal:	**2 - 5 bar** ***(29-73 psi) - above 3500 rpm***
Exhaust gas temp.	***Maximum:***	***950 °C (1742 °F)***
	EGT-split	*EGT-split is the difference between the actual highest EGT value of the actual lowest EGT value* **200 °C** ***(392 °F)*** *at fuel consumption higher than 3 lph* **500 °C** ***(932 °F)*** *at fuel consumption less than 3 lph*

Fuel pressure	***Minimum:***	**2.9 bar *(42 psi)*** *at fuel rail* **2.5 bar *(36 psi)*** *acceptable fuel press. exceedance (max.3 sec)* NOTE: Fuel pressure exceedance only allowed after power setting change.
	Maximum:	**3.1 bar *(45 psi)*** *at fuel rail* **3.5 bar *(51 psi)*** *acceptable fuel press. exceedance (max.3 sec)*
Ambient temperature	***Maximum in flight:***	**60 °C *(140 °F)* (manifold temperature)**
	Maximum at start:	**50 °C *(120 °F)* (ambient temperature)**
	Minimum at start:	**-20 °C *(-13 °F)* (oil temperature)**
Critical altitude	***Maximum:***	**15000 ft** *Manifold temperature max. 50°C (120 °F)*
Operating altitude	***Maximum***	**23000 ft**
Acceleration	***Maximum negative***	**-0.5 g (max. 5 seconds)**
Manifold temperature	***Maximum***	**50 °C *(120 °F)***
Manifold pressure	***Minimum***	**60 hPa *(1.77inHg)***
	Maximum	**1730 hPa *(51 inHg)***
Boost pressure	***Minimum***	**Ambient pressure**
	Maximum	**1730 hPa *(51 inHg)***

2.4.2 Fuel

ATTENTION
Obey the latest edition of Service Instruction SI-915 i-001, for the selection of the correct fuel.

ATTENTION
Use only fuel suitable for the respective climatic zone.

NOTE

Risk of vapour formation if using winter fuel for summer operation.

Antiknock properties

Fuels with following specification can be used:

	Usage/Description
	915 iS
Anti knock properties	Min. RON 95

NOTE

For fuels according to ASTM D4814 specifications following AKI (Anti Knock Index) value has to be observed: min. AKI 91.

MOGAS

	Usage/Description
MOGAS	**915 iS**
European standard	EN 228 super EN 228 super plus

AVGAS

AVGAS 100LL places greater stress on the valve seats due to its high lead content and forms increased deposits in the combustion chamber and lead sediments in the oil system.

	Usage/Description
AVGAS	**915 iS**
Aviation Standard	AVGAS 100 LL (ASTM D910)

Fuel volume:

Wing fuel tank volume ..... 2x60 l 2x16 US gal

Unusable fuel quantity ..... 2x0.5 l 2x0.13 US gal

2.4.3 Oil

ATTENTION

Obey the manufacturers instructions about the lubricants.
If the engine is mainly run on AVGAS more frequent oil changes will be required. See Service Information SI-915 i-001, latest edition.

Oil type

At the selection of suitable lubricants refer to the additional information in the Service Information SI-915 i-001, latest edition.

Oil consumption

Max. 0.06 l/h (0.13 liq pt/h)

Oil specification

- Use only oil with RON 424 classification

NOTE

The ROTAX® Norm 424 (RON 424) is a BRP-Rotax internal standard, which is only available on special request via the ROTAX® authorized distributor and will not be disclosed to third parties without prior consent.

- Due to the high stresses in the reduction gears, oils with gear additives such as high performance motor cycle oils are required.
- Because of the incorporated overload clutch, oils with friction modifier additives are unsuitable as this could result in clutch slippage during normal operation.
- Heavy duty 4-stroke motor cycle oils meet all the requirements. These oils are normally not mineral oils but semi- or full synthetic oils.
- Oils primarily for Diesel engines have **insufficient high temperature properties and additives which favour clutch slipping, and are generally** unsuitable.

Oil viscosity

Use of multi-grade oils is recommended.

NOTE

Multi-viscosity grade oils are less sensitive to temperature variations than single grade oils.
They are suitable for use throughout the seasons, ensure rapid lubrication of all engine components at cold start and get less fluid at higher temperatures.

NOTE

Type of oil used by aircraft manufacturer is shown in Section 10 Supplement No.2.

Oil volume:

Minimum	3.2 l	0.856	US gal
Maximum	3.6 l	0.951	US gal

2.4.4 Coolant

ATTENTION

Obey the latest edition of Service Instruction SI-915 i-001, for the selection of the correct coolant.

Conventional coolant

Conventional coolant mixed with water has the advantage of a higher specific thermal capacity than water-less coolant.

Application

When correctly applied, there is sufficient protection against vapor bubble formation, freezing or thickening of the coolant within the operating limits.
Use the coolant specified in the manufacturers documentation.

Mixture

ATTENTION

Obey the operating media manufacturer's instructions!

NOTE

Type of coolant used by aircraft manufacturer is shown in Section 10 Supplement No.2.

Coolant liquid volume:

approx..... 2.5 l 0.66 US gal

2.5 Power plant instrument markings

Analogue engine instruments markings and their color-code significance are shown below.

Rotax 915 iS	Minimum Limit (red line)	Caution Range (yellow arc)	Normal Operating Range (green arc)	Caution Range (yellow arc)	Maximum Range (red line)
Engine speed (RPM)	-	0-1800	1800-5500	5500-5800	5800
Oil Temperature	-	< 50 °C *(122 °F)*	50 – 120 °C *(122 – 248 °F)* *See ATTENTION below*	120 – 130 °C *(248 – 266 °F)*	130 °C *(266 °F)*
Exhaust Gas Temp. (EGT)	-	-	< 950 °C *(< 1742 °F)*	-	950 °C *(1742 °F)*
Coolant Temp. (CT)	-	-	< 120 °C *(< 248 °F)*	-	120 °C *(248 °F)*
Oil Pressure	0.8 bar *(12 psi)*	0.8 - 2 bar *(12 - 29 psi)*	2 - 5 bar *(29 - 73 psi)*	5 - 7 bar *(73 - 102 psi)*	7 bar *(102 psi)* *cold engine starting*
Fuel Pressure	2.5 bar *(36 psi)*	2.5 – 2.9 bar *(36 - 42 psi)*	2.9 – 3.1 bar *(42 - 45 psi)*	3.1 – 3.5 bar *(45 - 51 psi)*	3.5 bar *(51 psi)*
Manifold pressure	60 hPa 1.77 inHg		60 -1730 hPa 1.77 – 51 inHg	-	1730 hPa 51 inHg
Voltmeter	11 V	11-12 V	12-15 V	-	15 V

ATTENTION

Operating the engine below oil temperatures 90 – 110 °C *(194 – 230 °F)* may lead to formation of condensation water in the lubrication system. To evaporate possibly accumulated water, at least once a day 100 °C (212 °F) oil temperature must be reached.

2.6 Miscellaneous Instrument Marking

There is not any miscellaneous instrument marking.

2.7 Weight

NOTE
Actual empty weight is shown in SECTION 6

Max. take-off weight	1320	lb	600	kg
Max. landing weight	1320	lb	600	kg
Max. weight of fuel (120 l)	192	lb	87	kg
Max. baggage weight:				
Baggage compartment behind seats	33	lb	15	kg
Wing lockers (optional)	44	lb	20	kg each
Front locker (optional)	22	lb	10	kg

2.8 Center of gravity

Operating C.G. range	25	to 35 %	of MAC	
MAC (Mean Aerodynamic Chord)	1349.7	mm	53.138	in
MAC_LE	406.1	mm	15.989	in

MAC_LE: Distance of MAC origin to the Datum

Datum: Firewall

2.9 Approved maneuvers

Airplane Category: LSA (Light Sport Aircraft)

The BRISTELL LSA is approved for normal and below listed maneuvers:

- Steep turns not exceeding 60° bank
- Lazy eights
- Chandelles
- Stalls (except whip stalls)

WARNING
Aerobatics and intentional spins are prohibited!

2.10 Maneuvering load factors

Maximum positive limit load factor ..... +4 g
Maximum negative limit load factor..... - 2 g
Maximum negative for the engine..... -0.5 g (max. 5 seconds)

2.11 Crew

Number of seats 2
Minimum crew..... 1 pilot in the left seat
Minimum crew weight ..... 55 kg 121 lb
Maximum crew weight ..... see SECTION 6

WARNING
Do not exceed maximum take-off weight 1320 lb (600 kg)!

2.12 Kinds of operation

There are permitted Day/Night VFR flights.

WARNING
IFR flights and intentional flights under icing conditions are PROHIBITED!

Minimum instruments and equipment list for VFR flights:

- Airspeed indicator
- Altimeter
- Compass (not required by ASTM F 2245)
- Fuel quantity indicator
- Tachometer (RPM)
- Oil temperature indicator
- Oil pressure indicator
- Cylinder head temperature indicator (Coolant temp indicator)

2.13 Other limitations

WARNING
No smoking on board of the aircraft!

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SECTION 3

3 EMERGENCY PROCEDURES

3.9 Rotax 915 iS Failures in flight

3.9.1 Failures indicated by the EMS
3.9.2 Failure of internal generators
3.9.2.1 Failure of Generator 1
3.9.2.2 Failure of Generator 2
3.9.2.3 Failure of both Generators
3.9.3 Engine not responding on throttle position commands
3.9.4 Engine on fire or fire in the engine compartment
3.9.5 Emergency Engine shut-off
3.9.6 Loss of Display CAN Information
3.9.7 Loss of power
3.9.8 Failures during engine start
3.9.8.1 Engine does not start
3.9.9 The sprag clutch fails to decouple from the starter
3.9.10 Exceedance of operational limits
3.9.11 Fuel pressure outside range
3.9.11.1 High fuel pressure
3.9.11.2 Low fuel pressure
3.9.12 Occurrence of uncharacteristic and severe engine vibrations
3.9.13 Exceeding max. admissible engine speed
3.9.14 Exceeding of max. coolant temperature
3.9.15 Exceeding of max. admissible oil temperature
3.9.16 Oil pressure below minimum - during flight
3.9.17 Oil pressure below minimum - on ground
3.9.18 Oil pressure above permitted range at low ambient temperatures
3.9.19 Maximum permissible exhaust temperatures exceeded

3.10 BRS-7 ballistic recovery system emergency procedures

3.10.1 Deployment Scenarios
3.10.2 Mid-air collision
3.10.3 Structural failure
3.10.4 Loss of control
3.10.5 Stall/Spin on approach
3.10.6 Engine-out over hostile terrain

3.10.7 Pilot incapacitation
3.10.8 Out of fuel, with landing areas within reach
3.10.9 Lost, with fuel remaining
3.10.10 Proper Activation Procedures

3.11 Propeller control failure or emergency

3.1 Introduction

Section 3 provides checklists and amplified procedures for coping with various emergencies that may occur. Emergencies caused by aircraft or engine malfunction are extremely rare if proper pre-flight inspections and maintenance are practiced.

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 - reduce to idle
2. Ignition (LANE A,B) - switch OFF
3. Apply brakes

3.2.2 Engine failure during take-off

1. Speed - gliding at 65 KIAS (120 km/h)
2. Altitude - below 150 ft: land in take-off direction
   - over 150 ft: choose a landing area
3. Wind - find direction and velocity
4. Landing area - choose free area without obstacles
5. Flaps - extend as needed
6. Fuel Selector - shut OFF
7. Ignition (LANE A,B) - switch OFF
8. Safety harness - tighten
9. Master switch - switch OFF before landing
10. Land

3.2.3 Engine failure in flight

1. Push control stick forward
2. Speed - gliding at 65 KIAS (120 km/h)
3. Altitude - below 150 ft: land in take-off direction
   - over 150 ft: choose a landing area
4. Wind - find direction and velocity
5. Landing area - choose free area without obstacles
6. Flaps - extend as needed
7. Fuel Selector - shut OFF
8. Ignition (LANE A,B) - switch OFF
9. Safety harness - tighten
10. Master switch - switch OFF before landing
11. Land

3.3 In-flight Engine Starting

Engine Stop

1. If the propeller continues to rotate during flight by windmilling, but the speed is not sufficient to start the engine, the electric starter can be used without problems. You must not wait until the propeller stands still.
2. Electric pumps - ON
3. Fuel Selector - switch to second fuel tank
4. Throttle lever - to idling position
5. EMS main switch - AUTO
6. LANE select switch A - ON
7. LANE select switch B - ON
8. Start power switch - switch ON
9. Starter button - press until the engine starts to run
10. Start power switch - switch OFF after 15 sec.

WARNING

Do not try to re-start the engine in the case, that the reason for the engine stop was empty fuel tank!

3.4 Smoke and Fire

3.4.1 Fire on ground at engine starting

1. Starter - keep in starting position
2. Fuel Selector - close
3. Throttle - full power
4. Ignition (LANE A,B) - switch OFF
5. Leave the airplane
6. Call for help via radio
7. If possible, fight the fire with a fire extinguisher and call the fire department
8. The cause of the fire must be determined and the fault rectified by qualified personnel (with the approval of the aviation authorities) before the next flight.
9. An entry in the logbook shall be made.
10. A maintenance inspection should be carried out.

3.4.2 Fire on ground with engine running

1. Heating - close
2. Fuel selector - close
3. Throttle - full power
4. Ignition (LANE A,B) - switch OFF
5. Leave the airplane
6. If possible, fight the fire with a fire extinguisher and call the fire department
7. The cause of the fire must be determined and the fault rectified by qualified personnel (with the approval of the aviation authorities) before the next flight.
8. An entry in the logbook shall be made.
9. A maintenance inspection should be carried out.

3.4.3 Fire during take-off

1. Speed - 65 KIAS (120 km/h)
2. Heating - close
3. Fuel Selector - close
4. Throttle - full power
5. Ignition (LANE A,B) - switch OFF
6. Land and stop the airplane
7. Parking brake - apply before leaving the aircraft
8. Leave the airplane
9. Fight fire with fire extinguisher if possible and call fire department.
10. Determine the cause of the fire and have it repaired by qualified personnel (authorized by aviation authorities) before the next flight.
11. An entry should be made in the aircraft logbook.
12. A maintenance inspection should be performed.

3.4.4 Fire in flight

1. Heating - close
2. Fuel Selector - close
3. Throttle - full power
4. Master switch - switch OFF
5. Ignition (LANE A,B) - switch OFF
6. Choose of area - heading to the nearest airport or choose emergency landing area
7. Emergency landing - perform according to 3.6
8. Leave the airplane
9. Fight fire with fire extinguisher if possible and call fire department.
10. Locate the cause of the fire and rectify the fault before the next flight by qualified personnel (authorized by aviation authorities).
11. An entry in the logbook must be made.
12. A maintenance inspection should be carried out

NOTE

Engine will stop immediately after master switch switched off.

WARNING

Do not attempt to re-start the engine!

3.4.5 Fire in the cockpit

1. Master switch - switch OFF
2. Heating - close
3. Use a fire extinguisher if available.
4. If not, land a leave the airplane as soon as possible

3.5 Glide

An example of the use of gliding is in the case of engine failure

1. Speed - recommended gliding speed 65 KIAS
   120 km/h

3.5.1 Emergency descent

Emergency descent means to get on the ground as quickly as possible. It is used in case of a big problem encountered in flight like engine fire, smoke in the cockpit, or any other serious problem.

1. Throttle lever - fully pulled to set idle
2. Flaps - retracted
3. Control stick - push forward to bring airplane into descent
4. Speed - V_{NO} 129 KIAS (240 km/h)
   Do not exceed this speed except in smooth air, and then only with caution.
   - V_{NE} 157 KIAS (290 km/h)
   Do not exceed this speed in any operation.

Steep spiral dive with max. 60° bank may be used however be careful to not exceed limit load factor during spiral. You can monitor area below you during a spiral.

3.6 Landing Emergencies

3.6.1 Emergency landing

Emergency landings are generally carried out in the case of engine failure and the engine cannot be re-started.

1. Speed - adjust for optimum gliding 65 KIAS
   120 km/h
2. Trim - adjust
3. Safety harness - tighten
4. Flaps - extend as needed
5. COMM - report your location if possible
6. Fuel Selector - close
7. Ignition (LANE A,B) - switch OFF
8. Master switch - switch OFF
9. Perform approach without steep turns and land on chosen landing area.

3.6.2 Precautionary landing

A precautionary landing is generally carried out in the cases where the pilot may be disorientated, the aircraft has no fuel reserve or possibly in bad weather conditions.

1. Choose landing area, determine wind direction
2. Report your intention to land and land area location.
3. Perform low-altitude passage into wind over the right-hand side of the chosen area with flaps extended as needed and thoroughly inspect the landing area.
4. Perform circle pattern.
5. Perform approach at increased idling with flaps fully extended.
6. Reduce power to idle when flying over the runway threshold and touch-down at the very beginning of the chosen area.
7. After stopping the airplane switch OFF all switches, shut OFF the fuel selector, lock the airplane and seek for assistance.

NOTE

Watch the chosen area steadily during precautionary landing.

3.6.3 Landing with a flat tire

1. During landing keep the damaged wheel above ground as long as possible using the ailerons control
2. Maintain the direction on the landing roll out, applying rudder control.

3.6.4 Landing with a defective landing gear.

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

3.7 Recovery from Unintentional Spin

WARNING
Intentional spins are prohibited!

WARNING
If unable to recover from a spin and the aircraft is fitted with ballistic recovery parachute system, then activate it immediately in accordance with section 3.10.1 Deployment Scenarios

WARNING
Loss of altitude during one turn spin and recovery may exceed 1300 ft!

There is no uncontrollable tendency of the airplane to enter into a spin provided the normal piloting techniques are used.
If an unintentional spin fully develops then the following recovery technique is advised:

1. Throttle - idle
2. Lateral control - ailerons neutralized
3. Rudder pedals - full opposite rudder (to the mechanical stop)
4. Following a short pause - Elevator control – push forward until rotation stops
5. Rudder pedals - neutralize rudder immediately when rotation stops
6. Recover from the dive.

3.8 Other Emergencies

3.8.1 Vibration

If any forced aircraft vibrations appear, it is necessary:

1. To set engine speed to such power rating where the vibrations are lowest.
2. To land on the nearest airfield or to perform a precautionary landing according to 3.6

A maintenance inspection should be carried out.

3.8.2 Autopilot malfunction

In the case, that autopilot starts to not work properly, press immediately red button “AP OFF” on the instrument panel.

WARNING

Take-Off, climb, Approach and landing with AP “ON” or with malfunction AP are PROHIBITED.

3.8.3 Inadvertent icing encounter

WARNING

Intentional flights under icing conditions are PROHIBITED!

If icing is inadvertently encountered then:

1. Pitot heat (if installed) - ON
2. Exit icing conditions - change altitude or turn back.
3. Cockpit heating - pull knob to ON
4. Up/Down knob - pushed forward (UP) to defrost windshield

3.8.4 Loss of primary instruments

If primary instruments are lost and the aircraft is fitted with the backup instruments then use these to safely complete the flight.

If no backup instruments are installed then visually check the aircraft altitude and attitude and land as soon as practicable.

3.8.5 Loss of flight controls

Loss of control may have several reasons like a failure of the control system, jamming, disconnection, strong turbulence, unrecoverable spin, pilot disorientation, etc.

If loss of a control appears e.g. due to jamming or disconnection, then some control might be still possible:

Lost control	Action
Ailerons	Some degree of roll control is available by using the secondary effect of rudder. Effectiveness of rudder may be increased by rapid bursts of power. Aircraft with a jammed aileron can be landed in a slip, preferably against a crosswind.
Elevator	Try to use elevator trim to control airplane longitudinally. Keep in mind that trim control works considerably slower than elevator control. Engine power may be used to pitch up. Before landing, when the airplane will enter ground effect, will be needed to apply a slight nose-up pitch as the airplane enters ground effect. Small shot of power in addition to the trim up may be needed. Wing flap control may be used to pitch down.
Rudder	Some degree of yaw control is available by using the secondary effect of ailerons.
Wing flaps	The flaps are mechanically interconnected and have the electrical control. If the electrical control would fail or if the flaps would jam in any position, then adjust elevator trim to trim flaps pitching moment. If (in spite of flaps mechanical interconnection) one flap would extend and the aircraft rolls then immediately use the opposite ailerons and rudder to eliminate pitching and rolling moment.

WARNING

If the control cannot be regained and the aircraft is fitted with a ballistic rescue system, then activate the system according to 3.10.1.

3.8.6 Runaway pitch trim

Runaway pitch trim is a condition in which the elevator trim control is lost from some reasons (trim servo stuck, trim control failure, etc.).

In event of trim runaway, act as follows:

1. Speed - reduce to 65 KIAS (120 km/h IAS) or speed at which you can control aircraft without excessive stick force
2. Land as soon as possible

3.9 Rotax 915 iS Failures in flight

WARNING

Non-compliance can result in serious injuries or death!

Unless otherwise in this chapter stated, operating an engine with limited airworthiness is not permitted. Unscheduled maintenance action is required. At unusual engine behavior conduct checks as per Maintenance Manual Line Chapter 05-50-00 before the next flight.

ATTENTION

Identifies an instruction which, if not followed, may severely damage the engine or could void any warranty.

3.9.1 Failures indicated by the EMS

EMS **Health Status**

The warning indicators provide basic information on the engine health.

HIC A: Voltage between Terminal 2 and Terminal 8 (Warning Indicator A)	HIC B: Voltage between Terminal 2 and Terminal 10 (Warning Indicator B)	Action on ground	Action during flight
0 V	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	0 V	One way flight to maintenance hangar permissible	Flight is possible to your destination at your own discretion.
0 V	12 V	Flight not permissible	Land the aircraft*
Oscillating 0–12 V	Oscillating 0–12 V	Flight not permissible	Land the aircraft*
Oscillating 0–12 V	12 V	Flight not permissible	Land the aircraft*
12 V	0 V	Flight not permissible	Land the aircraft*
12 V	Oscillating 0–12 V	Flight not permissible	Land the aircraft*
12 V	12 V	Flight not permissible	Land the aircraft*

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

NOTE

If a warning indicator flashes, it indicates an error with lower se- verity (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 CU 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.

3.9.2 Failure of internal generators

3.9.2.1 Failure of Generator 1

If during normal operation (Generator 1 is supplying the EMS) Generator 1 fails, the ECU automatically switches over to sup- ply the EMS by using Generator 2.

If the engine is supplied by Generator 2 the engine is able to de- liver full performance. No performance drop can be recognized while the engine switches the supply from Generator 1 to Generator 2.

ATTENTION
If Generator 2 is used for supplying the EMS, the airframe will not be supplied with electrical power by an internal generator.

This failure condition will be detected by the EMS. Therefore see section “Failures detected by the EMS” for appropriate action.

3.9.2.2 Failure of Generator 2

If during normal operation (Generator 1 is supplying the EMS) Generator 2 fails, the ECU is not able to detect this condition.

ATTENTION
If Generator 2 fails the Airframe will not be supplied with electrical power by an internal generator

Land as soon as practicable.

3.9.2.3 Failure of both Generators

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 (12 V voltage drop between X3 Terminal 1 and Aircraft ground).

Land as soon as practicable.

3.9.3 Engine not responding on throttle position commands

Possible breakage/blockage of throttle valve actuation/linkage. In case of a breakage of the throttle valve actuation the valve will jump to wide open position.

WARNING

Non-compliance can result in serious injuries or death!

Never attempt starting the engine with a disconnected, broken or blocked throttle valve actuation. This may lead to excessive engine speeds.

For shutting off the engine proceed according to Engine shut- OFF procedure. As part of an abnormal operation, it might be required to shut down the engine at higher engine speeds.

3.9.4 Engine on fire or fire in the engine compartment

ATTENTION

Shut off fuel supply and carry out emergency procedures as prescribed in 3.4

Event has to be entered by the pilot into engine logbook.

3.9.5 Emergency Engine shut-off

Step	Step Description	Procedure
1	Deactivate ECU	HIC A: Disconnect Terminal 1 and Terminal 7 to turn OFF ECU Lane A HIC B: Disconnect Terminal 1 and Terminal 9 to turn OFF ECU Lane B Display CAN A/B: Check and ensure compliance with operational limits.
	Example (Symbolic)	Lane select Switch A: OFF Lane select Switch B: OFF

3.9.6 Loss of Display CAN Information

If Display CAN Bus A or B fail, all information are still available on the working CAN Bus.

In case Display CAN A and B fail and no engine parameters are available land the aircraft.

3.9.7 Loss of power

Perform Emergency landing according to 3.6.1 if engine power is fully lost and cannot be recovered.

If engine power is lost partially then land as soon as possible.

3.9.8 Failures during engine start

3.9.8.1 Engine does not start

Insufficient supply from electrical power source.

Ensure that Engine starter and EMS system is supplied by an external power source until engine reached idle speed

Insufficient fuel supply.

Ensure that Engine is supplied with fuel in appropriate quality

Starting at low oil temperature.

Use high quality oil without friction modifier.

3.9.9 The sprag clutch fails to decouple from the starter

ATTENTION
Shut down engine! Risk of fire and danger of the electric starter overheating

Follow engine shut OFF procedure according to 4.5.19.

3.9.10 Exceedance of operational limits

ATTENTION
When exceeding an operating limit, adapt engine power setting and land as soon as possible.

Any exceeding of an operating limit has to be entered by the pilot into engine logbook, stating duration and duration of this condition. Unscheduled maintenance action may be required (see Maintenance Manual Line).

3.9.11 Fuel pressure outside range

ATTENTION
Reduce engine power setting to the minimum necessary and carry out precautionary landing according to 3.6.2.

3.9.11.1 High fuel pressure

If the pressure is too high, switch the AUX- pump OFF.

If this has no effect then limited flight operation with reduced power is possible.

3.9.11.2 Low fuel pressure

If the pressure is too low, switch the AUX-pump ON. If this has no effect then limited flight operation with reduced power is possible.

A maintenance inspection should be carried out.

3.9.12 Occurrence of uncharacteristic and severe engine vibrations

- If the vibrations occur in conjunction with a loss of power then the engine may only be firing on 3 cylinders.
- Limited flight operation.
- A maintenance inspection should be carried out.

3.9.13 Exceeding max. admissible engine speed

Exceeding engine speed

- Reduce the engine speed. Any exceeding of the max. admissible engine speed has to be entered by the pilot into logbook, stating duration and extent of over engine speed.

3.9.14 Exceeding of max. coolant temperature

Exceeding coolant temperature

CAUTION
Reduce engine power setting to the minimum necessary and carry out precautionary landing.

- Any exceeding of the max. admissible coolant temperature has to be entered by the pilot into logbook, stating duration and extent of over-temperature condition.
- A maintenance inspection should be carried out.
- Check the ECU error log file.

3.9.15 Exceeding of max. admissible oil temperature

Exceeding oil temperature

CAUTION
Reduce engine power setting to the minimum necessary and carry out precautionary landing.

- Any exceeding of the max. admissible oil temperature has to be entered by the pilot into logbook, stating duration and extent of over-temperature condition.
- A maintenance inspection should be carried out.
- Check the ECU error log file.

3.9.16 Oil pressure below minimum - during flight

Oil pressure too low

CAUTION
Reduce engine power setting to the minimum necessary and carry out precautionary landing.

- Check oil system.
- A maintenance inspection should be carried out.
- Check the ECU error log file.

3.9.17 Oil pressure below minimum - on ground

Oil pressure too low

CAUTION
Immediately stop the engine and check for reason. Check oil system.

- Check oil quantity in oil tank.
- Check oil quality. See also Chapter 2.4 of the Engine Manual.
- A maintenance inspection should be carried out.

3.9.18 Oil pressure above permitted range at low ambient temperatures

Oil pressure too high

- Reduce engine speed and check the oil pressure again once it has reached a higher oil temperature.
- A maintenance inspection should be carried out.
- Check the ECU error log file.

3.9.19 Maximum permissible exhaust temperatures exceeded

Exceeded exhaust temperatures

CAUTION
Reduce engine power setting to the minimum necessary and carry out precautionary landing.

- Check the exhaust temperature
- Oil and coolant limits must not be exceeded.
- A maintenance inspection should be carried out.

3.10 BRS-7 ballistic recovery system emergency procedures

This section identifies the situations for which the system should be activated, outlines the proper activation procedures, describes the deployment environment, and describes the post-touchdown activities.

3.10.1 Deployment Scenarios

The following scenarios describe situations in which activation of the BRS system may be the only means to save the airplane occupants from serious injury or fatality. These scenarios do not represent all possible situations nor do they represent situations in which activation of the BRS system is the only option.

WARNING

The BRS system is intended to be used only in an extreme emergency in which recovery of the occupants of the airplane using other EMERGENCY PROCEDURES is not possible. If the airplane is controllable and structurally capable of flying to a safe landing site, the BRS system SHOULD NOT BE ACTIVATED. If the airplane is uncontrollable and/or a forced landing on extreme inhospitable terrain cannot be avoided, the BRS system SHOULD BE ACTIVATED.

CAUTION

The extreme emergency in which the BRS system must be activated requires that it be activated in a timely manner. Do not wait until the airplane has exceeded the airspeed and load factor operating envelope, is at an altitude which does not allow the parachute to fully deploy prior to ground impact, or is in an extreme attitude.

BRS systems are not intended to be a substitute for good pilot judgment, skills and training, proper preflight planning, proper aircraft maintenance and preflight inspections, and safe aircraft operations.

Some situations provide scenarios where BRS system deployment is not desirable. These have a central theme: if the aircraft can still be controlled, continue flying the airplane to a safe landing.

3.10.2 Mid-air collision

A mid-air collision will completely disable most aircraft.
Most mid-air collisions occur at relatively low altitudes or in the landing traffic pattern. If a mid-air collision occurs, the pilot must immediately determine if the airplane is controllable and structurally capable of flying to a landing site. If not, the pilot should activate the BRS system immediately.

3.10.3 Structural failure

A structural failure can result from many conditions:
encountering a severe gust at speeds above the aircraft's structural cruising speed, exceeding design load factor at speeds above the aircraft's maneuvering speed, wake turbulence or a degrading and/or defective aircraft structure. If a structural failure occurs, the pilot must determine if the airplane is controllable and structurally capable of flying to a landing site. If it is not, the pilot should activate the BRS system immediately.

3.10.4 Loss of control

Loss of control could result from a control system failure, wake turbulence, severe airframe icing or pilot disorientation. If control can be recovered before the aircraft is in danger of ground impact, the pilot should do so and not deploy the BRS. If the airplane cannot be controlled, the pilot should activate the BRS system immediately

3.10.5 Stall/Spin on approach

The stall tightening to a spin due to pilot distraction on landing approach is a dilemma long faced by aviation. With its low altitude recovery capability, the BRS unit could save some occurrences from becoming fatalities. The BRS unit is not guaranteed to fully decelerate an aircraft from extremely low altitudes, but a spin below 500 feet is a grave problem, and the BRS unit may offer your only alternative.

3.10.6 Engine-out over hostile terrain

An engine-out emergency should not be a reason to deploy the BRS unless the terrain below will not accommodate a safe landing. If the surface is extremely rough, a safe landing may be impossible. At night or in ground fog conditions, visibility may not permit a safe landing approach. If a safe landing is not possible, the pilot should activate the BRS.

3.10.7 Pilot incapacitation

Passengers must be briefed on the BRS location and operation prior to take-off. If the pilot is incapacitated and cannot fly the airplane to a safe landing and the passenger does not have the training or skills to fly the airplane to a safe landing, the passenger should activate the BRS

3.10.8 Out of fuel, with landing areas within reach

If a landing area is available and the aircraft is controllable, the airplane should be flown to a normal landing.

3.10.9 Lost, with fuel remaining

Getting lost, or being uncertain of control of flight, may seem a life-threatening situation. If sufficient fuel remains and if the airplane is controllable, the airplane should be flown to a safe landing.

3.10.10 Proper Activation Procedures

1. Master switch - OFF (to switch off R915 iS engine)
2. Activating handle - pull hard continuously!
3. Safety harness - tight down
4. Assume emergency landing position - both hands should be placed behind the head with the fingers locked together. The elbows should be pulled forward to protect the side of the head and face. The upper torso should be erect.
5. Post-Touchdown - extricate yourself as quickly as possible
6. Upon exiting the aircraft, move to the upwind side to keep from being injured by the moving aircraft if the canopy were to re-inflate.
7. If you should end up in power lines (carrying electrical current), do not under any circumstances touch any metal parts. Also shout this precaution to anyone attempting to help you.

WARNING

POWER TO THE ENGINE MUST BE SHUT OFF BEFORE DEPLOYING A BRS PARACHUTE. FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.

BRS uses for harnesses and bridles the Kevlar® that is very resilient to cutting, yet could still be severed if the engine is not shut off and the **propeller is still turning!** If a bridle or harness does survive contact with a moving propeller, it may nonetheless be drawn into the prop's hub, possibly causing a malfunction or at least an improper descent attitude.

WARNING

If the aircraft speed was high at deployment, the de-stabilization can continue longer. If the altitude at deployment was low, the oscillations may not cease before the aircraft reaches the ground. *If the latter is true, the aircraft may strike the ground in an unusual attitude, which could result in injury or death to occupants.*

3.11 Propeller control failure or emergency

In the unlikely event of hydraulic failure, the propeller comes naturally in small-pitch stop thank to the return spring.

1. Adjust throttle setting to not overspeed the engine.
2. Land as soon as practicable.

SECTION 4

4 NORMAL PROCEDURES

4.1 Introduction

Section 4 provides checklists and recommended procedures for normal operation of the aircraft.

4.2 Assembly and Disassembly

Refer to the BRISTELL LSA Maintenance and Inspection Procedures manual.

4.3 Rotax 915 iS Daily Checks:

WARNING

Risk of burnings and scalds! Hot engine parts!

Conduct checks on the cold engine only!

WARNING

Non-compliance can result in serious injuries or death!

When performing checks which do not require ignition make sure that the ECU is turned off and the aircraft is secured to prevent form unwanted engine starts.

ATTENTION

If established abnormalities (e.g. excessive resistance of the engine, noise etc.) inspection in accordance with the relevant Maintenance Manual is necessary. Do not release the engine into service before rectification.

4.3.1 Coolant level

ATTENTION
Operating media must be observed. Inappropriate coolant quantity can lead to serious engine damage

The specifications given in 2.4.4 must be adhered to when refilling coolant.

Step	Procedure
1	Verify coolant level in the **expansion tank**, replenish as required up to top. The max. coolant level must be flush with the bottom of the filler neck.
2	Verify coolant level in the **overflow bottle**, replenish as required. The coolant level must be between max. and min. mark.

4.3.2 Check of mechanical/electronic components

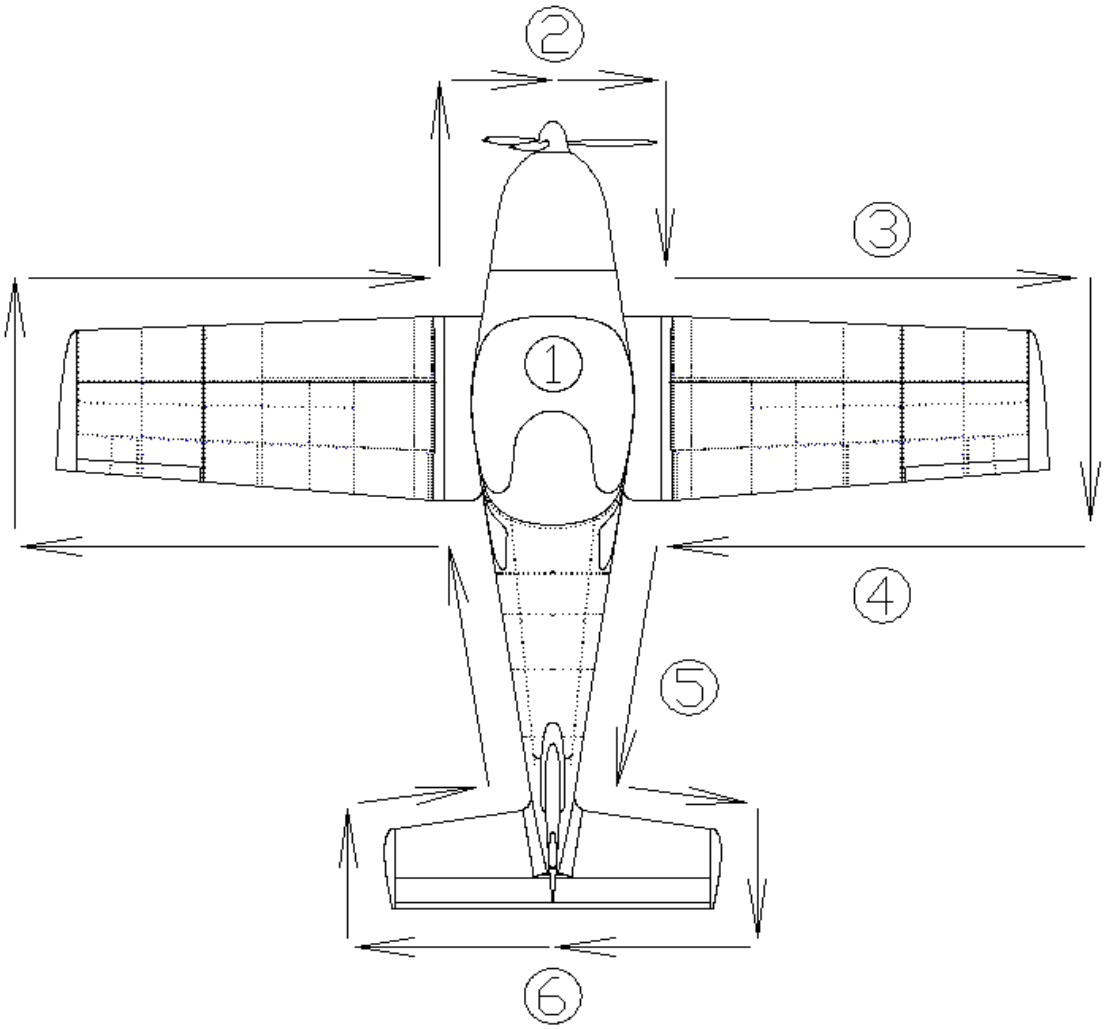
Step	Procedure
1	Turn propeller slowly by hand in direction of engine rotation several times and observe engine for odd noises or excessive resistance and normal compression.
2	Verify free movement of throttle valve and the complete range.
3	Inspect for damages, leakage and general condition of exhaust system and turbocharger.
4	Visual inspection for mechanical and thermal damages of sensor, actuators and the wiring harness.
5	Visual inspection for mechanical and thermal damages of pressure control valve, fusebox and ECU.

4.4 Pre-flight Inspection

Carry out the pre-flight inspection every day prior to the first flight or after airplane assembly. Incomplete or careless inspection can cause an accident. Carry out the inspection following the instructions in the Inspection Check List.

> ***NOTE***
> The word "condition" in the instructions means a visual inspection of surface for damage deformations, scratching, chafing, corrosion or other damages, which may lead to flight safety degradation.

The manufacturer recommends carrying out the pre-flight inspection as follows:



4.4.1 Inspection Check List

①	– Ignition (LANE A,B)	- OFF
	– Master switch	- ON
	– Fuel gauge ind.	- check fuel quantity
	– Master switch	- OFF
	– Avionics	- check condition
	– Control system	- visual inspection, function, clearance, free movement up to stops - check wing flaps operation
	– Canopy	- condition of attachment, cleanness
	– Check cockpit for loose objects	
②	– Rotax 915 iS Pre-flight checks according to 0	
	– Engine cowling condition	
	– Propeller daily inspection – refer to next page for DUC FLASHBLACK Preflight inspection	
	– Engine mount and exhaust manifold condition	
	– Oil and coolant quantity check	
	– Visual inspection of the fuel and electrical system	
	– Fuel system draining	
	– Other actions according to the engine manual	
③	– Wing surface condition	
	– Leading edge condition	
	– Pitot tube condition	
④	– Wing tip	- surface condition, attachment
	– Aileron	- surface condition, attachment, clearance, free movement
	– Flap	- surface condition, attachment, clearance
⑤	– Landing gear	- wheel attachment, brakes, condition and pressure of tires
	– Wing lower surface and fuselage bottom surface condition	
⑥	– Vertical tail unit	- condition of surface, attachment, free movement, rudder stops
	– Horizontal tail unit	- condition of surface, attachment, free movement, elevator stops
	– The check on left side of the fuselage and wing is the same as on right side	

DUC FLASHBLACK Preflight inspection:

Fixation of the propeller: Manually maintaining the tip of a blade of the propeller, shake it firmly to feel if a too much clearance appears in the setting of the propeller.

Degradation of material: Check visually the entire propeller without dismantling (blade root, Inconel leading edge, surface of the blade, spinner, hub, etc.)

Fixation of the spinner: Check visually the fixation screws of the spinner. A marking paint can be made between each screw and spinner to have a means of visual inspection of proper tightening the screws.

Possible problems:

Too much clearance in the propeller fixation

Surface degradation due to dirt or impact / Crack apparent

Corrective actions (depending on the importance):

1. Clean the propeller with the DUC cleaning treatment DUC (ref. 01-80-003)
2. Perform a repair with the DUC repair kit (ref. 01-80-004)
3. Tighten the screws to proper torque with wrench
4. Replace(s) damage component(s)
5. Contact DUC Propellers Company to define a solution

4.4.2 Rotax 915 iS Pre-flight checks

WARNING

Risk of burnings and scalds! Hot engine parts!

Conduct checks on the cold engine only!

Operating media

Step	Procedure
1	Check for any oil-, coolant- and fuel leaks. If leaks are evident, rectify and repair them before next flight.

Oil level

ATTENTION

Operating media must be observed.

Inappropriate coolant quantity can lead to serious engine damage.

The specifications given in 2.4.3 must be adhered to when refilling oil.

Step	Procedure
1	***NOTE*** Propeller shouldn't be turned excessively reverse the normal direction of engine rotation. Remove bayonet cap from the oil tank, turn the propeller slowly by hand in direction of engine rotation several times to pump oil from the engine into the oil tank.
2	It is essential to build up compression in the combustion chamber. Maintain the pressure for a few seconds to let the gas flow via the piston rings into the crankcase. The speed of rotation is not important but the pressure and the amount of gas which is transferred into the crankcase.
3	This process is finished when air is returning back to the oil tank and can be noticed by a gurgle from the open oil tank.
4	Check oil level and add oil if necessary. The oil level should be in the upper half (between the “50%“ and the “max“ mark) and should never falls below the “min.“ mark of the oil dipstick. Prior to long flights oil should be added so that the oil level reaches the “max“ mark. Avoid oil levels exceeding the “max“ mark, since excess oil could be poured out through the venting system. Difference between max.- and min.- mark = 0.45 liter (0.95 liq pt). Oil consumption max 0.06 l/h (0.13 liq pt/h).
5	Re-install bayonet cap.

4.5 Normal procedures

4.5.1 Before engine starting

1. Control system - free & correct movement
2. Canopy - clean
3. Brakes - fully applied
4. Safety harness - tighten
5. Rudder pedals - set to required position

WARNING
Adjusting of rudder pedals position during flight is PROHIBITED.

4.5.2 Engine starting

WARNING
Non-compliance can result in serious injuries or death!
Do not start the engine if any person is near the engine.

Maintenance CAN Bus (A/B) must not be used during flight. B.U.D.S. aircraft USB-to-CAN converter must be disconnected.

1. Fuel Selector - ON - LEFT or RIGHT FUEL TANK
2. Master switch - ON

Step	Step Description	Procedure
1	Engine Pre-heating (if necessary)	–
	Example (Symbolic)	–
2	Activate Fuel pumps	HIC A: A connection between Terminal 3 and Terminal 9 will power Fuel pump 1. HIC B: A connection between Terminal 3 and Terminal 11 will power Fuel pump 2.
	Example (Symbolic)	Fuel pump 1: **ON** Fuel pump 2: **ON**

ATTENTION
Only switch on one fuel pump when starting the engine. Switching on both fuel pumps can lead to a bad start behavior.

3	Activate ECU	HIC A: A connection between Terminal 1 and Terminal 7 will power ECU Lane A. HIC B: A connection between Terminal 1 and Terminal 9 will power ECU Lane B.
	Example (Symbolic)	Lane select Switch A: **ON** Lane select Switch B: **ON**
4	Temporary supply engine with external power supply	X3: A connection between Terminal 2 and Terminal 3, and between airframe ground and EMS ground will activate Start Power. The temporary power supply must be maintained during steps 4, 5, 6.
	Example (Symbolic)	Start Power Switch: **HOLD**
5	Check if Warning Indicators illuminate and extinguish after around 3 seconds.	HIC A: 12 V voltage drop between Terminal 2 and Terminal 8 for 3 seconds. HIC B: 12 V voltage drop between Terminal 2 and Terminal 10 for 3 seconds.
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check
6	Set Throttle Valve	Set linearized throttle position according to diagram Figure 3. Throttle position below.
	Example (Symbolic)	Set Throttle.

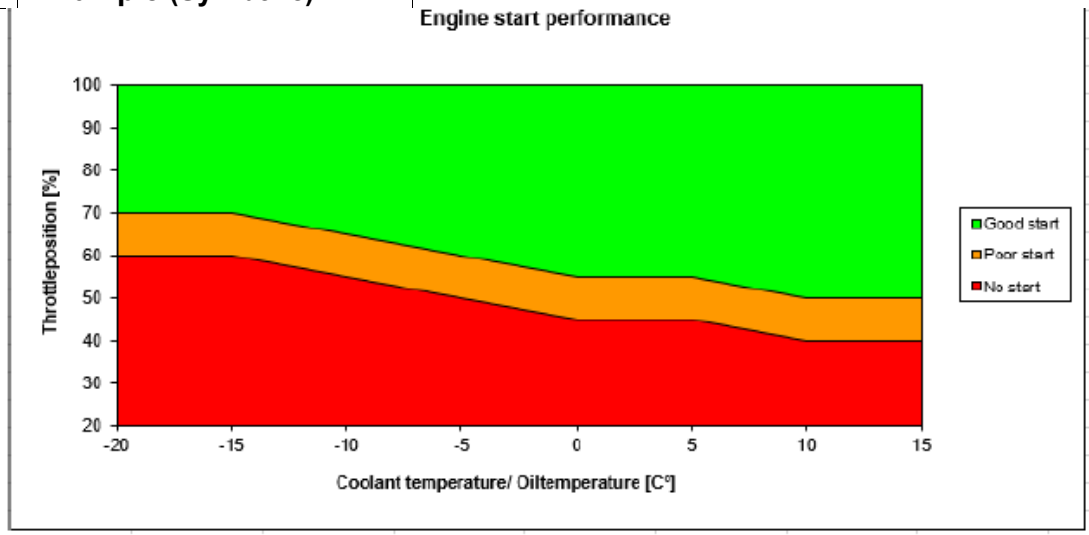


Figure 3: Throttle position

7	Start Engine	HIC B: A connection between Terminal 4 and Terminal 12 actuates the starter. The connection must persist until the engine speed exceeds 1500 rpm.
	Example (Symbolic)	Start Button: **HOLD**

ATTENTION

Activate starter for maximum of 10 seconds only (without interruption), followed by a cooling period of 2 minutes

8	Reduce Throttle Valve as required	Set linearized throttle position so that the engine runs on idle.
	Example (Symbolic)	Reduce Throttle.

ATTENTION
Increasing engine speed is only permitted at steady oil pressure readings above 3 bar.

9	Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 (permanent or oscillating) is detected perform Lane and Ignition Check. See abnormal operation if the voltage drop still persists. HIC B: If a 12 V voltage drop between Terminal 2 and Terminal 10 (permanent or oscillating) is detected perform a Lane and Ignition Check. See abnormal operation if the voltage drop still persists. Display CAN A/B: Check if oil pressure has risen within 10 seconds after engine start and monitor oil pressure.
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check Pilot Display: Check
10	Generator Switching	Increase engine speed above 2400 rpm and hold for 8 seconds.
	Example (Symbolic)	Increase Throttle Position
11	Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. HIC B: If a 12 V voltage drop between Terminal 2 and Terminal 10 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. Display CAN A/B: Check and ensure compliance with operational limits.
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check Pilot Display: Check

4.5.3 After engine start

WARNING
Non-compliance can result in serious injuries or death!
Do not start the engine if any person is near the engine.

4.5.3.1 Warming up period

Step	Step Description	Procedure
1	Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits while step 2 to 4.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. HIC B: If a 12 V voltage drop between Terminal 2 and Terminal 10 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. Display CAN A/B: Check and ensure compliance with operational limits.
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check Pilot Display: Check
2	Set Throttle Valve as required.	Set linearized throttle position in a way that the engine runs on approx. 2000 rpm for approx. 2 minutes.
	Example (Symbolic)	Set Throttle
3	Set Throttle Valve as required.	Set linearized throttle position in a way that the engine runs on approx. 2500 rpm until oil temperature reaches 50 °C (120 ° F).
	Example (Symbolic)	Set Throttle
4	Reduce Throttle Valve as required.	Set linearized throttle position so that the engine runs on idle.
	Example (Symbolic)	Reduce Throttle

The warm up period depends on ambient air temperature.
Switch “ON” propeller control and check propeller adjustment in all adjustment range.

4.5.4 Engine run-up

4.5.4.1 Ground test

CAUTION

The engine check should be performed with the aircraft heading upwind and not on a loose terrain (the propeller may suck grit which can damage the leading edges of blades).

ATTENTION

After a full-load ground test allow a short cooling run at idle speed to prevent vapor formation in the cylinder head.

Step	Step Description	Procedure
1	Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits while step 2 to 3.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. HIC B: If a 12 V voltage drop between Terminal 2 and Terminal 10 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting Display CAN A/B: Check and ensure compliance with operational limits.
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check Pilot Display: Check
2	Set Full Throttle	Set linearized throttle position to WOT and check if maximum performance can be reached.
	Example (Symbolic)	Set Throttle.
3	Set Throttle Valve as required	Set linearized throttle position to reach an engine speed of 2500 rpm and continue with Lane check 2500 rpm and Ignition check.
	Example (Symbolic)	Set Throttle.

4.5.4.2 Lane and Ignition check

During the Lane and Ignition check Engine Speed must always show plausible values no matter if one or both lanes are active. Otherwise maintenance is required.

Step	Step Description	Procedure
1	Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits while step 2 to 11.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. HIC B: If a 12 V voltage drop between Terminal 2 and Terminal 10 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting Display CAN A/B: Check and ensure compliance with operational limits.
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check Pilot Display: Check
2	Set Throttle Valve as required.	Set linearized throttle position so that engine speed is approx. 2500 rpm.
	Example (Symbolic)	Set Throttle
3	Deactivate ECU Lane A	HIC A: Disconnect Terminal 1 and Terminal 7 to turn OFF ECU Lane A.
	Example (Symbolic)	Lane select Switch A: **OFF**
4	Observe engine speed	Display CAN A/B; Check engine speed.
	Example (Symbolic)	Pilot Display: Check

ATTENTION

Engine speed may not drop/increase more than 250 rpm. If the fuel pressure is not within the limits, the cause must be determined. The engine must not be put into service until the problem is rectified.

5	Activate ECU Lane A	HIC A: Connect Terminal 1 and Terminal 7 to power ECU Lane A.
	Example (Symbolic)	Lane select Switch A: **ON**
6	Await Warning Indicator A to extinguish and consider slack time.	HIC A: 12 V voltage drop between Terminal 2 and Terminal 8 for 3 seconds.
	NOTE *After the voltage drop between Terminal 2 and Terminal 8 changes back to 0 V wait approx. 3 seconds until continuing with the next step.*	
	Example (Symbolic)	Warning Lamp A: Check

7	Deactivate ECU Lane B	HIC B: Disconnect Terminal 1 and Terminal 9 to turn OFF ECU Lane B.
	Example (Symbolic)	Lane select Switch B: **OFF**
8	Observe engine speed	Display CAN A/B: Check engine speed.
	Example (Symbolic)	Pilot Display: Check

ATTENTION

Engine speed may not drop/increase more than 250 rpm. If the fuel pressure is not within the limits, the cause must be determined. The engine must not be put into service until the problem is rectified.

9	Activate ECU Lane B	HIC B: Connect Terminal 1 and Terminal 9 to power ECU Lane B.
	Example (Symbolic)	Lane select Switch B: **ON**
10	Await Warning Indicator B to extinguish and consider slack time.	HIC A: 12 V voltage drop between Terminal 2 and Terminal 10 for 3 seconds.
	NOTE *After the voltage drop between Terminal 2 and Terminal 10 changes back to 0 V wait approx. 3 seconds until continuing with the next step.*	
	Example (Symbolic)	Warning Lamp B: Check
11	Reduce Throttle Valve as required.	Set linearized throttle position to reach an engine speed of 2000 rpm and continue with fuel pump check.
	Example (Symbolic)	Set Throttle

NOTE

Lane A and Lane B have different sensor inputs. During Lane and Ignition check, some sensor values are not displayed, de- pending 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

4.5.4.3 Wastegate and PCV check

Manifold Air Temperature (MAT) must be <65 °C during the check procedure. Otherwise the ECU (Engine Control Unit) internal check of the Pressure Control Valve (PCV) and Wastegate will not be executed.

NOTE

If possible the PCV Check and the Lane and Ignition Check might be combined in one check.

Step	Step Description	Procedure
1	Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits while step 2 –13.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. HIC B: If a 12 V voltage drop between Terminal 2 and Terminal 10 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. Display CAN A/B: Check and ensure compliance with operational limits.
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check Pilot Display: Check
2	Set Throttle valve to WOT	Set linearized throttle position to 100%. Governor must be set in a way that engine speed >4700 rpm.
	Example (Symbolic)	Set Throttle
3	Deactivate ECU Lane A	HIC A: Disconnect Terminal 1 and Terminal 7 to turn OFF ECU Lane A
	Example (Symbolic)	Lane Select Switch A: **OFF**
4	Wait > 15 seconds	–
	Example (Symbolic)	Wait
5	Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. HIC B: If a 12 V voltage drop between Terminal 2 and Terminal 10 (permanent or oscillating) is detected, shut OFF
		engine and perform troubleshooting. Display CAN A/B: Check and ensure compliance with operational limits.
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check Pilot Display: Check
6	Activate ECU Lane A	HIC A: Connect Terminal 1 and Terminal 7 to power ECU Lane A
	Example (Symbolic)	Lane Select Switch A: **ON**

7	Await Warning Indicator A to extinguish and consider slack time.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 for 3 second.
	NOTE *After the voltage drop between Terminal 2 and Terminal 8 changes back to 0 V wait approx. 3 seconds until continuing with the next step.*	
	Example (Symbolic)	Warning Lamp A: Check
8	Deactivate ECU Lane B	HIC B: Disconnect Terminal 1 and Terminal 9 to turn OFF ECU Lane B
	Example (Symbolic)	Lane Select Switch B: OFF
9	Wait > 15 seconds	–
	Example (Symbolic)	Wait
10	Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 (permanent or oscillating) is detected, shut off engine and perform troubleshooting. HIC B: If a 12 V voltage drop between Terminal 2 and Terminal 10 (permanent or oscillating) is detected, shut off engine and perform troubleshooting. Display CAN A/B: Check and ensure compliance with operational limits.
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check
		Pilot Display: Check
11	Activate ECU Lane B	HIC B: Connect Terminal 1 and Terminal 9 to power ECU Lane B.
	Example (Symbolic)	Lane select Switch B: **ON**
12	Await Warning Indicator B to extinguish and consider slack time.	HIC A: 12 V voltage drop between Terminal 2 and Terminal 10 for 3 seconds.
	NOTE *After the voltage drop between Terminal 2 and terminal 10 changes back to 0 V wait approx. 3 seconds until continuing with the next step.*	
	Example (Symbolic)	Warning Lamp B: Check
13	Reduce Throttle Valve as required	Set linearized throttle position to reach an engine speed of 2000 rpm and continue with Fuel pump check
	Example (Symbolic)	Set Throttle

4.5.4.4 Fuel pump check

It must be ensured, that both fuel pumps are working and no loss of power or irregular running by deactivation of one fuel pump occurs. The limits for fuel pressure must not be exceeded.

Step	Step Description	Procedure
1	Check engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits while step 2– 8.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. HIC B: If a 12 V voltage drop between Terminal 2 and Terminal 10 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. Display CAN A/B: Check and ensure compliance with operational limits.
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check Pilot Display: Check
2	Set Throttle valve as required	Set linearized throttle position so that the engine speed is approx. 2000 rpm.
	Example (Symbolic)	Set Throttle
3	Deactivate Fuel pump 1	HIC A: Disconnect Terminal 3 and Terminal 9 to deactivate Fuel pump 1
	Example (Symbolic)	Fuel pump 1: **OFF**
4	Observe Fuel pressure	
	Example (Symbolic)	Pilot Display: Check

ATTENTION

If the fuel pressure is not within the limits, the cause must be determined. The engine must not be put into service until the problem is rectified.

5	Activate Fuel pump 1	HIC A: Disconnect Terminal 3 and Terminal 9 to deactivate Fuel pump 1
	Example (Symbolic)	Fuel pump 1: **ON**
6	Deactivate Fuel pump 2	HIC A: Disconnect Terminal 3 and Terminal 11 to deactivate Fuel pump 2
	Example (Symbolic)	Fuel pump 2: **OFF**

7	Observe Fuel pressure	
	Example (Symbolic)	Pilot Display: Check

ATTENTION
If the fuel pressure is not within the limits, the cause must be determined. The engine must not be put into service until the problem is rectified.

8	Activate Fuel pump 2	HIC A: Disconnect Terminal 3 and Terminal 11 to deactivate Fuel pump 2.

NOTE

Cycling the propeller governor puts a relatively high load on the engine. Unnecessary cycling should be avoided.

4.5.5 Taxiing

Apply power and brakes as needed. Apply brakes to control movement on ground. Taxi carefully when wind velocity exceeds 20 knots (10 m/s). Hold the control stick in neutral position, or in a position that properly deflects a crosswind.

4.5.6 Before take-off

1.	Altimeter	- set
2.	Trim	- set neutral position
3.	Control system	- check free movement
4.	Cockpit canopy	- closed
5.	Safety harness	- tighten
6.	AEPS (parachute)	- unlocked and safety pin removed - crew familiar with AEPS activation procedure in emergency
7.	Fuel Selector	- ON (LEFT or RIGHT tank)

NOTE

AIRCRAFT IS EQUIPPED WITH RETURN LINES IN BOTH FUEL TANKS.

8.	Ignition (LANE A,B)	- ON
9.	El. pumps	- ON
10.	Propeller control	- set for take-off (min. pitch)
11.	Wing flaps	- 10° (Takeoff position)
12.	Autopilot	- OFF (if installed)

4.5.7 Take-off

1. Brakes - apply to stop wheel rotation
2. Take-off power - throttle fully forward
3. Brakes - release
4. Nose wheel unstick - 43 KIAS (80 km/h)
5. Airplane lift-off - 49 KIAS (90 km/h)
6. Engine speed - check rpm
7. Instruments - check if within limits
8. Wing flaps - retract when speed of 65 KIAS (120 km/h) is reached, at altitude of 150 ft
9. Make transition to climb

WARNING

The Take-off is prohibited if:
- The engine is running unsteadily
- The engine instruments values are beyond operational limits
- The crosswind velocity exceeds permitted limits (see 5.2.8)
- Autopilot is “ON”

4.5.8 Short field take-off

1. Use all available runway
2. Heading - set
3. Flaps - 30°
4. Trim - as required
5. Hold brakes
6. Throttle - fully forward (5800 rpm, max. 5min.)
7. Engine instruments - check within limits
8. Release brakes after rpm increase
9. Accelerate and pull control stick aft to lift off the nose wheel as soon as possible.
10. As aircraft becomes airborne, level off in ground effect to accelerate to:

No obstacle:	Vy (best rate of climb)	100 KIAS (185 km/h)
Obstacle:	Vx (best angle of climb)	90 KIAS (167 km/h)

11. Flaps	- set to 10°	
12. Climb at:		
No obstacle:	Vy (best rate of climb)	100 KIAS (185 km/h)
Obstacle:	Vx (best angle of climb)	90 KIAS (167 km/h)
13. Trim	- adjust	
14. Flaps	- retract at V_{FE} 75 KIAS (139 km/h) or at 150 ft Do not exceed V_{FE} with flaps extended	

4.5.9 Soft field take-off

1. Inspect field condition checking for grass height, bumps, holes, debris, wetness.		
2. Taxiing	- control stick fully aft	
3. Heading	- set	
4. Flaps	- 30°	
5. Trim	- as required	
6. Throttle	- fully forward (5800 rpm, max. 5min.)	
7. Control stick	- full aft pressure during T/O run to lift off nose wheel as soon as possible.	
8. As aircraft becomes airborne, level off in ground effect to accelerate to:		
No obstacle:	Vy (best rate of climb)	100 KIAS (185 km/h)
Obstacle:	Vx (best angle of climb)	90 KIAS (167 km/h)
9. Flaps	- set to 10°	
10. Climb		
No obstacle:	Vy (best rate of climb)	100 KIAS (185 km/h)
Obstacle:	Vx (best angle of climb)	90 KIAS (167 km/h)
11. Trim	- adjust	
12. Flaps	- retract at V_{FE} 75 KIAS (139 km/h) or at 150 ft Do not exceed V_{FE} with flaps extended	

4.5.10 Climb

1. Best ROC speed
   - Best rate of climb speed (Vy): 100 KIAS (185 km/h)
   - Best angle of climb speed (Vx): 90 KIAS (167 km/h)

CAUTION

For the safety of flight reason, the airspeeds Vy and Vx are specified higher, considering high power of Rotax 915 iS engine, which would lead to too high angles of climb at lower climbing speeds.

2. Throttle
   - Max. take-off power
   - (max. 5800 rpm for 5 minutes)
   - Max. cont. power 5500 rpm
3. Trim
   - trim the airplane
4. Instruments
   - oil temperature and pressure, coolant temperature within limits

CAUTION

If coolant or oil temperature approach their limits, reduce the climb angle to increase airspeed and thus fulfill the limits.

4.5.11 Cruise

1. Electric fuel pump - AUX pump OFF
2. Fuel selector - full tank (LEFT or RIGHT)

NOTE

It is recommended to switch between tanks from time to time during flight to consume fuel equally from both tanks.

3. Wing flaps - retracted
4. Throttle control - set desired MAP (LOADING PRESSURE)

CAUTION

Avoid operation below normal oil temperature (90-110°C / 194-230 °F), as possible formation of condensation water in the lubrication system badly influences the oil quality. To evaporate possibly accumulated condensation water, at least once a day 100 °C (212 °F) oil temperature must be reached.

DUC FLASHBLACK propeller governor allows "Constant Speed" management of the propeller pitch in flight. An adjustment is made by the pilot on this governor to choose an engine rotation speed. This adjustment is made using a mechanical cable control that can be either a push-pull or lever. In flight, depending on the position of the throttle and the evolution of the aircraft, the governor varies his pressure to vary the propeller pitch and then keep the engine and propeller speed constant.

Refer to Section 5, for recommended cruising regimes.

4.5.12 Descent

1. Optimum glide speed - 65 KIAS (120 km/h)

CAUTION

It is not advisable to reduce the engine throttle control lever to minimum on final approach and when descending from very high altitude. In such cases the engine becomes under-cooled and a loss of power may occur. Descent at increased idle (approx. 3000 rpm), speed between 120-1300 km/h (65-70 KIAS) and check that the engine instruments indicate values within permitted limits.

4.5.13 Before landing

1. Approach speed - 60 KIAS (110 km/h)
2. Throttle - as needed
3. Electric fuel pump(s) - ON
4. Wing flaps - extend as needed
5. Trim - as needed
6. Propeller control - in the take-off position
7. Autopilot - OFF

4.5.14 Balked Landing (Go around)

1. Throttle - full power (max.5800 rpm)
2. Wing flaps - extend as needed
3. Trim - adjust as needed
4. Wing flaps - retract at height of 150 ft after reaching 65 KIAS (120 km/h)
5. Trim - adjust
6. Repeat circuit pattern and landing

4.5.15 Landing

1. Touch-down on main wheels
2. Apply brakes as needed after the nose wheel touch-down

4.5.16 Short field landing

1. Fuel selector - select proper tank
2. Safety harness - check that tightened
3. Approach speed - 55 KIAS (100 km/h)
4. Glide path – just enough to clear obstacle at approach end of runway
5. Throttle - as required
6. Electric fuel pump - ON
7. Flaps - 30°
8. Trim - as required
9. Landing light(s) - ON
10. Flare - minimum float
11. After touchdown - stick forward
    - Retract flaps
    - Maximum braking

4.5.17 Soft field landing

1. Fuel selector - select proper tank
2. Safety harness - check that tightened
3. Approach speed - 59 KIAS (110 km/h)
4. Throttle - as required
5. Electric fuel pump - ON
6. Flaps - 20 °
7. Trim - as required
8. Landing light(s) - ON
9. Flare - add power before touchdown to keep elevator effective to help keep weight off nose wheel
10. After touchdown - throttle to idle
    gradually increase back elevator to keep weight of nosewheel
    No braking during roll out

4.5.18 After landing

1. Engine speed - set as required for taxiing
2. Wing flaps - retract

4.5.19 Engine shut-off

Step	Step Description	Procedure
1	Check the engine instruments (Warning Indicators and Operational Limits) and ensure compliance with the operating limits while step 2 to 5.	HIC A: If a 12 V voltage drop between Terminal 2 and Terminal 8 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. HIC B: If a 12 V voltage drop between Terminal 2 and Terminal 10 (permanent or oscillating) is detected, shut OFF engine and perform troubleshooting. Display CAN A/B: Check and ensure compliance with operational limits
	Example (Symbolic)	Warning Lamp A: Check Warning Lamp B: Check Pilot Display: Check
2	Reduce **Throttle** valve as required.	Set linearized throttle position so that the engine runs on **idle**.
	Example (Symbolic)	Reduce Throttle
3	Await cooling down phase.	**Wait > 2 minutes**
4	Deactivate ECU	HIC A: Disconnect Terminal 1 and Terminal 7 to turn OFF ECU Lane A HIC B: Disconnect Terminal 1 and Terminal 9 to turn OFF ECU Lane B
	Example (Symbolic)	Lane select Switch A: **OFF** Lane select Switch B: **OFF**

NOTE

The ECU needs to deactivated first. Shutting of the engine by deactivating the fuel supply may result in fault and failure entries in the ECU. Shutting down the engine by shutting of the fuel pumps is only allowed in emergency situations.

5	Deactivate Fuel pumps	HIC A: Disconnect Terminal 3 and terminal 9 to turn OFF Fuel pump 1 HIC B: Disconnect Terminal 3 and terminal 11 to turn OFF Fuel pump 2
	Example (Symbolic)	Fuel pump 1: **OFF** Fuel pump 2: **OFF**
6	Propeller control	switch off
7	Circuit breakers	switch off
8	Master switch	switch off

4.5.20 Aircraft parking and tie-down

1. Ignition check - OFF
2. Master switch check - OFF
3. Fuel selector - OFF
4. Parking brake - use it as necessary (if installed)
5. AEPS - activation handle locked
6. Canopy - close, lock as necessary
7. Secure the airplane

NOTE

It is recommended to use parking brake (if installed) for short-time parking only, between flights during a flight day. After ending the flight day or at low temperatures of ambient air, do not use parking brake, but use the wheel chocks instead.

NOTE

Use anchor eyes on the wings and fuselage rear section to fix the airplane. Move control stick forward and fix it together with the rudder pedals. Make sure that the cockpit canopy is properly closed and locked. The anchoring before leaving the airplane is important if the airplane is not equipped with a parking brake.

WARNING

Caution when parking the aircraft in direct sunlight with the cockpit canopy open. An open cockpit canopy can act as an optical lens and cause damage to the cockpit interior, including possible fire ignition!

4.5.21 Flight in rain

When flying in the rain, no additional steps are required. Aircraft qualities and performance are not substantially changed. However Visual Meteorological Condition (VMC) must be maintained.

SECTION 5

5 PERFORMANCE

5.1 Introduction

5.2 Performance

5.2.1 Airspeed indicator system calibration
5.2.2 Stall speeds
5.2.3 Take-off performance
5.2.4 Landing distances
5.2.5 Climb performance
5.2.6 Cruise
5.2.7 Endurance and Range
5.2.8 Demonstrated crosswind performance
5.2.9 Optimum glide speed
5.2.10 Ceiling

5.1 Introduction

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

The presented data has been computed from actual flight tests with the aircraft and engine in good conditions and using average piloting techniques.

If not stated otherwise, the performance stated in this section is valid for maximum take-off weight and under ISA conditions.

The performance shown in this section is valid for aircraft fitted with different propeller type, the real parameters may be slightly different.

5.2 Performance

5.2.1 Airspeed indicator system calibration

	KIAS	KCAS
VS0	38	39
	40	41
VS1	43	44
	50	51
	55	55
	60	60
	65	65
	70	70
VFE, VLO	75	75
	80	80
	85	85
	90	90
VA, VLE	96	96
	100	100
	105	105
	110	109
	115	114
	120	119
	125	124
VNO	129	128
	135	134
	140	139
	145	144
	150	149
VNE	157	156

	IAS [km/h]	CAS [km/h]
VS0	71	72
	75	76
VS1	80	81
	90	91
	100	101
	110	111
	120	120
	130	130
VFE, VLO	139	139
	150	150
	160	160
	170	170
VA, VLE	180	179
	190	189
	200	199
	210	209
	220	219
	230	229
VNO	240	238
	250	248
	260	258
	270	268
	280	278
VNE	290	287

5.2.2 Stall speeds

Conditions: Max. takeoff-off weight Engine idle run	Wing flaps pos.	IAS [km/h]	CAS [km/h]	*KIAS*	*KCAS*	Altitude loss at recovery [ft]
Wing level stall	**0°**	81	82	44	44	100
	10°	76	77	41	41	120
	20°	73	75	40	40	120
	30°	72	73	39	39	160
Co-ordinated turn 30° bank stall	**0°**	87	88	47	47	120
	10°	81	82	44	44	140
	20°	79	80	43	43	160
	30°	77	78	42	42	200

5.2.3 Take-off performance

ISA Conditions		CONCRETE		GRASS	
Airport altitude H [ft]	Temperature tH [°C]	Takeoff Run [m]	Distance over 50 ft obstacle [m]	Takeoff Run [m]	Distance over 50 ft obstacle [m]
0 ft ISA	15,0	140	240	170	270
2000 ft ISA	11,0	160	270	190	300
4000 ft ISA	7,1	180	300	220	340
6000 ft ISA	3,1	200	340	240	390
8000 ft ISA	-0,8	230	390	280	440
10000 ft ISA	-4,8	260	440	310	500

ISA + 20 °C		CONCRETE		GRASS	
Airport altitude H [ft]	Temperature tH [°C]	Takeoff Run [m]	Distance over 50 ft obstacle [m]	Takeoff Run [m]	Distance over 50 ft obstacle [m]
0 ft ISA	35,0	160	270	190	310
2000 ft ISA	31,0	180	310	220	350
4000 ft ISA	27,1	200	350	250	390
6000 ft ISA	23,1	230	400	280	440
8000 ft ISA	19,2	260	450	320	500
10000 ft ISA	15,2	300	510	360	570

ISA + 35 °C		CONCRETE		GRASS	
Airport altitude H [ft]	Temperature tH [°C]	Takeoff Run [m]	Distance over 50 ft obstacle [m]	Takeoff Run [m]	Distance over 50 ft obstacle [m]
0 ft ISA	50,0	180	300	210	340
2000 ft ISA	46,0	200	340	240	380
4000 ft ISA	42,1	220	390	270	430
6000 ft ISA	38,1	250	440	310	490
8000 ft ISA	34,2	290	490	350	560
10000 ft ISA	30,2	330	560	400	630

ISA -20 °C		CONCRETE		GRASS	
Airport altitude H [ft]	Temperature tH [°C]	Takeoff Run [m]	Distance over 50 ft obstacle [m]	Takeoff Run [m]	Distance over 50 ft obstacle [m]
0 ft ISA	-5,0	120	210	150	230
2000 ft ISA	-9,0	140	230	170	260
4000 ft ISA	-12,9	150	260	190	300
6000 ft ISA	-16,9	170	300	210	330
8000 ft ISA	-20,8	190	330	240	380
10000 ft ISA	-24,8	220	380	270	420

ISA -40 °C		CONCRETE		GRASS	
Airport altitude H [ft]	Temperature tH [°C]	Takeoff Run [m]	Distance over 50 ft obstacle [m]	Takeoff Run [m]	Distance over 50 ft obstacle [m]
0 ft ISA	-25,0	100	180	130	200
2000 ft ISA	-29,0	120	200	140	220
4000 ft ISA	-32,9	130	220	160	250
6000 ft ISA	-36,9	150	250	180	280
8000 ft ISA	-40,8	160	280	200	320
10000 ft ISA	-44,8	190	320	230	360

5.2.4 Landing distances

ISA Conditions		CONCRETE		GRASS	
Airport altitude H [ft]	Temperature tH [°C]	Landing Run [m]	Distance over 50 ft obstacle [m]	Landing Run [m]	Distance over 50 ft obstacle [m]
0 ft ISA	15,0	240	470	290	520
2000 ft ISA	11,0	250	500	310	550
4000 ft ISA	7,1	270	530	330	590
6000 ft ISA	3,1	290	560	350	620
8000 ft ISA	-0,8	310	600	370	660
10000 ft ISA	-4,8	330	640	390	700

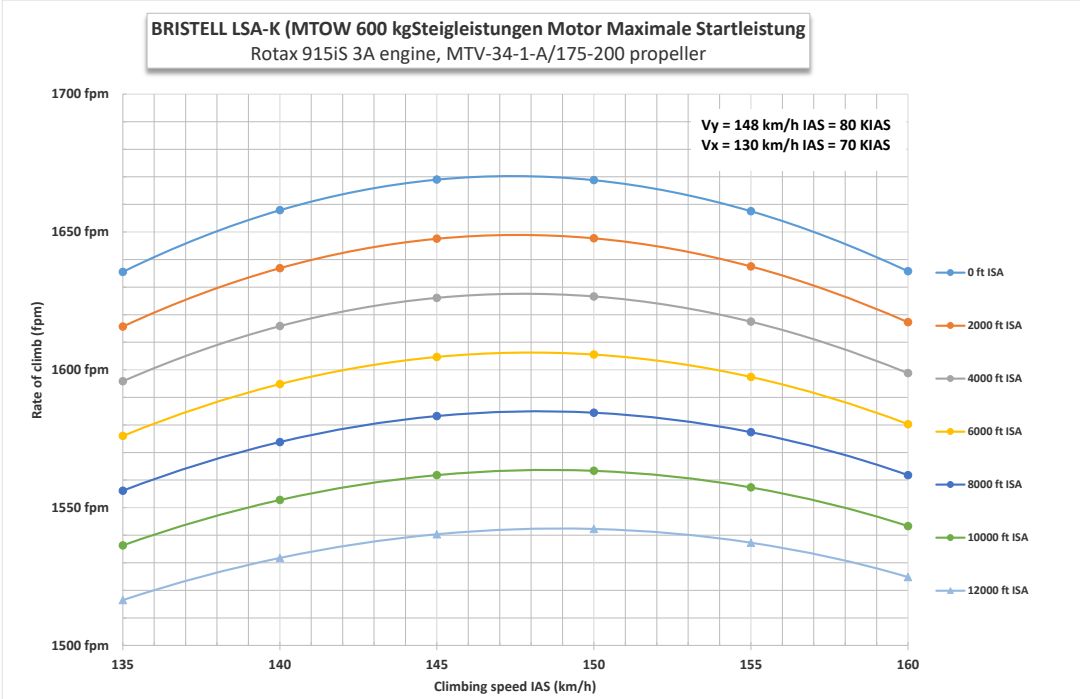
ISA + 20 °C		CONCRETE		GRASS	
Airport altitude H [ft]	Temperature tH [°C]	Landing Run [m]	Distance over 50 ft obstacle [m]	Landing Run [m]	Distance over 50 ft obstacle [m]
0 ft ISA	35,0	260	500	310	560
2000 ft ISA	31,0	270	530	330	590
4000 ft ISA	27,1	290	570	350	630
6000 ft ISA	23,1	310	600	370	670
8000 ft ISA	19,2	330	640	400	710
10000 ft ISA	15,2	350	680	420	760

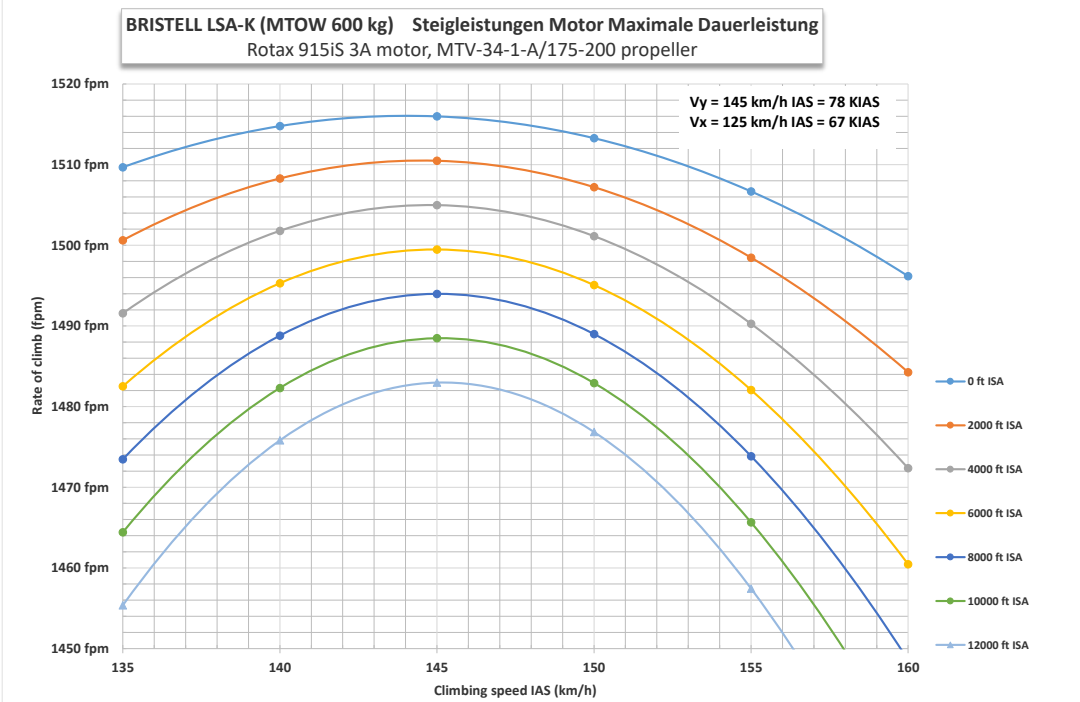
ISA + 35 °C		CONCRETE		GRASS	
Airport altitude H [ft]	Temperature tH [°C]	Landing Run [m]	Distance over 50 ft obstacle [m]	Landing Run [m]	Distance over 50 ft obstacle [m]
0 ft ISA	50,0	270	530	330	580
2000 ft ISA	46,0	290	560	350	620
4000 ft ISA	42,1	300	600	370	660
6000 ft ISA	38,1	320	630	390	700
8000 ft ISA	34,2	340	670	420	750
10000 ft ISA	30,2	370	720	440	800

ISA -20 °C		CONCRETE		GRASS	
Airport altitude H [ft]	Temperature tH [°C]	Landing Run [m]	Distance over 50 ft obstacle [m]	Landing Run [m]	Distance over 50 ft obstacle [m]
0 ft ISA	-5,0	220	440	270	480
2000 ft ISA	-9,0	240	460	290	510
4000 ft ISA	-12,9	250	490	300	540
6000 ft ISA	-16,9	270	520	320	580
8000 ft ISA	-20,8	280	550	340	610
10000 ft ISA	-24,8	300	590	360	650

ISA -40 °C		CONCRETE		GRASS	
Airport altitude H [ft]	Temperature tH [°C]	Landing Run [m]	Distance over 50 ft obstacle [m]	Landing Run [m]	Distance over 50 ft obstacle [m]
0 ft ISA	-25,0	210	400	250	450
2000 ft ISA	-29,0	220	430	260	470
4000 ft ISA	-32,9	230	450	280	500
6000 ft ISA	-36,9	250	480	300	530
8000 ft ISA	-40,8	260	510	310	560
10000 ft ISA	-44,8	280	540	330	600

5.2.5 Climb performance





NOTE

It is advisable to climb at higher speeds than those ones in the table above to reduce high-pitch angle of climbing and necessity to apply right rudder in order to counterbalance Rotax 915 iS high power.

5.2.6 Cruise

Pressure altitude Hp [ft]	Engine power [% of MCP]	Engine speed RPM	MAP [inHg]	IAS [km/h]	CAS [km/h]	TAS [km/h]	KIAS	KCAS	KTAS
0	100	5500	49,7	249	248	248	134	134	134
0	80	5500	38,1	223	223	223	120	121	121
0	60	5500	29,9	202	204	204	109	110	110
0	97	5300	48,8	242	241	241	131	130	130
0	80	5300	39,1	231	231	231	125	125	125
0	60	5300	30,8	199	201	201	108	108	108
0	88	5000	46,2	236	236	236	127	127	127
0	80	5000	51,4	220	221	221	119	119	119
0	60	5000	31,2	198	200	200	107	108	108
3000	100	5500	49,7	245	244	255	132	132	138
3000	80	5500	38,1	221	222	232	119	120	125
3000	60	5500	29,9	197	198	207	106	107	112
3000	97	5300	48,8	239	239	249	129	129	135
3000	80	5300	39,1	227	227	237	122	122	128
3000	60	5300	30,8	194	196	205	105	106	111
3000	88	5000	46,2	231	231	242	125	125	131
3000	80	5000	51,4	219	220	230	118	119	124
3000	60	5000	31,2	193	195	204	104	105	110
5000	100	5500	49,7	242	241	260	131	130	140
5000	80	5500	38,1	220	221	238	119	119	128
5000	60	5500	29,9	193	195	210	104	105	113
5000	97	5300	48,8	237	237	255	128	128	138
5000	80	5300	39,1	224	224	242	121	121	130
5000	60	5300	30,8	191	193	208	103	104	112
5000	88	5000	46,2	228	228	246	123	123	133
5000	80	5000	51,4	218	219	236	118	118	127
5000	60	5000	31,2	190	192	206	102	103	111
8000	100	5500	49,7	238	238	268	129	128	145
8000	80	5500	38,1	219	219	247	118	118	134
8000	60	5500	29,9	187	189	214	101	102	115
8000	97	5300	48,7	234	234	264	126	126	142
8000	80	5300	39,1	220	220	249	119	119	134
8000	60	5300	30,8	186	188	213	101	102	115
8000	88	5000	46,2	223	224	252	120	121	136
8000	80	5000	51,3	217	218	245	117	117	132
8000	60	5000	31,2	185	187	211	100	101	114
10000	100	5500	49,7	236	235	274	127	127	148
10000	80	5500	38,1	218	218	254	118	118	137
10000	60	5500	29,9	184	186	216	99	100	117
10000	97	5300	48,7	232	232	270	125	125	146
10000	80	5300	39,1	217	218	253	117	118	137
10000	60	5300	30,8	183	185	216	99	100	116
10000	88	5000	46,2	220	220	257	119	119	139
10000	80	5000	51,3	216	217	252	117	117	136
10000	60	5000	31,2	181	183	214	98	99	115
12000	100	5500	49,7	233	233	280	126	126	151
12000	80	5500	38,1	217	217	261	117	117	141
12000	60	5500	29,9	180	182	219	97	98	118
12000	97	5300	48,7	230	230	276	124	124	149
12000	80	5300	39,1	214	215	258	116	116	140
12000	60	5300	30,8	180	182	219	97	98	118
12000	88	5000	46,2	217	217	261	117	117	141
12000	80	5000	51,3	215	216	259	116	117	140
12000	60	5000	31,2	178	180	216	96	97	117

5.2.7 Endurance and Range

The table below shows fuel consumption, endurance and range

Pressure altitude Hp [ft]	Engine power [% of MCP]	Engine speed RPM	MAP [inHg]	IAS [km/h]	CAS [km/h]	TAS [km/h]	KIAS	KCAS	KTAS	Fuel consumption [lph]	Endurance [hh:mm]	Range [km]	Range [NM]
0	100	5500	49,7	249	248	248	134	134	134	47,1	2:31	630	340
0	80	5500	38,1	223	223	223	120	121	121	31,4	3:47	850	460
0	60	5500	29,9	202	204	204	109	110	110	22,5	5:17	1080	580
0	97	5300	48,8	242	241	241	131	130	130	42,9	2:46	670	360
0	80	5300	39,1	231	231	231	125	125	125	29,4	4:02	930	500
0	60	5300	30,8	199	201	201	108	108	108	22,6	5:15	1050	570
0	88	5000	46,2	236	236	236	127	127	127	37,9	3:08	740	400
0	80	5000	51,4	220	221	221	119	119	119	28,8	4:07	910	490
0	60	5000	31,2	198	200	200	107	108	108	21,9	5:26	1090	590
3000	100	5500	49,7	245	244	255	132	132	138	47,1	2:31	640	350
3000	80	5500	38,1	221	222	232	119	120	125	31,4	3:47	880	480
3000	60	5500	29,9	197	198	207	106	107	112	22,5	5:17	1100	590
3000	97	5300	48,8	239	239	249	129	129	135	42,9	2:46	690	370
3000	80	5300	39,1	227	227	237	122	122	128	29,4	4:02	960	520
3000	60	5300	30,8	194	196	205	105	106	111	22,7	5:15	1080	580
3000	88	5000	46,2	231	231	242	125	125	131	37,9	3:08	760	410
3000	80	5000	51,4	219	220	230	118	119	124	28,8	4:07	950	510
3000	60	5000	31,2	193	195	204	104	105	110	21,9	5:26	1110	600
5000	100	5500	49,7	242	241	260	131	130	140	47,1	2:31	660	360
5000	80	5500	38,1	220	221	238	119	119	128	31,4	3:47	900	490
5000	60	5500	29,9	193	195	210	104	105	113	22,5	5:17	1110	600
5000	97	5300	48,8	237	237	255	128	128	138	42,9	2:46	710	380
5000	80	5300	39,1	224	224	242	121	121	130	29,4	4:02	980	530
5000	60	5300	30,8	191	193	208	103	104	112	22,7	5:15	1090	590
5000	88	5000	46,2	228	228	246	123	123	133	37,9	3:08	770	420
5000	80	5000	51,4	218	219	236	118	118	127	28,8	4:07	970	520
5000	60	5000	31,2	190	192	206	102	103	111	21,9	5:26	1120	600
8000	100	5500	49,7	238	238	268	129	128	145	47,1	2:31	680	370
8000	80	5500	38,1	219	219	247	118	118	134	31,4	3:47	940	510
8000	60	5500	29,9	187	189	214	101	102	115	22,5	5:17	1130	610
8000	97	5300	48,7	234	234	264	126	126	142	42,9	2:46	730	390
8000	80	5300	39,1	220	220	249	119	119	134	29,4	4:02	1000	540
8000	60	5300	30,8	186	188	213	101	102	115	22,7	5:15	1120	600
8000	88	5000	46,2	223	224	252	120	121	136	37,9	3:08	790	430
8000	80	5000	51,3	217	218	245	117	117	132	28,8	4:07	1010	550
8000	60	5000	31,2	185	187	211	100	101	114	21,9	5:26	1150	620
10000	100	5500	49,7	236	235	274	127	127	148	47,1	2:31	690	370
10000	80	5500	38,1	218	218	254	118	118	137	31,4	3:47	960	520
10000	60	5500	29,9	184	186	216	99	100	117	22,5	5:17	1140	620
10000	97	5300	48,7	232	232	270	125	125	146	42,9	2:46	750	400
10000	80	5300	39,1	217	218	253	117	118	137	29,4	4:02	1020	550
10000	60	5300	30,8	183	185	216	99	100	116	22,7	5:15	1130	610
10000	88	5000	46,2	220	220	257	119	119	139	37,9	3:08	810	440
10000	80	5000	51,3	216	217	252	117	117	136	28,8	4:07	1040	560
10000	60	5000	31,2	181	183	214	98	99	115	21,9	5:26	1160	630
12000	100	5500	49,7	233	233	280	126	126	151	47,1	2:31	710	380
12000	80	5500	38,1	217	217	261	117	117	141	31,4	3:47	990	530
12000	60	5500	29,9	180	182	219	97	98	118	22,5	5:17	1160	630
12000	97	5300	48,7	230	230	276	124	124	149	42,9	2:46	760	410
12000	80	5300	39,1	214	215	258	116	116	140	29,4	4:02	1040	560
12000	60	5300	30,8	180	182	219	97	98	118	22,7	5:15	1150	620
12000	88	5000	46,2	217	217	261	117	117	141	37,9	3:08	820	440
12000	80	5000	51,3	215	216	259	116	117	140	28,8	4:07	1070	580
12000	60	5000	31,2	178	180	216	96	97	117	21,9	5:26	1180	640

5.2.8 Demonstrated crosswind performance

Max. permitted head wind velocity for take-off and landing	12	m/s	23	knots
Max. permitted cross wind velocity for take-off and landing	6	m/s	12	knots

5.2.9 Optimum glide speed

Optimum glide speed	120	km/h	65	KIAS

5.2.10 Ceiling

Service ceiling	5.500	m	18.000	ft

SECTION 6

6 WEIGHT AND BALANCE

6.1 Introduction

6.2 Weight and Balance Record

6.2.1 Weight and Balance Report

6.2.1.1 Empty Aircraft Weight and CG

6.2.1.2 Loaded Aircraft Weight and CG

6.2.1.3 Weight and CG Blank Form

6.3 Permitted payload range

6.4 Operational Weight and Balance Computation

6.4.1 Airplane Loading Schedule Chart

6.4.2 Table of Static Moments

6.4.3 Airplane Loading Graph

6.4.4 CG Moment Envelope

6.4.5 CG Limits

6.5 Equipment List

6.1 Introduction

This section contains the payload range within which the BRISTELL LSA may be safely operated.

Procedures for weighing the aircraft and the calculation method for establishing the permitted payload range are contained in last revision of FAA Aviation Advisory Circular AC.43.13 – 1B.

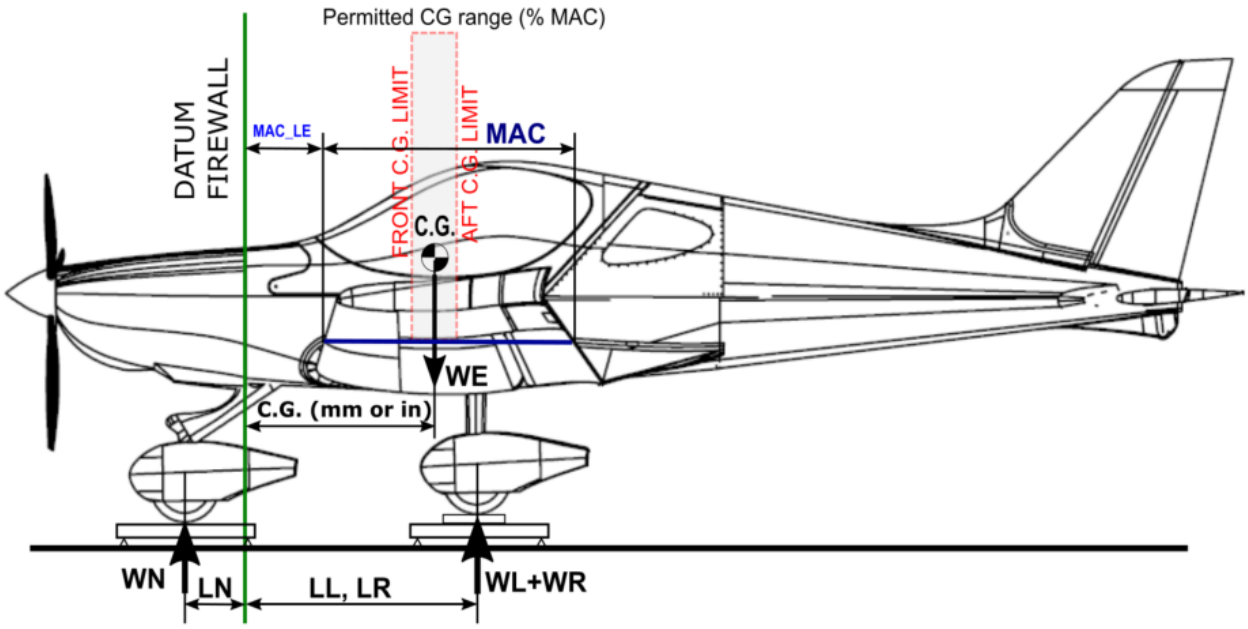
6.2 *Weight and Balance Record*

The table is intended to record continuous history of changes of equipment affecting weight and balance.

Type	BRISTELL LSA	Serial. No.:	718/2024																	
Date	Item No.	Description of part or modification	Weight change						Basic weight of empty airplane											
			Added (+)			Removed (-)														
	+	-	Weight (kg)	Arm (mm)	Moment (kg.mm)	Weight (kg)	Arm (mm)	Moment (kg.mm)	Weight (kg)	Moment (kg.mm)										
22.02.2024		Manufactured airplane							**392,9**	**292869**										

6.2.1 Weight and Balance Report

6.2.1.1 Empty Aircraft Weight and CG



Registration: ZK-TOW MAC (mm): 1349,7

	ITEM	WEIGHT (kg)	ARM (mm)	MOMENT = WEIGHT x ARM (kg.mm)
EMPTY AIRCRAFT WEIGHT AND CG	RIGHT MAIN WHEEL	WR= 148,3	LR= 1108	MR= 164236,1
	LEFT MAIN WHEEL	WL= 148,3	LL= 1108	ML= 164236,1
	NOSE WHEEL	WN= 96,4	LN= -369	MN= -35603,5
	EMPTY AIRCRAFT	**EMPTY WEIGHT** (kg) **WE= 392,9**	**CG (mm) = 745,32** **CG (%MAC) = 25,1**	**EMPTY ACFT TOTAL MOMENT** (kg.mm) **MT= 292868,65**

CG (mm)= TOTAL MOMENT / TOTAL WEIGHT

CG (%MAC)= (CG (mm) - MAC_LE) X 100 / MAC

Serial No.: 718/2024
Date: 22.02.2024
By: BRM Aero

6.2.1.2 Loaded Aircraft Weight and CG

	ITEM	WEIGHT (kg)	ARM (mm)	MOMENT = WEIGHT x ARM (kg.mm)
	EMPTY AIRCRAFT	392,9	745,32	292868,7
LOADED AIRCRAFT WEIGHT AND CG	PILOT		1156,0	
	PASSENGER		1156,0	
	BAGGAGE - BEHIND SEATS		1806,0	
	~~BAGGAGE - FRONT optional)~~		106,0	
	BAGGAGE - WING LOCKERS		1036,0	
	FUEL TANKS		606,0	
	LOADED AIRCRAFT	TAKEOFF WEIGHT (kg) TOW=	CENTER OF GRAVITY CG (mm)= CG (%MAC) =	LOADED ACFT TOTAL MOMENT (kg.mm) MT=

Max.Takeoff Weight:	600	kg	CG (mm)= TOTAL MOMENT / TOTAL WEIGHT
CG Range:	25	35	CG (%MAC)= (CG (mm) - MAC_LE) X 100 / MAC
Front C.G. limit (behind Datum):	744	mm	
Aft C.G. limit (behind Datum):	878	mm	

Serial No.: 718/2024
Date:
By:

6.2.1.3 Weight and CG Blank Form

	ITEM	WEIGHT (kg)	ARM (mm)	MOMENT = WEIGHT x ARM (kg.mm)
EMPTY AIRCRAFT WEIGHT AND CG	RIGHT MAIN WHEEL	WR=	LR= 1108	MR=
	LEFT MAIN WHEEL	WL=	LL= 1108	ML=
	NOSE WHEEL	WN=	LN= -369	MN=
	EMPTY AIRCRAFT	EMPTY WEIGHT (kg) WE=	CG (mm) = CG (%MAC) =	EMPTY ACFT TOTAL MOMENT (kg.mm) MT=

	ITEM	WEIGHT (kg)	ARM (mm)	MOMENT = WEIGHT x ARM (kg.mm)
	EMPTY AIRCRAFT			
LOADED AIRCRAFT WEIGHT AND CG	PILOT		1156,0	
	PASSENGER		1156,0	
	BAGGAGE - BEHIND SEATS		1806,0	
	BAGGAGE - FRONT optional)		106,0	
	BAGGAGE - WING LOCKERS		1036,0	
	FUEL TANKS		606,0	
	LOADED AIRCRAFT	TAKEOFF WEIGHT (kg) TOW=	CENTER OF GRAVITY CG (mm)= CG (%MAC) =	LOADED ACFT TOTAL MOMENT (kg.mm) MT=

Max.Takeoff Weight:	600	kg	CG (mm)= TOTAL MOMENT / TOTAL WEIGHT
CG Range:	25	35	CG (%MAC)= (CG (mm) - MAC_LE) X 100 / MAC
Front C.G. limit (behind Datum):	744	mm	
Aft C.G. limit (behind Datum):	878	mm	

Serial No.: 718/2024	
Date:	
By:	

Max.useful load:

WU (kg) =	MTOW	-	WE
WU (kg) =	600	-	
WU (kg) =			

WARNING
DO NOT EXCEED MAXIMUM TAKEOFF WEIGHT!

6.3 Permitted payload range

PERMITTED PAYLOAD RANGE OF BRISTELL (kg)								
S/N:	718/2024				Empty weight (kg):	393	MTOW (kg):	600,0
FUEL								
	VOLUME	(litres)	20	40	60	80	100	120
	WEIGHT	(kg)	14,5	29,0	43,5	58,0	72,5	87,0
			PERMITTED CREW WEIGHT (kg)					
BAGGAGE (kg)	NO BAGGAGE	0	**193** *34,6 %MAC*	**178** *33,7 %MAC*	**164** *32,7 %MAC*	**149** *31,7 %MAC*	**135** *30,7 %MAC*	**120** *29,7 %MAC*
	1/2 REAR	8	**178** *35,0 %MAC*	**171** *34,3 %MAC*	**156** *33,3 %MAC*	**142** *32,3 %MAC*	**127** *31,3 %MAC*	**113** *30,3 %MAC*
	MAX REAR	15	**153** *35,0 %MAC*	**163** *34,9 %MAC*	**149** *33,9 %MAC*	**134** *32,9 %MAC*	**120** *31,9 %MAC*	**105** *30,9 %MAC*
	1/2 WING LOCKERS	20	**173** *34,4 %MAC*	**158** *33,4 %MAC*	**144** *32,4 %MAC*	**129** *31,4 %MAC*	**115** *30,4 %MAC*	**100** *29,4 %MAC*
	1/2 REAR + 1/2 WING	28	**165** *35,0 %MAC*	**151** *34,0 %MAC*	**136** *33,0 %MAC*	**122** *32,0 %MAC*	**107** *31,0 %MAC*	**93** *30,0 %MAC*
	MAX REAR + 1/2 WING	35	**141** *35,0 %MAC*	**143** *34,6 %MAC*	**129** *33,6 %MAC*	**114** *32,6 %MAC*	**100** *31,6 %MAC*	**85** *30,6 %MAC*
	MAX WING LOCKERS	40	**153** *34,1 %MAC*	**138** *33,1 %MAC*	**124** *32,1 %MAC*	**109** *31,1 %MAC*	**95** *30,1 %MAC*	**80** *29,1 %MAC*
	1/2 REAR + MAX WING	48	**145** *34,7 %MAC*	**131** *33,7 %MAC*	**116** *32,7 %MAC*	**102** *31,7 %MAC*	**87** *30,7 %MAC*	**73** *29,7 %MAC*
	MAX REAR + WING	55	**130** *35,0 %MAC*	**123** *34,3 %MAC*	**109** *33,3 %MAC*	**94** *32,3 %MAC*	**80** *31,3 %MAC*	**65** *30,3 %MAC*

Permitted crew weight with regard to CG limits.
"X" (if present) means computed crew weight less than minimum crew weight

CAUTION

35.0 %MAC in the table above means that a crew of a given weight with a given amount of fuel and baggage is at the rear center of gravity (CG) limit. The fuel consumed during the flight will move the CG further aft of the CG rear limit. It is necessary therefore to increase the amount of fuel and/or decrease the amount of baggage to move the center of gravity forward. Exceeding of the CG rear limit may deteriorate flight characteristics of the airplane.

6.4 Operational Weight and Balance Computation

An important part of preflight planning is to determine that the aircraft is loaded so its weight and CG location are within the allowable limits.
This is possible by using hereafter explained Loading graph method, using weights, arms, and moment indexes.

Procedure:

1. Record into the 6.4.1 Airplane Loading Schedule Chart current empty weight and static moment of the airplane, which you read from 6.2 Weight and Balance Record.
2. Record the weight of crew, fuel, and baggage into 6.4.1 Airplane Loading Schedule Chart.
3. See the 6.4.2 Table of static moments or 6.4.3 Airplane loading graph to read static moments for given weights of crew, fuel, and baggage.
4. Record found moments into the 6.4.1 Airplane Loading Schedule Chart.
5. Determine Take-off weight of the airplane – add together the airplane empty weight, crew, fuel, and baggage and record the result into the 6.4.1 Airplane Loading Schedule Chart.
6. Check, whether the calculated Take-off weight does not exceed Airplane Maximum Take-off Weight 1320 lb, 600 kg.
   If yes, then it is necessary to reduce weight of some of the useful load items (fuel, baggage).

WARNING
EXCEEDING MTOW MAY LEAD TO DETERIORATION
OF SAFETY OF FLIGHT!

7. Determine Total Static Moment of loaded airplane – add together the static moment of empty airplane, crew, fuel, and baggage and record the result into the 6.4.1 Airplane Loading Schedule Chart.
8. Plot Takeoff Weight and Total Static Moment into the 6.4.4 CG Moment envelope.
9. Check, whether the intersection of Take-off weight horizontal line and Total Static Moment vertical line is inside the envelope.
   If **YES**, then the flight may be safely performed as regards weight and balance.
   If **NOT**, then it is necessary to change weight of some of the useful load items (crew, fuel, baggage) so that after a repeated computation the intersection of Take-off Weight and Total Static Moment will be inside the CG Moment envelope.

WARNING

SAFETY OF FLIGHT PERFORMED WITH THE AIRPLANE LOADED OUTSIDE PERMITTED LIMITS OF WEIGHT AND STATIC MOMENTS MAY BE DETERIORATED!

6.4.1 Airplane Loading Schedule Chart

Aircraft Type/Model:	BRISTELL LSA	Airplane S/N:	718/2024	Registration:	ZK-TOW

LOADING SCHEDULE CHART			SAMPLE AIRCRAFT			YOUR AIRCRAFT		718/2024
#	ITEM	WEIGHT LIMIT [kg]	WEIGHT [kg]	ARM [m]	MOMENT [kg.m]	WEIGHT [kg]	ARM [m]	MOMENT [kg.m]
1.	Empty aeroplane		378 kg	0,726	274,1	392,9	0,745	292,9
2.	Crew		90	1,156	104,0		1,156	
3.	Fuel	86,4	57,6	0,606	34,9		0,606	
4.	Bagagge behind seats	15	15	1,806	27,1		1,806	
5.	Baggage wing lockers	40	40	1,036	41,4		1,036	
6.	Baggage front locker	10	0	-0,219	0,0		-0,219	
		MTOW [kg]	TAKEOFF WEIGHT [kg] = sum of weights 1 to 6		TOTAL MOMENT [kg.m] = sum of moments 1 to 6	TAKEOFF WEIGHT [kg] = sum of weights 1 to 6		TOTAL MOMENT [kg.m] = sum of moments 1 to 6
		600	580,1		481,5			

FRONT CG LIMIT 0,744 m
AFT CG LIMIT 0,878 m

CG POSITION [m] = TOTAL MOMENT / TAKEOFF WEIGHT

= 481,5 / 580,1

= **0,830**

CG POSITION [m] = TOTAL MOMENT / TAKEOFF WEIGHT

= _____

=

FRONT CG LIMIT 25,0 %MAC
AFT CG LIMIT 35,0 %MAC

CG POSITION [%MAC] = (CG POS. [m] - MAC_LE) x 100 / MAC

= 42,399 / 1,3497

= **31,4**

CG POSITION [%MAC] = (CG POS. [m] - MAC_LE) x 100 / MAC

= _____

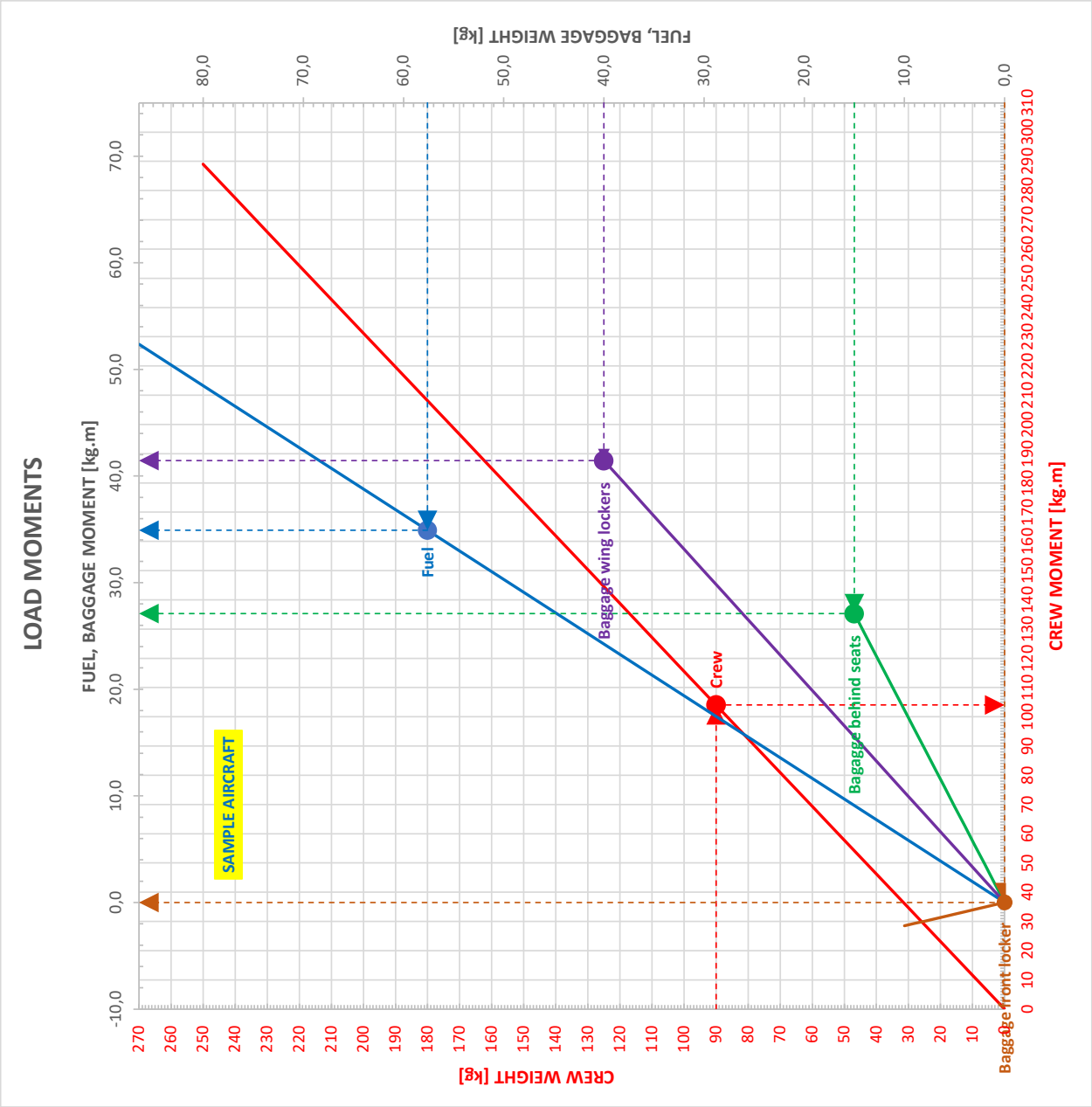
=

MAC [m]= 1,3497
MAC_LE [m]= 0,4061

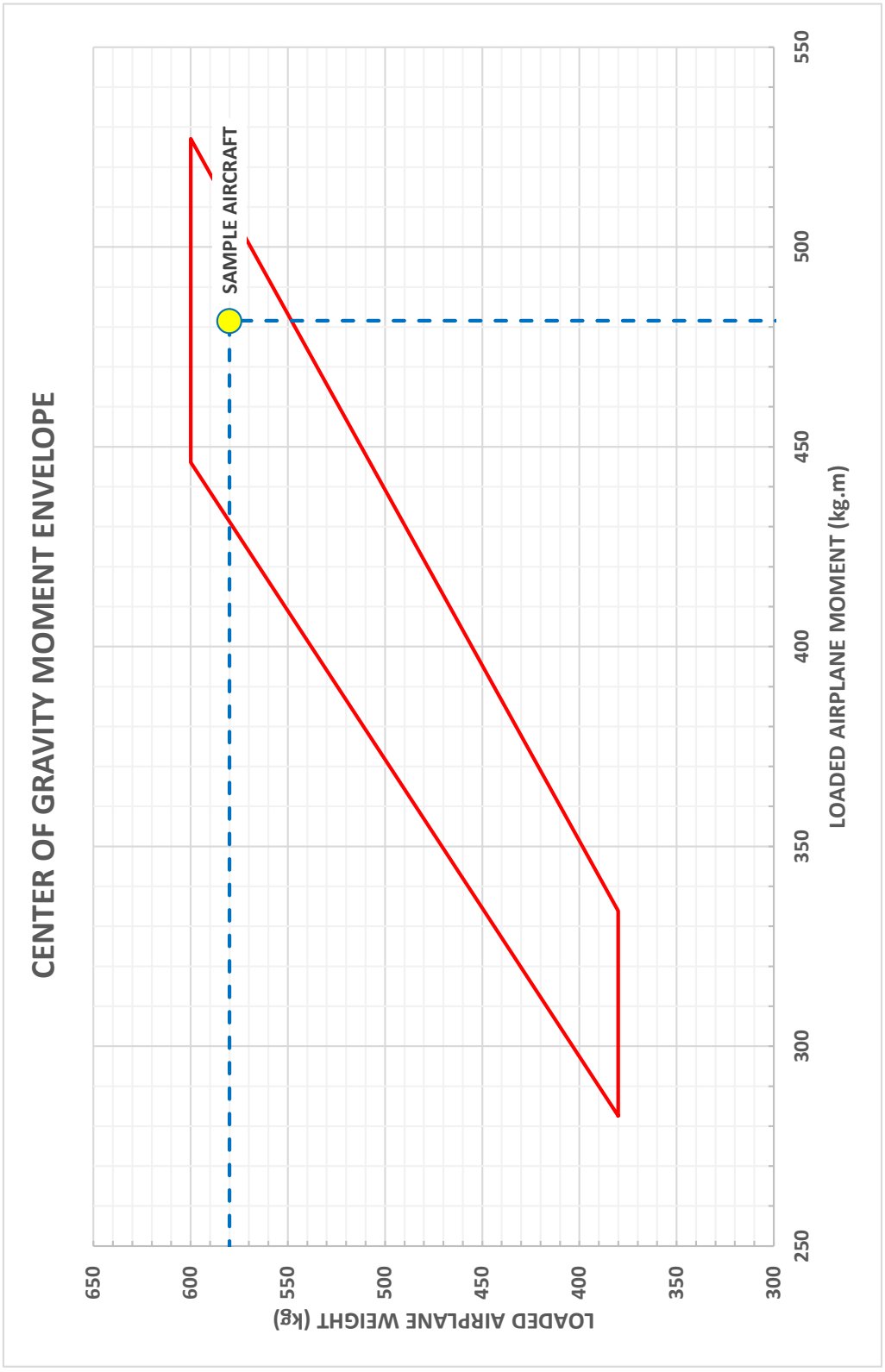
6.4.2 Table of Static Moments

CREW		FUEL			BAGGAGE BEHIND SEATS		BAGGAGE WING LOCKERS		BAGGAGE FRONT LOCKER	
Weight [kg]	Moment [kg.m]	Quantity [liters]	Weight [kg]	Moment [kg.m]	Weight [kg]	Moment [kg.m]	Weight [kg]	Moment [kg.m]	Weight [kg]	Moment [kg.m]
0	0,0	0,0	0,0	0,0	0	0,0	0	0,0	0	0,0
55	63,6	10,0	7,2	4,4	1	1,8	2	2,1	1	-0,2
60	69,4	20,0	14,4	8,7	2	3,6	4	4,1	2	-0,4
70	80,9	30,0	21,6	13,1	3	5,4	6	6,2	3	-0,7
80	92,5	40,0	28,8	17,5	4	7,2	8	8,3	4	-0,9
90	104,0	50,0	36,0	21,8	5	9,0	10	10,4	5	-1,1
100	115,6	60,0	43,2	26,2	6	10,8	12	12,4	6	-1,3
110	127,2	70,0	50,4	30,5	7	12,6	14	14,5	7	-1,5
120	138,7	80,0	57,6	34,9	8	14,4	16	16,6	8	-1,8
130	150,3	90,0	64,8	39,3	9	16,3	18	18,6	9	-2,0
140	161,8	100,0	72,0	43,6	10	18,1	20	20,7	10	-2,2
150	173,4	110,0	79,2	48,0	11	19,9	22	22,8		
160	185,0	120,0	86,4	52,4	12	21,7	24	24,9		
170	196,5				13	23,5	26	26,9		
180	208,1				14	25,3	28	29,0		
190	219,6				15	27,1	30	31,1		
200	231,2						32	33,2		
210	242,8						34	35,2		
220	254,3						36	37,3		
230	265,9						38	39,4		
240	277,4						40	41,4		
250	289,0									

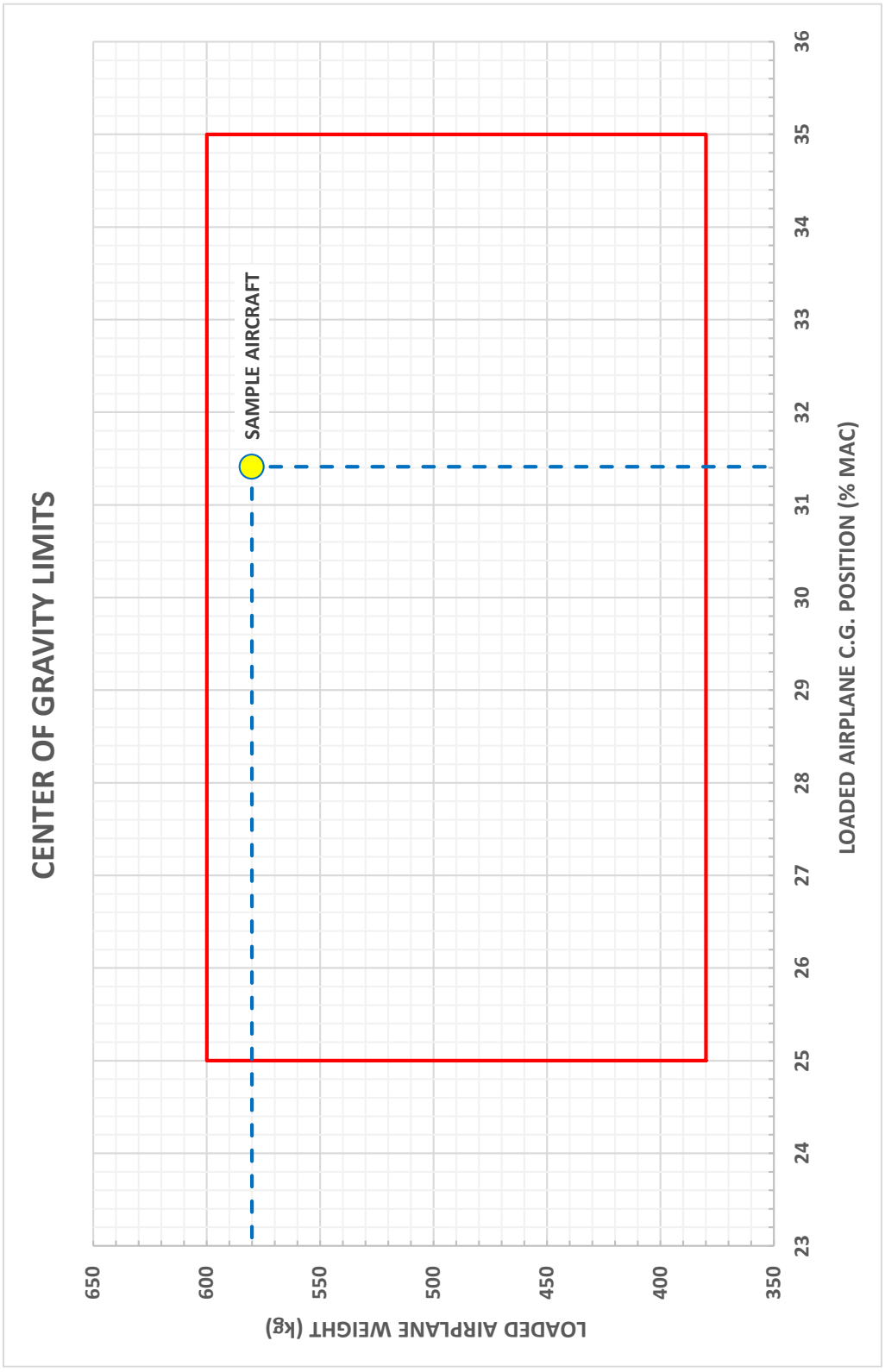
6.4.3 Airplane Loading Graph



6.4.4 CG Moment Envelope



6.4.5 CG Limits



6.5 Equipment List

List of equipment installed in BRISTELL LSA, S/N 718/2024:

1. Adjustable 3-pos. rudder pedals on both sides
2. Aileron electric trim - control on both control sticks
3. AIR TRAFFIC Anti-collision system and Traffic Display V3+M (FLARM)
4. AIRPATH C2400 L4P Compass
5. AMSAFE 4-point safety belts
6. Arm rest box
7. AVEO eye ball vents black
8. BERINGER dual brakes with pressure limiter and parking brake
9. BERINGER front and main wheels
10. BRS-7 AEPS installation
11. Cabin heating
12. Canopy glass dark grey with side sliding windows, no venting flaps
13. Central console cover, side panels, seats and seat backs padded textile
14. CO guardian carbon monoxide detector Aero-452
15. Elevator electric trim
16. ELT KANNAD AF Integra 406 MHz + RC 200 control panel
17. External connection to power for jump start - Anderson plug
18. Fixed landing gear with steerable nose wheel
19. GARMIN G3X backup battery TCW IBBS-12V-3AH
20. GARMIN G3X flight display system
21. GARMIN GA 35 External active GPS antenna
22. GARMIN GAP 26 angle of attack unheated probe
23. GARMIN GDU 460, 10,6" display
24. GARMIN GEA 24 Engine Interface Module
25. GARMIN GMU 11 Magnetometer
26. GARMIN GPS 20A ADS-B Receiver
27. GARMIN GPS BNC antenna(s) for G3X
28. GARMIN GSU 25C Air Data Attitude Heading Reference System
29. GARMIN GTP 59 Temperature Probe
30. GARMIN GTR 200 panel COM radio
31. GARMIN GTX 45R mode S transponder with ADS-B out
32. Glareshield and handle behind seats padded leather
33. HD wing spar 750 kg
34. Horn (klaxon) 4-cars
35. Instrument panel B23

36. Instrument panel storage box on the right
37. KANARDIA Altimeter 57 mm (ft/mBar)
38. KANARDIA INDU Airspeed indicator 57 mm (kts, long)
39. LAMBERT + LINAK electric flaps actuator
40. LAMBERT ARROW FLASH 2 wing tip pos. lights and fin beacon
41. LAMBERT LED-LEHV-CV3 Landing lights in both wings
42. Lockable canopy NEW system and lockable fuel tank caps
43. Long HTU (2.9 m) with long trim and horn balance
44. Low fuel warning lights
45. Noise insulation on firewall
46. Nose gear doubled flexible rod (TELEFLEX)
47. Nose leg fairing
48. Paint scheme: own design and grey interior RAL 7016
49. PIONEER ND-BC8 back-up camera
50. Propeller DUC Inconel FLASHBLACK-R hydraulic adjustable (R915iS)
51. RAMI AV-10 COMM antenna
52. RAMI AV-200 ELT Antenna
53. RAMI AV-74 transponder DME antennas (2x)
54. RAMI AV-75 broadband blade type antenna for FLARM (2x)
55. ROTAX 915 iS 3 A engine
56. SUPER B ANDRENA 12V 10Ah Battery
57. TOST glider tow release, side mirror
58. TOSTEN CS-6 grip on the left and right side
59. USB port(s) on the instrument panel and between seats
60. Wheel fairings (pants)
61. Wing lockers with drainage
62. WINTER QM 2 Art. 1120 bank indicator

SECTION 7

7 AIRPLANE AND SYSTEMS DESCRIPTION

7.1 Introduction

This section provides description and operation of the aircraft and its systems.

7.2 Airframe

All-metal construction, single curvature metal skins riveted to stiffeners. Construction is of 6061-T6 aluminum sheet metal riveted to aluminum angles with Avex rivets. This high strength aluminum alloy construction provides long life and low maintenance costs thanks to its durability and corrosion resistance characteristics.

The wing has a high lift airfoil equipped by fowler flaps controlled by the electric servo operated by the pilot.

7.3 Control system

The plane is equipped with a dual stick control and classic rudder pedals, with pedal hydraulic brakes for easy ground control.

The elevator and aileron trim control, as well as wing flaps are electrically operated from the rocker switches located on the instrument panel or on the control stick.

7.4 Landing gear

Tricycle landing gear with the steerable nose wheel. Main landing gear uses two fiberglass spring elements.

7.5 Seats and safety harness

Side-by-side seating. Seat cushions are removable to make easier cleaning and drying. Four point safety belts provided to each seat. Optional, is additional seat upholstery to raise the small pilot or move him forward.

NOTE

Prior to each flight, ensure that the seat belts are firmly secured to the airframe, and that the belts are not damaged. Adjust the buckle so that it is centered on the body.

7.6 Baggage compartment

The rear baggage compartment is located behind the seats. It may accommodate up to 33 lb (15 kg). This space is divided on two sections – baggage compartment A and B. Is not recommended give too heavy things into baggage compartment B.

The baggage may also be loaded into the baggage compartment inside each wing up to 44 lb (20 kg), in each wing locker.

Make sure that baggage does not exceed maximum allowable weight, and that the aircraft CG is within limits with loaded baggage.

All baggage must be properly secured.

7.7 Canopy

Canopy key lock is located on the fuselage left side. Access into cabin is from both sides.

BRISTELL LSA, S/N 718/2024 has got a new design of the canopy lock mechanism. There is an outer lever on the pilot (left side) – Fig.1. To open the canopy from outside push on lever tip to open the lever – Fig. 2. Then turn the lever down to release the lock hooks on both sides. Then move the canopy frame up (there is a canopy grab handle on both sides) to open the canopy.

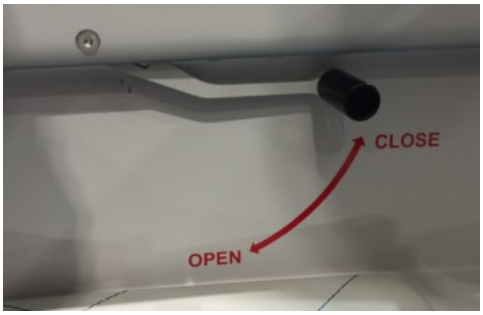
Once seated you can close the canopy from inside by moving the inside lever on the cockpit side (there are 2 levers – left and right, mechanically interconnected.

Maintenance: It is recommended to use a suitable spray lubricant to lubricate all movable joints of the hook system during each 100 h periodical inspection and a vaseline to grease the hook contact surface with the pin on tip-up canopy.

1. External canopy handle

2. Push lever tip and turn lever down

3. Lift canopy up



4. Move inside lever forward to lock

Before flight check that the canopy is fully closed and both inner levers (they are mechanically interconnected) are in closed position.

7.8 Power plant

Engine:

ROTAX 915 iS: turbo-charged engine having propeller shaft with flange for constant speed propeller and drive for hydraulic governor for constant speed propeller, 4-cylinder, 4-stroke liquid/air-cooled engine with horizontally opposed cylinders. Dry sump forced lubrication with separate oil tank, automatic adjustment by hydraulic valve tappet, Redundant electronic fuel injection and ignition, Engine management system (EMS), Electric starter (12 or 24 volt), Propeller speed reduction gearbox, Air intake system with intercooler, Turbocharger with stainless steel exhaust, TBO (Time between overhauls) 1,200 hours.

Propeller:

DUC Flashblack, in-flight hydraulic variable pitch propeller with carbon/titanium blades and carbon/aluminum hub. Constant Speed regime managed automatically by a hydraulic governor adjusted mechanically by a lever in the cockpit.

NOTE

For technical data refer to documentation supplied by the propeller manufacturer.

7.8.1 Throttle

Engine power is controlled by means of the THROTTLE lever. THROTTLE lever is positioned in the middle channel between the seats. Lever is mechanically connected (by cables) to the throttle lever on the engine throttle valve. Spring is added to the throttle push rod to ensure that the engine will go to full power if the linkages fail.

7.8.2 Heating

Heating consists of a heat exchanger on the exhaust manifold and control mechanism located on the right hand side of instrument panel.

CAUTION

Incidents involving exhaust gases entering the heating or ventilation system may result in fatal accidents due to carbon monoxide poisoning of the aircraft occupants. A carbon monoxide detector is recommended.

7.9 Fuel system

Wing tanks volume: 2x 60 l (2x 16 US gallons)
Each tank is equipped with a vent outlet and screen filter.
Drain valve located in the lowest point of each tank and on the bottom edge of the firewall, on the gascolator.
Main fuel selector valve is on the central console in the cockpit.
The electric fuel pump is located on firewall.

CAUTION
Due to fuel thermal expansion is recommended to not fill fully the tanks to avoid fuel run out from the vent outlets located on wingtips bottom. This will prevent possible environmental contamination by fuel.

7.10 Electrical system

7.10.1 Battery

The battery is mounted on the forward side of the firewall.

7.10.2 Master switch

Master switch connects the electrical system to the 12 Volt battery and charger/coils, controlled by the regulator. See Engine Manual for electrical system details.

NOTE
Ignition system is independent on the power source and will operate even with Master switch and/or breaker off.

7.10.3 Lane Switches

There are installed two independent LANE select switches A and B on the instrument panel to connect the engine control unit ECU for the relevant LANE to the EMS power supply. The switches are used for LANE and ignition check after engine starting. LANE A and LANE B have different sensor inputs. During LANE and Ignition Check, some sensors values are not displayed, depending on activation of the LANES. Refer to Engine Operator's Manual for more details.

NOTE

All switches and or engine controls are "up" or "push forward" for operation, except the cabin heat which is "Pull" for "on". Optional equipment, switches and/or fuses are subject to change or installed as requested. See Aircraft Equipment List and Photo and Description of equipment and controls in the cockpit.

7.10.4 Start Power Switch

By pressing the Start Power Switch, the EMS system of the engine is powered externally by the onboard battery for a short time during start-up.

7.10.5 Battery Backup Switch

If necessary (e.g. in case of supply failure by the internal generator) the EMS system can by powered by the onboard battery by activating the Battery Backup Switch.

7.10.6 Start Button

The Red Start Button on the instrument panel activates the starter motor.

7.11 Pitot and static pressure system

Pitot tube (optionally heated) is located below the wing.
Pressure distribution to the instruments is through flexible plastic hoses.
Static ports are located on both sides of the fuselage at the tail.
Keep the Pitot tube and static ports clean to ensure proper function of the system.

7.12 Miscellaneous equipment

BRISTELL LSA, S/N 718/2024 is fitted with

1. Adjustable 3-pos. rudder pedals on both sides
2. Aileron electric trim - control on both control sticks
3. AMSAFE 4-point safety belts
4. Arm rest box
5. Automotive net in baggage compartment (P/N 42084)
6. AVEO eye ball vents black
7. BERINGER dual brakes with pressure limiter and parking brake
8. BERINGER front and main wheels
9. BRS-7 AEPS installation
10. Canopy glass dark grey with side sliding windows, no venting flaps
11. Central console cover, side panels, seats and seat backs padded textile
12. Cockpit floor and baggage compartment floor carpets
13. External connection to power for jump start - Anderson plug
14. Glareshield and handle behind seats padded leather

15. HD wing spar 750 kg
16. Instrument panel B23 with storage box on the right
17. LAMBERT + LINAK electric flaps actuator
18. LAMBERT ARROW FLASH 2 wing tip pos. lights and fin beacon
19. LAMBERT LED-LEHV-CV3 Landing lights in both wings
20. Lockable canopy NEW system and lockable fuel tank caps
21. Low fuel warning lights
22. Map pockets 2 Pcs
23. Noise insulation on firewall
24. Nose gear doubled flexible rod (TELEFLEX)
25. Paint scheme: own design and grey interior RAL 7016
26. SUPER B ANDRENA 12V 10Ah Battery
27. TOST glider tow release, side mirror + PIONEER ND-BC8 back-up camera
28. TOSTEN CS-6 grip on the left and right side
29. USB port(s) on the instrument panel and between seats
30. Wheel fairings (pants) and Nose leg fairing
31. Wing lockers with drainage

7.13 Instruments and Avionics

BRISTELL LSA, S/N 718/2024 is fitted with:

Flight instruments:

1. KANARDIA INDU Airspeed indicator 57 mm (kts, long)
2. KANARDIA Altimeter 57 mm (ft/mBar)
3. AIRPATH C2400 L4P Compass
4. WINTER QM 2 Art. 1120 bank indicator
5. GARMIN G3X flight display system including:
6. GARMIN GDU 460, 10,6" display
7. GARMIN GAP 26 angle of attack unheated probe
8. GARMIN GTP 59 Temperature Probe
9. GARMIN GPS BNC antenna(s) for G3X
10. GARMIN GMU 11 Magnetometer
11. GARMIN GSU 25C Air Data Attitude Heading Reference System
12. GARMIN G3X backup battery TCW IBBS-12V-3AH

Engine instruments:

1. GARMIN GEA 24 Engine Interface Module, engine data displayed on GDU 460 display

COM/NAV, and Other instruments:

1. GARMIN GTR 200 panel COM radio + RAMI AV-10 COMM antenna
2. GARMIN GTX 45R mode S transponder with ADS-B out + RAMI AV-74 transponder DME antennas (2x)
3. GARMIN GPS 20A ADS-B Receiver
4. GARMIN GA 35 External active GPS antenna
5. AIR TRAFFIC Anti-collision system and Traffic Display V3+M (FLARM) + RAMI AV-75 broadband antenna for FLARM (2x)
6. ELT KANNAD AF Integra 406 MHz + RC 200 control panel
7. RAMI AV-200 ELT Antenna
8. CO guardian carbon monoxide detector Aero-452
9. Horn (klaxon) 4-cars

NOTE

For operating instructions refer to the documentation supplied with the instruments.

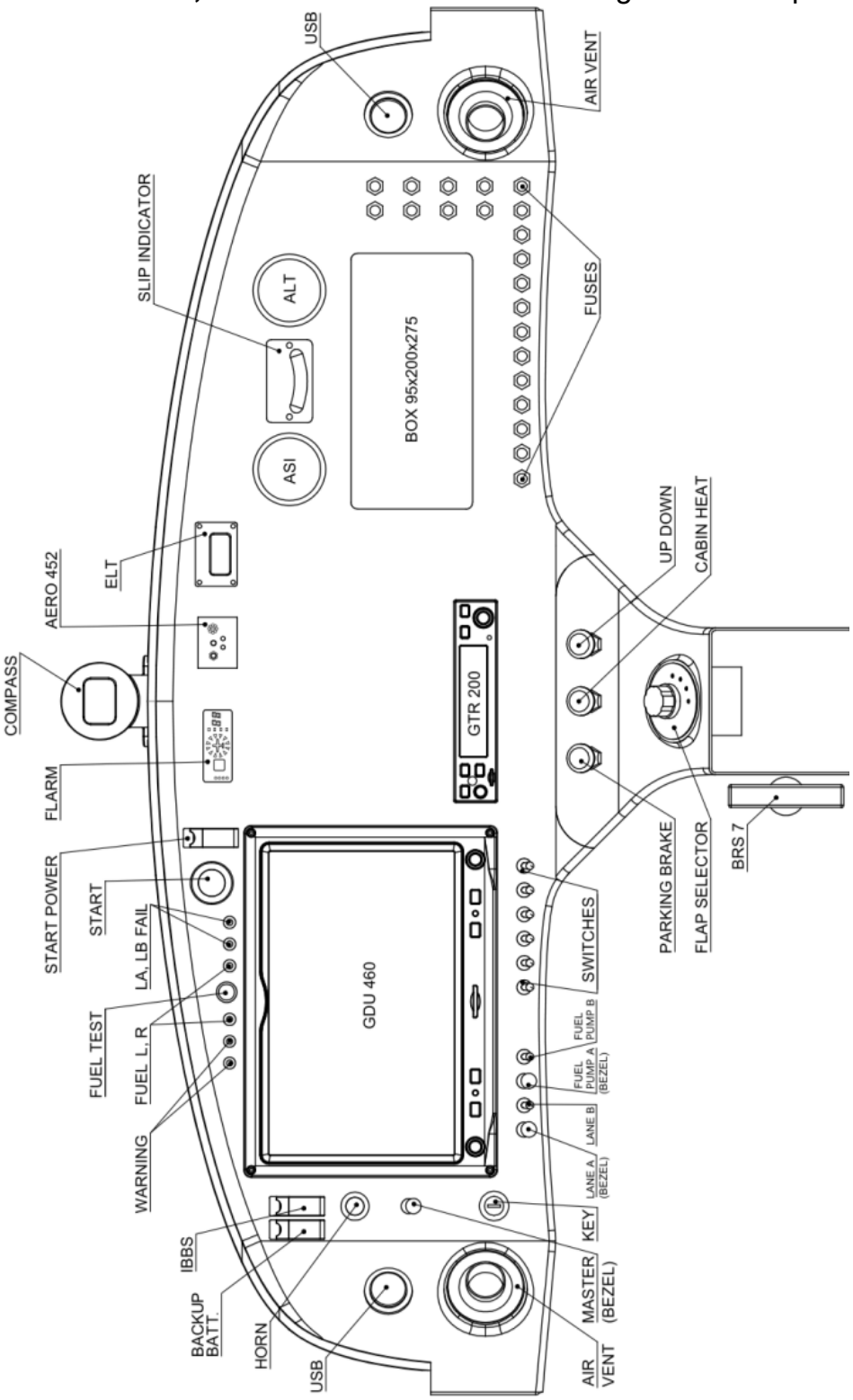
7.14 Cockpit

7.14.1 Cockpit layout

BRISTELL LSA, S/N 718/2024 has the following cockpit layout:

7.14.2 Instrument panel

BRISTELL LSA, S/N 718/2024 has the following instrument panel:



SECTION 8

8 AIRPLANE HANDLING, SERVICING AND MAINTENANCE

8.1 Introduction

This section contains factory-recommended procedures for proper ground handling and servicing of the airplane. It also identifies certain inspection and maintenance requirements, which must be followed if the airplane is to retain that new-plane performance and dependability.

8.2 Aircraft inspection periods

Periods of overall checks and contingent maintenance depends on the condition of the operation and on overall condition of the airplane.

Inspections and revisions should be carried out in the following periods, at least:

a) after the first 25 flight hours
b) after the first 50 flight hours
c) after every 100 flight hours or at least annual inspection

Refer to the Engine Operator's Manual for engine maintenance.

Maintain the prop according to its manual.

All repairs and maintenance should be made in accordance with AC 43.13-1B.

8.3 Aircraft alterations or repairs

It is recommended to contact the airplane manufacturer prior to any alternations to the aircraft to ensure that the airworthiness of the aircraft is not violated. Always use only the original spare parts produced by the airplane (engine, prop) manufacturer.

If the aircraft weight is affected by that alternation, a new weighing is necessary, then record the new empty weight into the Weight and Balance record / Permitted payload range in SECTION 6 and up-date the placard showing weights in the cockpit.

8.4 Ground handling

8.4.1 Towing

To handle the airplane on the ground, use the Tow Bar, or the fuselage rear pushed down in the place of a bulkhead.

CAUTION

Avoid excessive pressure at the airplane airframe-especially at control surfaces. Keep all safety precautions, especially in the propeller area.

8.4.2 Parking

It is advisable to park the airplane inside a hangar or alternatively inside any other suitable space (garage) with stable temperature, good ventilation, low humidity and dust-free environment.

It is necessary to moor the airplane when it is parked outside a hangar. Also when parking for a long time, cover the cockpit canopy, possibly the whole airplane by means of a suitable tarpaulin.

WARNING

Caution when parking the aircraft in direct sunlight with the cockpit canopy open. An open cockpit canopy can act as an optical lens and cause damage to the cockpit interior, including possible fire ignition!

8.4.3 Mooring

The airplane should be moored when parked outside a hangar after the flight day. The mooring is necessary to protect the airplane against possible damage caused by wind and gusts.

For this reason the aircraft is equipped with mooring eyes located on the lower surfaces of the wings.

Mooring procedure:

1. Check: Fuel Selector shut off, Circuit breakers and Master switch switched off, Switch box switched off.
2. Fix the hand control using e.g. safety harness
3. Close air vent
4. Close and lock canopy
5. Moor the aircraft to the ground by means of a mooring rope passed through the mooring eyes located on the lower surfaces of the wings and below rear fuselage

NOTE

In the case of long term parking, especially during winter, it is recommended to cover the cockpit canopy or possibly the whole aircraft by means of a suitable tarpaulin attached to the airframe.

8.4.4 Jacking

Since the empty weight of this aircraft is relatively low, two people can lift the aircraft easily.

First of all prepare two suitable supports to support the aircraft.

It is possible to lift the aircraft by handling the following parts:

- By pushing the fuselage rear section down in the place of a bulkhead the fuselage front section may be raised and then supported under the firewall.
- By holding the fuselage rear section under a bulkhead the fuselage rear may be raised and then supported under that bulkhead.
- To lift up a wing, push from underneath that wing only at the main spar area. Do not lift up a wing by handling the wing tip.

8.4.5 Road transport

The aircraft may be transported after loading on a suitable car trailer. It is necessary to dismantle the wings before road transport. The aircraft and dismantled wings should be attached securely to protect these parts against possible damage.

8.5 Cleaning and care

Use efficient cleaning detergents to clean the aircraft surface. Oil spots on the aircraft surface (except the canopy!) may be cleaned with gasoline.

The canopy may only be cleaned by washing it with a sufficient quantity of lukewarm water and an adequate quantity of detergents. Use either a soft, clean cloth sponge or deerskin. Then use suitable polishers to clean the canopy.

CAUTION

Never clean the canopy under “dry“ conditions and never use gas or chemical solvents!

Upholstery and covers may be removed from the cockpit, brushed and eventually washed in lukewarm water with an adequate quantity of detergents. Dry the upholstery thoroughly before insertion into the cockpit.

CAUTION

In the case of long term parking, cover the canopy to protect the cockpit interior from direct sunshine.

BRISTELL LSA, S/N 718/2024 has got a new design of the canopy lock mechanism.

Maintenance: It is recommended to use a suitable spray lubricant to lubricate all movable joints of the hook system during each 100 h periodical inspection and a vaseline to grease the hook contact surface with the pin on tip-up canopy.

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SECTION 9

9 REQUIRED PLACARDS AND MARKINGS

9.1 Limitation placards

9.2 Miscellaneous placards and markings

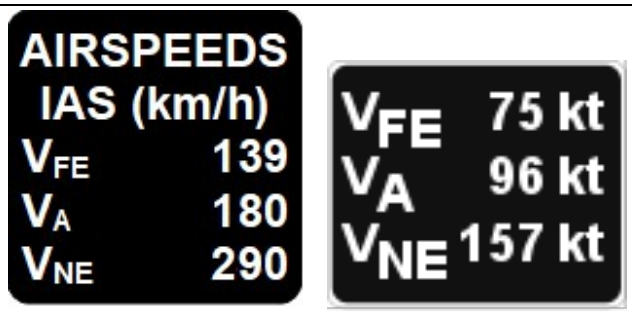
9.1 Limitation placards

The airplane must be placarded with:

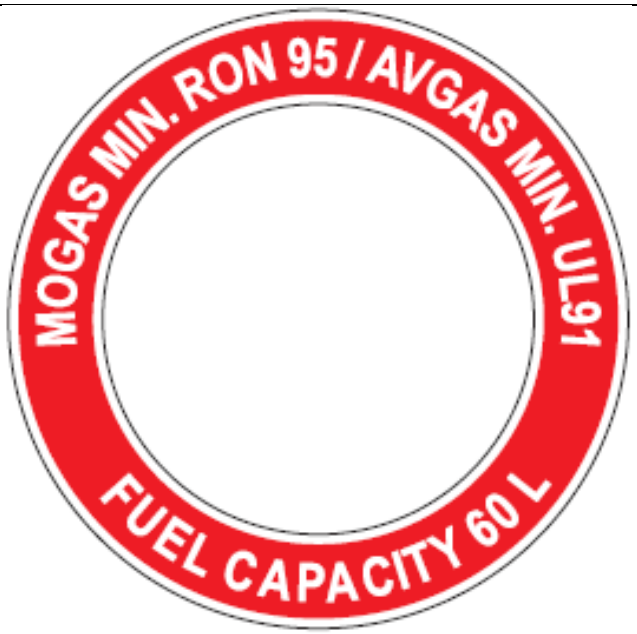
- All fuses
- Ignition switches (LANE A,B)
- Starter
- Trim: Nose heavy and Tail heavy
- Flaps: 0°, 10°, 20°, 30°
- Maximum rear baggage weight 15 kg, 33 lb
- Maximum weight in each wing locker 20 kg, 44 lb, if installed
- Instruments
- Canopy: Open - Close
- Fuel capacity: 60 liters, 16 US gallons / min. 95 Octane - at filler neck
- Fireproof Identification plate attached to the fuselage port side, in front of the horizontal tail unit

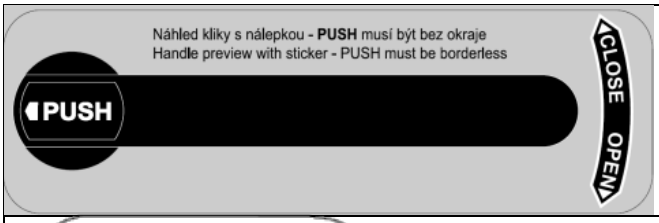
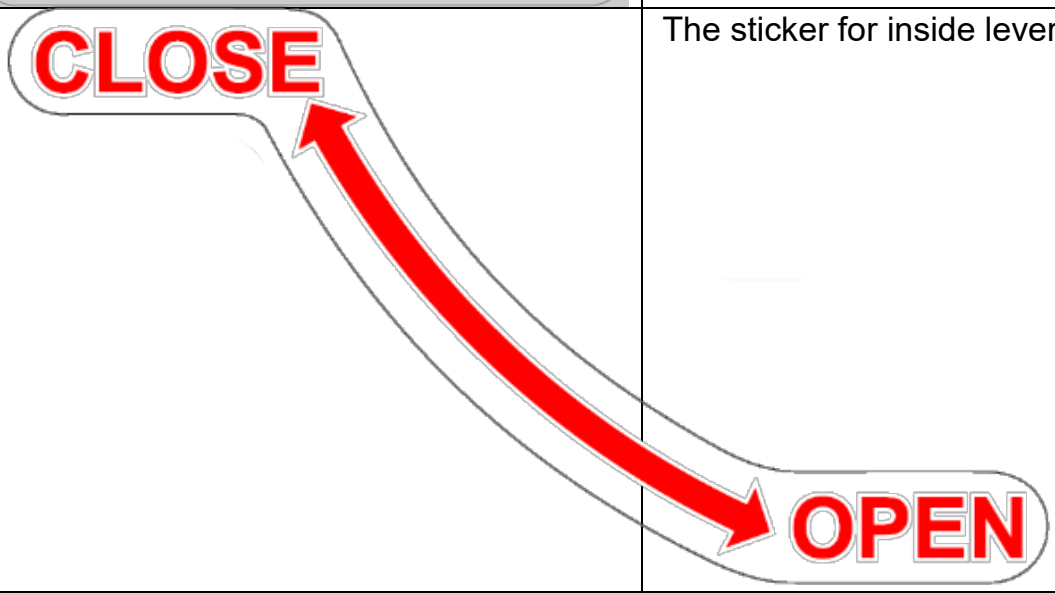
IDENTIFICATION PLATE Produced by: BRM AERO, s.r.o. Czech Rep. Type: BRISTELL S-LSA Production No./year : 718/2024	Identification plate attached to the fuselage port side, in front of the horizontal tail unit
PASSENGER WARNING! THIS AIRCRAFT WAS MANUFACTURED IN ACCORDANCE WITH LIGHT SPORT AIRCRAFT AIRWORTHINESS STANDARDS AND DOES NOT CONFORM TO STANDARD CATEGORY AIRWORTHINESS REQUIREMENTS.	Passenger warning Located on the instrument panel. Sticker not relevant for TC aircraft.
PASSENGER NOTICE THIS AIRCRAFT CONFORMS TO ASTM CONSENSUS STANDARDS OF AIRWORTHINESS DEVELOPED AND MAINTAINED BY THE AVIATION COMMUNITY UNDER ASTM TECHNICAL COMMITTEE F37.	Passenger notice. Located on the instrument panel. Sticker not relevant for TC aircraft.
ALL AEROBATIC MANEUVERS, INCLUDING SPINS ARE PROHIBITED	Operation limitation. Located on the instrument panel.
WARNING IFR FLIGHTS AND INTENTIONAL FLIGHTS UNDER ICING CONDITIONS ARE PROHIBITED!	Operation limitation. Located on the instrument panel.

Aircraft Operating Instructions

	Main baggage compartment behind the seats.
	Additional baggage compartment behind the Baggage compartment A. NOT TO BE USED FOR HEAVY ITEMS!
	Maximum weight of baggage in each wing locker, if installed.
	Maximum weight of baggage in fuselage front locker, if installed.
	Airspeed limitations. Located on the instrument panel or fuselage side.
	Engine speed limitations. Located on the instrument panel or fuselage side.
	Maximum Takeoff Weight Limitation. 600 kg (1320 lb) limit for Light sport airplanes. Located on the instrument panel or fuselage side.

9.2 Miscellaneous placards and markings

NO STEP !	Wing flap root area
NO PUSH DO NOT TOUCH !	Areas to avoid pushing on them. Wing trailing edge, control surfaces trailing edges, etc.
	Located on wing upper skin around the fuel tank filler neck. Standardly 60 l, optionally 82 l
	Located on both sides of the fuselage tail where are located static ports.
PROPELLER MAX THROTTLE MIN	Throttle and propeller placard located on the Throttle-propeller quadrant.
PEDAL SETTING PEDAL SETTING	Located on the fuselage right/left side under the instrument panel. Placard point to the lever to adjust pedals position.
COPILOT HEADSET PILOT HEADSET	Located between the seat backs, at the headphone sockets.

	The stickers for canopy external lever.
	The sticker for inside lever (left one).
	No smoking placard located on the side of instrument board

Placards If a ballistic rescue parachute is installed:

	Placard located on the both sides of fuselage between canopy and rear window
	Placard located in place of rocket egress

CAUTION

The owner (operator) of this airplane is responsible for the readability of placards during the aircraft service life.

SECTION 10

10 SUPPLEMENTS

10.1 Introduction

10.2 List of inserted supplements

10.3 Inserted Supplements

10.1 Introduction

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

10.2 List of inserted supplements

Date	Suppl. No.	Title of inserted supplement
07/2011	01	Aircraft Flight Training Supplement
03/2024	02	Description of the aircraft S/N 718/2024
06/2011	03	Glider Towing

10.3 Inserted Supplements

Aircraft Operating Instructions

SUPPLEMENT No. 01

Aircraft Flight Training Supplement

The BRISTELL LSA flying characteristics and behavior are similar to single engine aircraft.
Following training procedure is applicable if the pilot is holder of UL, PPL or LSA Pilot License. The training flight hours are recommended minimum and depends on the Flight Instructor if student pilot is ready to continue on in next training step. Training can be performed by Flight Instructor or by the experienced pilot who has minimum 20 hours on the BRISTELL LSA.

Type Rating Training Procedure:

Ground Training - *before practical Flight Training the pilot has to get familiar with following procedures and documentation*

- *Aircraft Operating Instructions (AOI)*
- *Aircraft Maintenance and Inspection Procedures*
- *Aircraft preflight inspection procedure*
- *Control Checklists*
- *Radio, avionics, aircraft and engine controls procedures*
- *Differences in control and aircraft handling*
- *Emergency procedures*

Aircraft Operating Instructions

Flight training program - *recommended*

Flight Training Procedure		*Dual*		*Solo*	
		Flights	*hr/min*	*Flights*	*hr/min*
1.	*Check flight*	1	30’		
2.	*Pattern training flights up to 1000 ft AGL*	4	20’	3	15’
3.	*Pattern training flights up to 500 ft AGL*	4	20’	3	15’
4.	*Stall speed, 45°turns, side slips*	1	30’	1	20’
5.	*Emergency landing training*	4	20’	3	10’
Total		***14***	***2 hr***	***10***	***1 hr***

Flight Training Procedure - *description*

1. ***Check flight –*** *Student Pilot will fly the airplane in local flight, instructor is giving advice as necessary.*

2. ***Pattern training flights up to 1000 feet AGL -*** *high pattern procedures, instructor is giving advice as necessary.*

3. ***Pattern training flights up to 500 feet AGL -*** *high pattern procedures, instructor is giving advice as necessary.*

4. ***Stall speed, 45°turns, sideslips –*** *stall speed flaps retracted and extended (landing configuration), sideslips at landing configuration.*

5. ***Emergency landing training –*** *emergency procedures and landing to 1/3 of runway.*

NOTE

During solo flights instructor is observing the student pilot on pattern and can advise by radio as necessary.

Endorsement:

Instructor will endorse the Type Rating to the Pilots Logbook, if required.

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BRISTELL LSA

BRM AERO Wings with heart

Aircraft Operating Instructions

SUPPLEMENT No. 02

AIRCRAFT DESCRIPTION

Registration: **ZK-TOW**

Serial Number: **718/2024**

This Supplement must be contained in the Aircraft Operating Instructions during operation of the airplane.

Information contained in this Supplement add or replace information from the basic Aircraft Operating Instructions in the further mentioned parts only. Limitations, procedures and information not mentioned in this Supplement are contained in the basic Aircraft Operating Instructions.

0 NUMBERING

This Supplement adds information necessary for airplane operation with equipment installed in the airplane **BRISTELL LSA, S/N 718/2024**.

1 GENERAL INFORMATION

No changes.

2 OPERATING LIMITATION

2.4 Power plant

2.4.3 Oil

Type of oil used by aircraft manufacturer :
Aeroshell OIL SPORT PLUS 4

2.4.4 Coolant

Type of used coolant:
Castrol Radicool NF
Mixture ratio coolant / water 1:1.5 liters (40%) (-25 °C)
Max. Coolant temperature : 120 °C (248 °F)

3 EMERGENCY PROCEDURES

No changes.

4 NORMAL PROCEDURES

No changes.

5 PERFORMANCE

No changes

6 WEIGHT AND BALANCE

6.2 Weight and Balance Record

Type	BRISTELL LSA		Serial. No.:	718/2024																
Date	Item No.		Description of part or modification	Weight change																
				Added (+)			Removed (-)			Basic weight of empty airplane										
	+	-		Weight (kg)	Arm (mm)	Moment (kg.mm)	Weight (kg)	Arm (mm)	Moment (kg.mm)	Weight (kg)	Moment (kg.mm)									
22.02.2024			Manufactured airplane							**397,4**	**292645**									

6.2.1.1 Empty Aircraft Weight and CG

Aircraft Type/model: BRISTELL LSA MAC_LE (mm): 406,1

Registration: ZK-TOW MAC (mm): 1349,7

	ITEM	WEIGHT (kg)	ARM (mm)	MOMENT = WEIGHT x ARM (kg.mm)
EMPTY AIRCRAFT WEIGHT AND CG	RIGHT MAIN WHEEL	WR= 148,8	LR= 1108	MR= 164770,9
	LEFT MAIN WHEEL	WL= 148,8	LL= 1108	ML= 164770,9
	NOSE WHEEL	WN= 99,9	LN= -369	MN= -36896,5
	EMPTY AIRCRAFT	**EMPTY WEIGHT (kg) WE= 397,4**	**CG (mm) = 736,38 CG (%MAC) = 24,5**	**EMPTY ACFT TOTAL MOMENT (kg.mm) MT= 292645,35**

CG (mm)= TOTAL MOMENT / TOTAL WEIGHT

CG (%MAC)= (CG (mm) - MAC_LE) X 100 / MAC

Serial No.: 718/2024
Date: 22.02.2024
By: BRM Aero

6.2.1.2 Loaded Aircraft Weight and CG

	ITEM	WEIGHT (kg)	ARM (mm)	MOMENT = WEIGHT x ARM (kg.mm)
	EMPTY AIRCRAFT	397,4	736,38	292645,4
LOADED AIRCRAFT WEIGHT AND CG	PILOT		1156,0	
	PASSENGER		1156,0	
	BAGGAGE - BEHIND SEATS		1806,0	
	~~BAGGAGE - FRONT optional)~~		106,0	
	BAGGAGE - WING LOCKERS		1036,0	
	FUEL TANKS		606,0	
	LOADED AIRCRAFT	**TAKEOFF WEIGHT (kg) TOW=**	**CENTER OF GRAVITY CG (mm)= CG (%MAC) =**	**LOADED ACFT TOTAL MOMENT (kg.mm) MT=**

Max.Takeoff Weight:	600	kg
CG Range:	25	35
Front C.G. limit (behind Datum):	744	mm
Aft C.G. limit (behind Datum):	878	mm

CG (mm)= TOTAL MOMENT / TOTAL WEIGHT

CG (%MAC)= (CG (mm) - MAC_LE) X 100 / MAC

Serial No.: 718/2024
Date:
By:

6.3 Permitted payload range

PERMITTED PAYLOAD RANGE OF BRISTELL (kg)								
S/N:	718/2024				Empty weight (kg):	397	MTOW (kg):	600,0
FUEL								
	VOLUME	(litres)	20	40	60	80	100	120
	WEIGHT	(kg)	14,5	29,0	43,5	58,0	72,5	87,0
			PERMITTED CREW WEIGHT (kg)					
BAGGAGE (kg)	NO BAGGAGE	0	**188** *34,0 %MAC*	**174** *33,0 %MAC*	**159** *32,0 %MAC*	**145** *31,0 %MAC*	**130** *30,0 %MAC*	**116** *29,1 %MAC*
	1/2 REAR	8	**181** *34,6 %MAC*	**166** *33,6 %MAC*	**152** *32,6 %MAC*	**137** *31,6 %MAC*	**123** *30,6 %MAC*	**108** *29,7 %MAC*
	MAX REAR	15	**168** *35,0 %MAC*	**159** *34,2 %MAC*	**144** *33,2 %MAC*	**130** *32,2 %MAC*	**115** *31,2 %MAC*	**101** *30,3 %MAC*
	1/2 WING LOCKERS	20	**168** *33,7 %MAC*	**154** *32,7 %MAC*	**139** *31,7 %MAC*	**125** *30,7 %MAC*	**110** *29,7 %MAC*	**96** *28,8 %MAC*
	1/2 REAR + 1/2 WING	28	**161** *34,3 %MAC*	**146** *33,3 %MAC*	**132** *32,3 %MAC*	**117** *31,3 %MAC*	**103** *30,3 %MAC*	**88** *29,4 %MAC*
	MAX REAR + 1/2 WING	35	**153** *34,9 %MAC*	**139** *33,9 %MAC*	**124** *32,9 %MAC*	**110** *31,9 %MAC*	**95** *31,0 %MAC*	**81** *30,0 %MAC*
	MAX WING LOCKERS	40	**148** *33,4 %MAC*	**134** *32,4 %MAC*	**119** *31,4 %MAC*	**105** *30,4 %MAC*	**90** *29,5 %MAC*	**76** *28,5 %MAC*
	1/2 REAR + MAX WING	48	**141** *34,0 %MAC*	**126** *33,0 %MAC*	**112** *32,0 %MAC*	**97** *31,0 %MAC*	**83** *30,1 %MAC*	**68** *29,1 %MAC*
	MAX REAR + WING	55	**133** *34,6 %MAC*	**119** *33,6 %MAC*	**104** *32,6 %MAC*	**90** *31,6 %MAC*	**75** *30,7 %MAC*	**61** *29,7 %MAC*

6.4.1. Airplane Loading Schedule Chart

Aircraft Type/Model:	BRISTELL LSA	Airplane S/N:	718/2024	Registration:	ZK-TOW

LOADING SCHEDULE CHART			SAMPLE AIRCRAFT			YOUR AIRCRAFT		718/2024
#	ITEM	WEIGHT LIMIT [kg]	WEIGHT [kg]	ARM [m]	MOMENT [kg.m]	WEIGHT [kg]	ARM [m]	MOMENT [kg.m]
1.	Empty aeroplane		378 kg	0,726	274,1	397,4	0,736	292,6
2.	Crew		90	1,156	104,0		1,156	
3.	Fuel	86,4	57,6	0,606	34,9		0,606	
4.	Bagagge behind seats	15	15	1,806	27,1		1,806	
5.	Baggage wing lockers	40	40	1,036	41,4		1,036	
6.	Baggage front locker	10	0	-0,219	0,0		-0,219	
		MTOW [kg]	TAKEOFF WEIGHT [kg] = sum of weights 1 to 6		TOTAL MOMENT [kg.m] = sum of moments 1 to 6	TAKEOFF WEIGHT [kg] = sum of weights 1 to 6		TOTAL MOMENT [kg.m] = sum of moments 1 to 6
		600	580,1		481,5			

FRONT CG LIMIT
0,744 m
AFT CG LIMIT
0,878 m

CG POSITION [m] = TOTAL MOMENT / TAKEOFF WEIGHT
= 481,5 / 580,1
= **0,830**

CG POSITION [m] = TOTAL MOMENT / TAKEOFF WEIGHT
=
=

FRONT CG LIMIT
25,0 %MAC
AFT CG LIMIT
35,0 %MAC

CG POSITION [%MAC] = (CG POS. [m] - MAC_LE) x 100 / MAC
= 42,399 / 1,3497
= **31,4**

CG POSITION [%MAC] = (CG POS. [m] - MAC_LE) x 100 / MAC
=
=

MAC [m]= 1,3497
MAC_LE [m]= 0,4061

6.5 Equipment List

List of all equipment for BRISTELL LSA, S/N 718/2024, installed at the customer's request:

1. Adjustable 3-pos. rudder pedals on both sides
2. Aileron electric trim - control on both control sticks
3. AIR TRAFFIC Anti-collision system and Traffic Display V3+M (FLARM)
4. AIRPATH C2400 L4P Compass
5. AMSAFE 4-point safety belts
6. Arm rest box
7. AVEO eye ball vents black
8. BERINGER dual brakes with pressure limiter and parking brake
9. BERINGER front and main wheels
10. BRS-7 AEPS installation
11. Cabin heating
12. Canopy glass dark grey with side sliding windows, no venting flaps
13. Central console cover, side panels, seats and seat backs padded textile
14. CO guardian carbon monoxide detector Aero-452
15. Elevator electric trim
16. ELT KANNAD AF Integra 406 MHz + RC 200 control panel
17. External connection to power for jump start - Anderson plug
18. Fixed landing gear with steerable nose wheel
19. GARMIN G3X backup battery TCW IBBS-12V-3AH
20. GARMIN G3X flight display system
21. GARMIN GA 35 External active GPS antenna
22. GARMIN GAP 26 angle of attack unheated probe
23. GARMIN GDU 460, 10,6" display
24. GARMIN GEA 24 Engine Interface Module
25. GARMIN GMU 11 Magnetometer
26. GARMIN GPS 20A ADS-B Receiver
27. GARMIN GPS BNC antenna(s) for G3X
28. GARMIN GSU 25C Air Data Attitude Heading Reference System
29. GARMIN GTP 59 Temperature Probe
30. GARMIN GTR 200 panel COM radio
31. GARMIN GTX 45R mode S transponder with ADS-B out
32. Glareshield and handle behind seats padded leather
33. HD wing spar 750 kg
34. Horn (klaxon) 4-cars
35. Instrument panel B23

36. Instrument panel storage box on the right
37. KANARDIA Altimeter 57 mm (ft/mBar)
38. KANARDIA INDU Airspeed indicator 57 mm (kts, long)
39. LAMBERT + LINAK electric flaps actuator
40. LAMBERT ARROW FLASH 2 wing tip pos. lights and fin beacon
41. LAMBERT LED-LEHV-CV3 Landing lights in both wings
42. Lockable canopy NEW system and lockable fuel tank caps
43. Long HTU (2.9 m) with long trim and horn balance
44. Low fuel warning lights
45. Noise insulation on firewall
46. Nose gear doubled flexible rod (TELEFLEX)
47. Paint scheme: own design and grey interior RAL 7016
48. Propeller DUC Inconel FLASHBLACK-R hydraulic adjustable (R915iS)
49. RAMI AV-10 COMM antenna
50. RAMI AV-200 ELT Antenna
51. RAMI AV-74 transponder DME antennas (2x)
52. RAMI AV-75 broadband blade type antenna for FLARM (2x)
53. ROTAX 915 iS 3 A engine
54. TOST glider tow release, side mirror + PIONEER ND-BC8 back-up camera
55. TOSTEN CS-6 grip on the left and right side
56. USB port(s) on the instrument panel and between seats
57. VARTA battery YTX20L
58. Wheel fairings (pants) and nose leg fairing
59. Wing lockers with drainage

7 AIRPLANE AND SYSTEMS DESCRIPTION

7.12 Miscellaneous equipment

List of misc. equipment for BRISTELL LSA, S/N 718/2024, installed at the customer's request:

1. Adjustable 3-pos. rudder pedals on both sides
2. Aileron electric trim - control on both control sticks
3. AMSAFE 4-point safety belts
4. Arm rest box
5. Automotive net in baggage compartment (P/N 42084)
6. AVEO eye ball vents black
7. BERINGER dual brakes with pressure limiter and parking brake
8. BERINGER front and main wheels
9. BRS-7 AEPS installation
10. Canopy glass dark grey with side sliding windows, no venting flaps
11. Central console cover, side panels, seats and seat backs padded textile
12. Cockpit floor and baggage compartment floor carpets
13. External connection to power for jump start - Anderson plug
14. Glareshield and handle behind seats padded leather
15. HD wing spar 750 kg
16. Instrument panel B23 with storage box on the right
17. LAMBERT + LINAK electric flaps actuator
18. LAMBERT ARROW FLASH 2 wing tip pos. lights and fin beacon
19. LAMBERT LED-LEHV-CV3 Landing lights in both wings
20. Lockable canopy NEW system and lockable fuel tank caps
21. Low fuel warning lights
22. Map pockets 2 Pcs
23. Noise insulation on firewall
24. Nose gear doubled flexible rod (TELEFLEX)
25. Paint scheme: own design and grey interior RAL 7016
26. TOST glider tow release, side mirror + PIONEER ND-BC8 back-up camera
27. TOSTEN CS-6 grip on the left and right side
28. USB port(s) on the instrument panel and between seats
29. VARTA battery YTX20L
30. Wheel fairings (pants) and nose leg fairing
31. Wing lockers with drainage

8 AIRPLANE HANDLING, SERVICING AND MAINTENANCE

No changes.

9 REQUIRED PLACARDS AND MARKINGS

9.2 Miscellaneous placards and markings

BRISTELL LSA, S/N 718/2024 is equipped with glider towing unit TOST:

	Towing release placard located on the Throttle – propeller quadrant.