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1. GENERAL INFORMATION

The Savannah S is intended for recreational use and can be used for pilot training and aerial work where permitted.

WARNING: read this manual before your first flight!

Each Savannah-S^{TM} is supplied with a Pilot Operating Handbook, a Maintenance Manual and a Spare Parts Catalogue; these manuals are to be considered as parts of the aircraft and they must follow the aircraft during its lifetime. They also be updated with the last revision by checking the ICP website (www.icpaviation.it) at My I.C.P. page, dedicated to the continuous airworthiness. In fact, the present manual has a first page with indicated the Serial Number of a certain Aircraft and the Document Code, then the other pages contains the Revision and the Generic Serial Number for the aircraft applicability (ref. also to *Ch. 9.4*). Insert the pages revised (last revision, if any) to maintain updated the manual.
The pilot must be informed and understand the specifications and limitations of this ultralight aircraft. This manual must be read with attention. Prescriptions regarding pre-flight and daily checks must be observed.
A separate maintenance manual is supplied and maintenance instructions must be adhered to strictly.
For engine maintenance, ballistic rescue system (if installed) and any other additional equipment refer to relevant manufacturers manuals.
This manual contains the necessary information for safe and efficient operation of your aircraft. These instructions provide you with general knowledge of the aircraft and its characteristics and specific normal and emergency operating procedure. It is assumed that the pilot operating this aircraft has a thorough knowledge of flight principals and such these principals are not covered on this manual. This manual provides the best possible operating instructions under most circumstances, but multiple emergencies, adverse weather, terrain or other factors may require different actions.

WARNING

Savannah^{TM}- S is intended for VFR flights only! Never attempt to fly under IMC intentionally. Avoid high wind and excessively turbulent weather. The Savannah S is not an aerobatic aircraft, aerobatic manoeuvres are not permitted.

WARNING

Engine types used on ultra-light aircrafts are not certified aircrafts engines and the maintenance is responsibility of the owner.
The ROTAX engine used on this aircraft, even though labelled as UL "ultra-light" and therefore "uncertified" is reputed to be reliable.
Nevertheless, ROTAX issues a statement to point user attention to the risk that an engine failure may call for an emergency landing.

The risk of engine failure is to be kept in mind in any case when planning and performing the flight.
The pilot should verify that every maintenance and check is carried out as prescribed by the engine manufacturer.

1.1. CERTIFICATION CRITERIA

The Savannah S complies with Italian law 106 (date 25.03.1985), it should be considered as an ultra-light airplane; no technical inspection by the Italian Authority (ENAC) is required for this kind of aircraft.
CS-VLA regulation has been used as design reference standard.
This ultra-light aircraft has been designed to comply with the load generated by a MTOW of 600 kg (1320 lbs) according to the CS-VLA regulations.
The Savannah S satisfy ASTM F2245 design standard and is eligible to fly under LSA regulation.
Different countries have different regulations for ultra-light class planes, it is the pilots responsibility to load the plane in order to withstand with the applicable limits.

Any modification to the aircraft that could potentially affect the structural integrity or flight characteristics of the aircraft that has not been approved by ICP in writing, will render all warrantees invalid and absolve ICP and ICP Dealer of any further responsibility to the owner and or operator and liability for the consequences of such modification.

1.2. MEANING OF "WARNING, CAUTION AND NOTE"

The following definitions apply to "Warnings", "Cautions" and "Notes" found throughout the manual:

WARNING
Operating procedures, techniques, etc., which could result in personal injury or loss of life if not carefully followed.

CAUTION
Operating procedures, techniques, etc., which could result in damage to equipment if not carefully followed.

NOTE
Operating procedures, techniques, etc., which is considered essential to emphasize.

1.3. SYMBOLS, ABBREVIATIONS AND GLOSSARY

CAS – Calibrated Airspeed: airspeed in standard atmosphere and at sea level, corrected by the positioning error of the sensing system.

IAS - Indicated Airspeed: airspeed, as indicated by the air speed indicator.

TAS - True Airspeed: effective air speed.

Va - Manoeuvring speed: maximum speed at which full deflection of flight controls is allowed without generating excessive load on the airframe.

V_{FE} - Maximum flaps extended speed: maximum speed with the flaps extended. Indicated by the upper white arc limit on the air speed indicator

Vno - Maximum structural cruising speed: speed which must not be exceeded in turbulent conditions. Indicated by the lower yellow arc limit on the air speed indicator.

Vne - Never exceed speed: speed that should never been exceeded. Indicated by the red line on the air speed indicator.

Vs - Stall speed (clean): minimum speed at which the aircraft can be maintained in level flight with the flaps retracted. Indicated by lower green arc limit on the airspeed indicator.

Vso - minimum speed at which the aircraft can be maintained in level flight with the flaps extended. Indicated by the lower white arc limit on the airspeed indicator.

Standard temperature: 15°C (59°F).

RPM - Revolutions per minute: engine rotation speed, in order to obtain propeller rotation speed use gear ratio.

MAP - Manifold air pressure: pressure of the fuel/air supplied to the engine measured by in the cylinders intake manifold.

G - load factor: Ratio between aircraft generated lift and weight, is an indication of airframe stress.

C.G. - Centre of gravity: the point where the resultant of the weight force is applied.

ARM - longitudinal distance from an item centre of gravity to the reference datum.

MOMENTUM - item weight multiplied by its arm.

C.G. LIMITS - extreme positions of the centre of gravity that allows safe aircraft operation.

1.4. UNIT CONVERSION TABLE

Speed

1 Km/h	0.54 Knots
1 Km/h	0.621 Mph
1 Knot	1.852 Km/h
1 Mph	1.61 km/h

Distance

1 m	3.28 feet
1 feet	0.305 m

Pressure

1 PSI	68.95 mbar
1 PSI	51.75 mmHg
1 mbar	0.0145 PSI
1 mmHg	0.019 PSI

Mass

1 Kg	2.2045 Lbs.

1.5. INSTALLED OPTIONAL / ADDITIONAL EQUIPMENT

This manual describes the Savannah S in the standard configuration and the most common optional / additional equipment. Other optional / additional equipment not covered in this document, should be described in an addendum to the Pilot Operating Handbook.
It is the owner responsibility to produce such documentation and verify that optional / additional equipment are properly installed and satisfy applicable regulations.

2. AIRPLANE AND SYSTEM DESCRIPTIONS

2.1. ENGINE

The aircraft is equipped with a Rotax 912 UL, ULS or iS engine.
Engine and propeller limitations are reported in the relevant chapter of this manual. Engine manufacturer manual and notification will always have priority over this manual.

CAUTION

Because of the continuous issuing of Service Bulletin and Service Information by Rotax, ICP Srl does not intend to forward such information to the owners of Rotax engines.
Said information is available on the website www.rotax-aircraft-engines.com in the "Documentation" section; we also recommend contacting the official Rotax dealer in your country.
ICP S.r.l. does not take any responsibility for any damage to people and/or property due to failures in applying Rotax instructions.

Cooling system

The engine is cooled by water, oil and air. The engine is equipped with water and oil radiators. Air intakes on the engine cowling ensure the correct air distribution around cylinders and radiators. Air flow around radiators and engine cooling surfaces is assured by the low air pressure generated by the extraction lip on the lower part of the engine cowling.

NOTE

For engine liquids specification refer to engine supplier documentation

CAUTION

Water or coolant containing water must never be added to waterless coolant.
For complete coolant specifications refer to Rotax documentation.

Lubrication system

Oil is contained in an external tank mounted on the firewall and cooled by a radiator. Oil pressure is generated by an engine driven pump that pumps oil through a filter to the internal engine components. Oil is then returned to the tank blown by the engine internal gasses.

Minimum and maximum oil quantity at take-off 2 litres – 3 litres

NOTE

For engine liquids specification refer to engine supplier documentation

2.2. PROPELLER

The aircraft is equipped with the following propeller type:

As standard

"DUC Helice Swirl", 3 blade in carbon fibre, adjustable on ground - STANDARD.

As option

"DUC Helice Swirl Inconel", 3 blade in carbon fibre, adjustable on ground

"DUC Helice Swirl 3" o "Swirl 3 L", 3 blade in carbon fibre, adjustable on ground

"DUC Helice FLASH", 3 blade carbon fiber, adjustable pitch on ground

"Ivoprop Patriot", 3 blade carbon fiber, variable pitch in flight

"E-PROPS Durandal" or "V20", 3 blade carbon fiber, adjustable pitch on ground

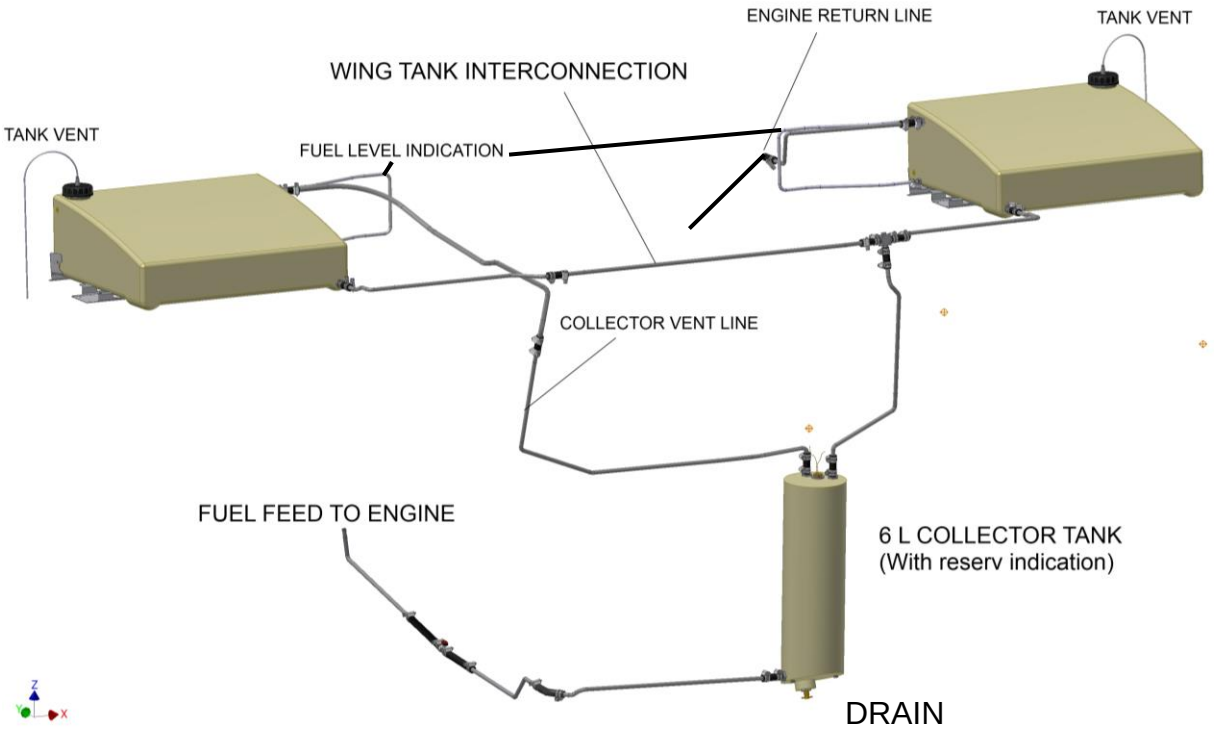
"E-PROPS Glorieuse", 3 blade carbon fiber, adjustable pitch in flight

2.3. FUEL SYSTEM

The fuel system is composed of two 36 litre capacity plastic wing tanks located between the main and the rear wing spar. Both tanks have visual level indicators on wing roots and venting line through the fuel caps.
Wing tanks are interconnected through a line passing on the cabin roof, via a "T" joint that is connected to a 6 litre collector sump located on aft fuselage behind passenger seat.
This is the lower part of the fuel system, a drain cock is located at the bottom of this collector tank allowing the fuel system to be drained.
Once wing tanks are empty the collector tank level decreases switching the low level sensor, leading to low level warning indication on the control panel.
Collector tank is vented to the atmosphere through the left fuel tank. One fuel return line from the engine discharge vapours and excessive pressure to the right wing tank.

WARNING

DO NOT replace the Fuel Tank caps with non-original parts. Tank venting should always be assured, verify during pre-flight venting line free flow.



A fuel SHUT-OFF valve located on the cabin floor in front of the pilot; this valve should only be closed in case of emergency in order to isolate the fuel system from the engine.

Fuel SHUT-OFF is secured with a safety wire that must be broken in order to operate the valve.

WARNING
Attempt to take off with SHUT-OFF valve close will lead to a sudden engine stop

Fuel filters are located in the engine compartment against the lower firewall and on the delivery side of the fuel distributor to carburettor (3 in total). Fuel pressure is generated by two fuel pumps in series, the auxiliary electrical fuel pump and the engine mechanical fuel pump.

Quantity of usable fuel excluding reserve 70 litres (of 72 total on wing tanks)
Quantity of unusable fuel 2 litres (of 72 total on wing tanks)

Type of approved fuel

	Usage/description	
	912 UL/A/F	912 ULS /IS
MOGAS		
European standard	EN 228 Normal [1)]	
	EN 228 Super [1)]	EN 228 Super[2)]
	EN 228 Super plus[1)]	EN 228 Super plus[2)]
Canadian standard	CAN/CGSB-3.5 Quality 1[3)]	CAN/CGSB-3.5 Quality 3[4)]
US standard	ASTM D4814	ASTM D4814
AVGAS		
US standard	AVGAS 100LL (ASTM D910)	AVGAS 100LL (ASTM D910)

1) min. ROZ 90
2) Min. ROZ 95
3) Min. AKI*87
4) Min.AKI 91

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 sediment in the oil system. Thus it should only be used in case of problems with vapour lock or when other types of gasoline are unavailable.
According SI-912-016 R2 emitted by Rotax all engine 912 series are approved for use with E10 (Unleaded automotive fuel blended with 10% ethanol). Engine and fuel system of the aircraft are not been tested with fuels that contain more than 10% ethanol.

NOTE
For complete fuel specifications refer to ROTAX documentation

2.4. AIRFRAME

Savannah^{TM}-S is a monoplane with a high wing two seat side-by-side ultra-light airplane.
The airframe is mainly composed of aluminium alloy Al 6061 T6. 6061T6 has relatively high corrosion resistance but not sufficient to withstand corrosion in highly corrosive environments such as coastal and saline areas. It is recommended to protect the airframe in such high corrosive environments with a suitable painting system.
All the overlapping metal sheet joints are protected by the application of a thin layer of primer paint.
The welded parts are made of steel 25CrMo4 or AISI304.
High stress parts such as the main landing gear spring are made of aluminium alloy Al 2024 T3.
The fuselage is composed of two sections (front and rear) with bulkheads and reinforcement stringers joined by rivets and solid rivets. The firewall is made of galvanized steel plate and the seats are an integral part of the FWD fuselage.
Welded Steel tube cabin frame is used to hold wing attachment points and support FWD fuselage loads.
The wing airfoil is designed to generate high lift and the wing adopts Junkers type flaperon (aileron + flap) to improve manoeuvrability at low speed.
High lift and high stall angle of attack are reached thanks to a combination of large aerofoil nose radius, dropped nose and vortex generators.
The wings are rectangular in plan with small dihedral and without washout. A "virtual washout" is introduced by different angle between inboard and outboard flaperons. Wing structure is composed of main and aft spars with a torque box. Two wing struts connects the wing to the fuselage.
Horizontal Tail plane is composed of stabilizer and elevator with anti-balance electric trim tab.
Vertical tailplane is composed of conventional fin and rudder. Both tailplanes are bolted to the aft fuselage, four attachment points for the stabilizer and four for the fin plus two bolts that joins vertical fin to the stabilizer.
The engine mount is made of two parts composed of steel 25CrMo4 welded tubes. The two parts are bolted together with silent-blocks in order to dampen engine vibrations.

2.5. LANDING GEAR

The aircraft can be configured with either a tri-cycle or tail wheel landing system. For tail wheel configured aircraft consult the relevant Savannah S – Tail Dragger POH Addendum.
The main landing gear is composed of a single-piece aluminium 7075 alloy spring; the spring is fixed to welded steel plates bolted to the fuselage. The nose landing gear is steerable and is linked to the frame with a bungee cord that acts as a shock absorber.
Disc brakes are installed on main landing gear wheels and have hydraulic calliper. Two hydraulic fluid cylinders are installed on the rudder pedals allowing pilot to perform

differential breaking. Brake system for both pilot and Co-pilot side as well as a park break are options.
The parking brake (option) MUST be used only with engine-off and for short period of time. Parking brake is composed of a shut off valve that isolates the brake cylinders from the wheel callipers.
In order to set parking brake, pilot has to apply pressure on brake pedals, then with pressure applied shut the parking brake valve (move PB lever).

CAUTION

If parking brake valve is moved on "BRAKE ON" position without having applied pressure to the system, foot braking will no longer be available until parking brake is released and no braking action will be provided.

In case of long term parking use chocks to prevent aircraft movements.

Brake fluid: mineral based oil (Renofluid 3.000 IT, Fiat TUTELA GI/A);
(DO NOT USE synthetic oil type DOT4)

Wheels size:6.00"x6.00" (4.00"x6.00" and Tundra tyres as options, as well as fairings)

2.6. FLIGHT CONTROLS

The aircraft is equipped with a single central "Y" shaped control stick (dual control stick is available as an option)

Pitch control

The elevator is connected to flight control system via two Ø 3.2 mm steel cables. Cable tension is adjustable by two adjusters situated on the AFT fuselage and accessed by AFT fuselage hatch. Elevator deflection is +25°/ -25° ±2°

Yaw control

The rudder is connected to rudder pedals via two Ø 3.2 mm steel cables. Cable tension is adjustable by two adjusters situated close to rudder pedals. Rudder deflection is +28°/ -28° ±2°

Roll Control

Full span Flaperons are asymmetrically operated by push-pull rods and bell crank connected to a torque tube linked to the control stick, flaperon deflection is +15,5°/-15,5° ±2° with flaps UP setting.

Flaps Control

Full span Flaperons are symmetrically operated by a flap mixer, push-pull rods and bell crank. Flaps operation is achieved by movement of a three position control lever situated on the pilot side cabin floor (electric flaps are optional). Flaperons deflection on the three flap position is: 0°, 13,5° and 27° ±2° with aileron centred.

Pitch Trim controls

Pitch trim is provided with one electrically operated antibalance trim TAB on the left elevator. Trim control is positioned on the control panel or on the control stick (optional) and trim position is indicated by an optional led indicator.

EngineControls

The power plant controls are:
- Double throttle control push – pull rod type with adjustable friction;
- Choke lever (cold start);
- Carburettors heat (standard on Rotax 912 ULS, option on Rotax 912 UL);
- Auxiliary electric fuel pump;
- Fuel shut-off valve, located on the cockpit floor;
- Magnetos switches 1 and 2;
- Battery master key and starter motor that connects the electrical system to the 12 V battery.

The engine can work with the master in the OFF position, the ignition system is independent. In case of master OFF the instruments and the electrical services will not operate. For safety reasons, the key should be removed when the engine is off.

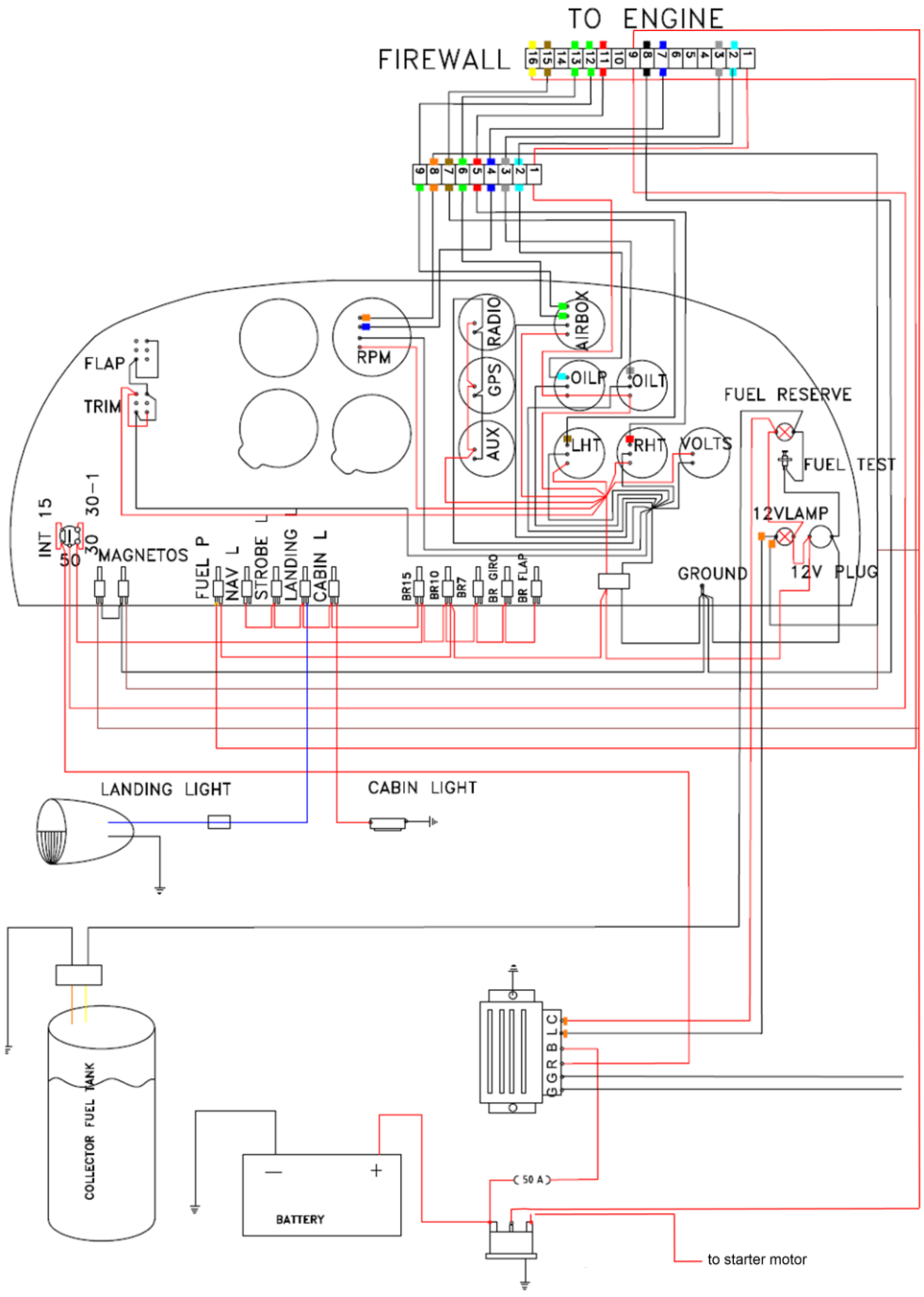
WARNING

The engine may start when the master is OFF if even only one magnetos switch is in the ON position. Always verify magnetos switches position prior to rotate the propeller.

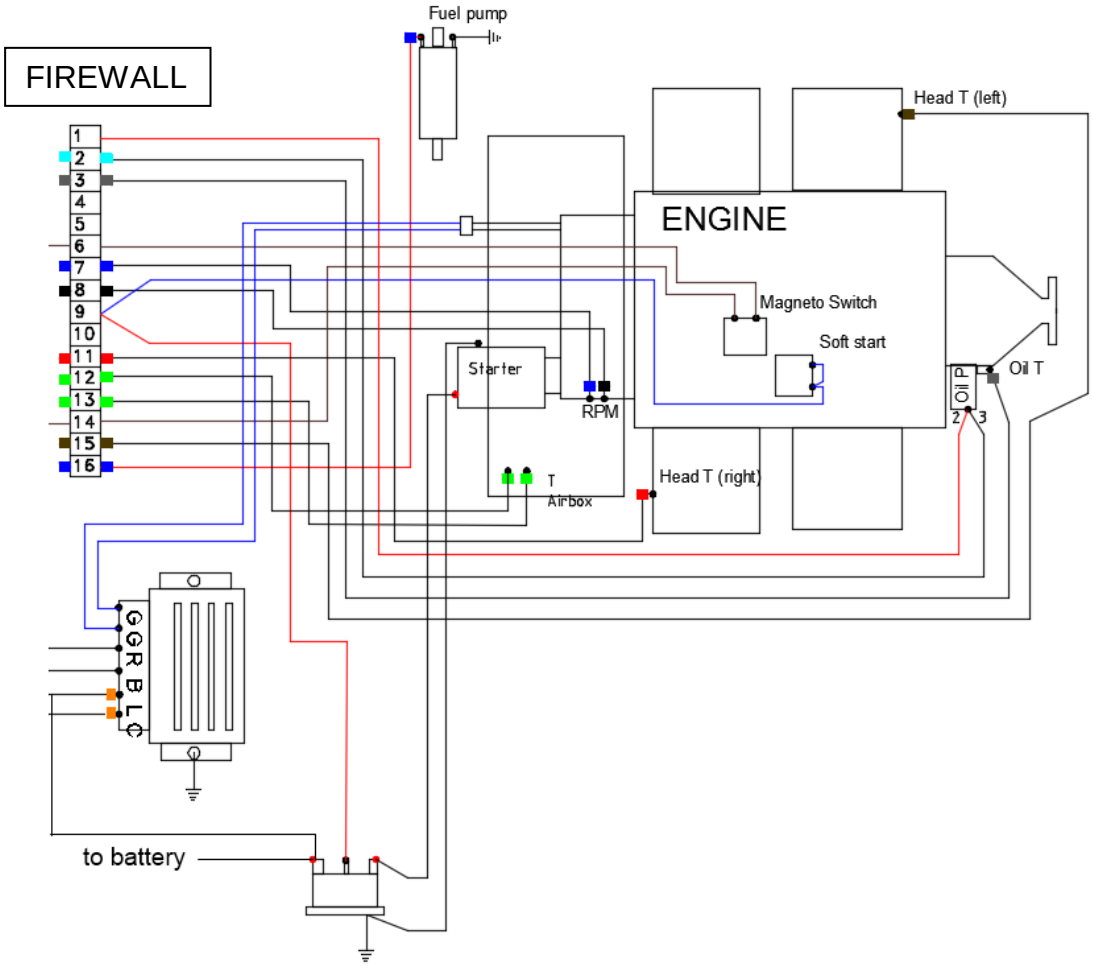
All the switches and/or controls of the engine are activated in the UP position. The starter and carburettor heat are activated by pulling the control levers.

2.7. ELECTRIC SYSTEM

The following diagrams illustrate the electrical system:



Aircraft



Engine

2.8. CABIN AND INSTRUMENTS

Doors

Doors are operated and locked by a central handle, a secondary lock on the door frame provide redundancy on door lock.

WARNING

The doors and support hinges have not been designed to be opened during flight. Opening the doors in flight may result in airframe damage.

It is possible to fly with one or both doors removed. Flying without doors could be very pleasant. It should be taken into account that drag will be increased particularly at high angle of attack. If only one door is removed, side-slip should be avoided.

Seats

In order to limit weight, seats are integral parts of the fuselage and no adjustment is provided. Adjustable seats are available as an option.

Luggage compartment

Luggage should be placed in the compartment behind seats respecting the 20 kg limit.

WARNING

Ensure that luggage is properly stowed and secured. Unsecured luggage may jam flight controls or cause injury to crew.

Ventilation / heating

Snapvents on each window can be used for cabin ventilation.
Heating is provided routing hot air from the engine compartment. Hot air to the cabin is controlled by a butterfly valve controlled by the cabin heat toggle. Hot air enters the cabin just below the windshield thus providing windshield defog.

CAUTION

If visibility is impaired by mist on the windshield, open cabin heat and set snapvents fully open on extraction (opening backwards).

Pitot and static port system

Static ports for flight instruments are located on both aft fuselage lateral panels; pitot pressure tube is located on the left wing near wing struts.

CAUTION

When the aircraft is on the ground, remember to protect the pitot tube using provided cap. Always remove the protection during preflight inspection.

Airspeed Indicator

Coloured arcs indicated on the ASI are explained on the following table:

ARC	SPD RANGE (mph)	SPD RANGE (Kph)	SPD RANGE (KIAS)	NOTE
White	34-69	55-111	30-60	Flaps extended spd range
Green	40-112	65-180	35-97	Normal operation spd range
Yellow	112-143	180-230	97-124	Calm air operation spd range
Red line	143	230	124	Speed never exceed

Basic Instruments

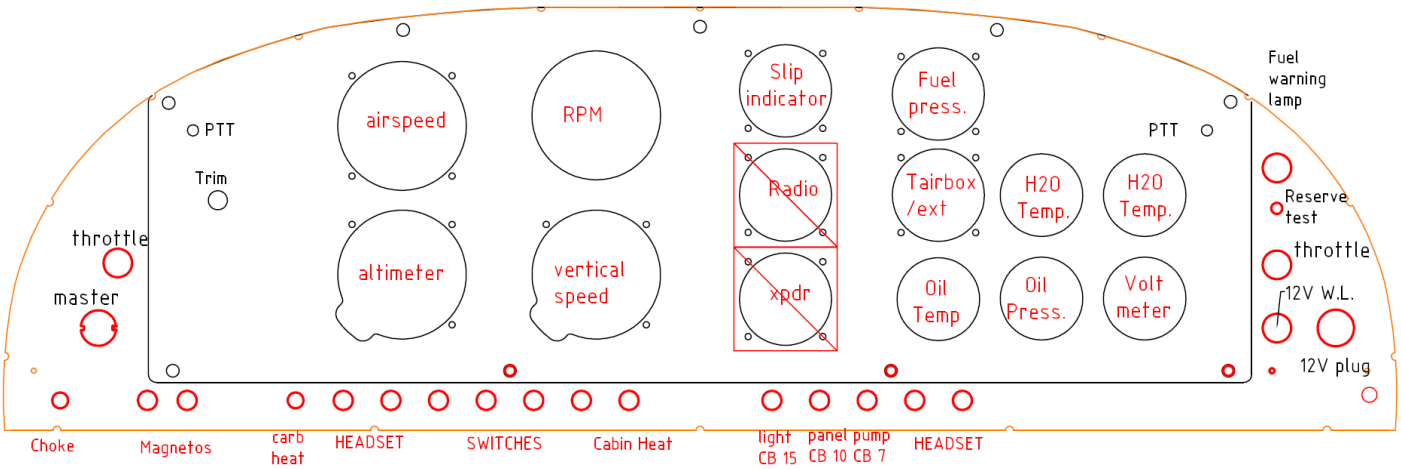
The base instruments layout is reported below.

NOTE

Layout may vary with options; check the standard configuration and supplements to the Chapter 4, *Weight and balance*, of the present manual.

CAUTION

The instruments installed are not certified following any aeronautical standard. Do not consider the indication given by the instruments as completely accurate.



Fuel level indicator and fuel reserve light

An indication of the fuel quantity on board can be viewed from the level indicators placed on the first rib of the wings. Those indicators are composed of a transparent tube directly connected to the respective fuel tank; refer to cap 3.3 for fuel system schematics.

CAUTION

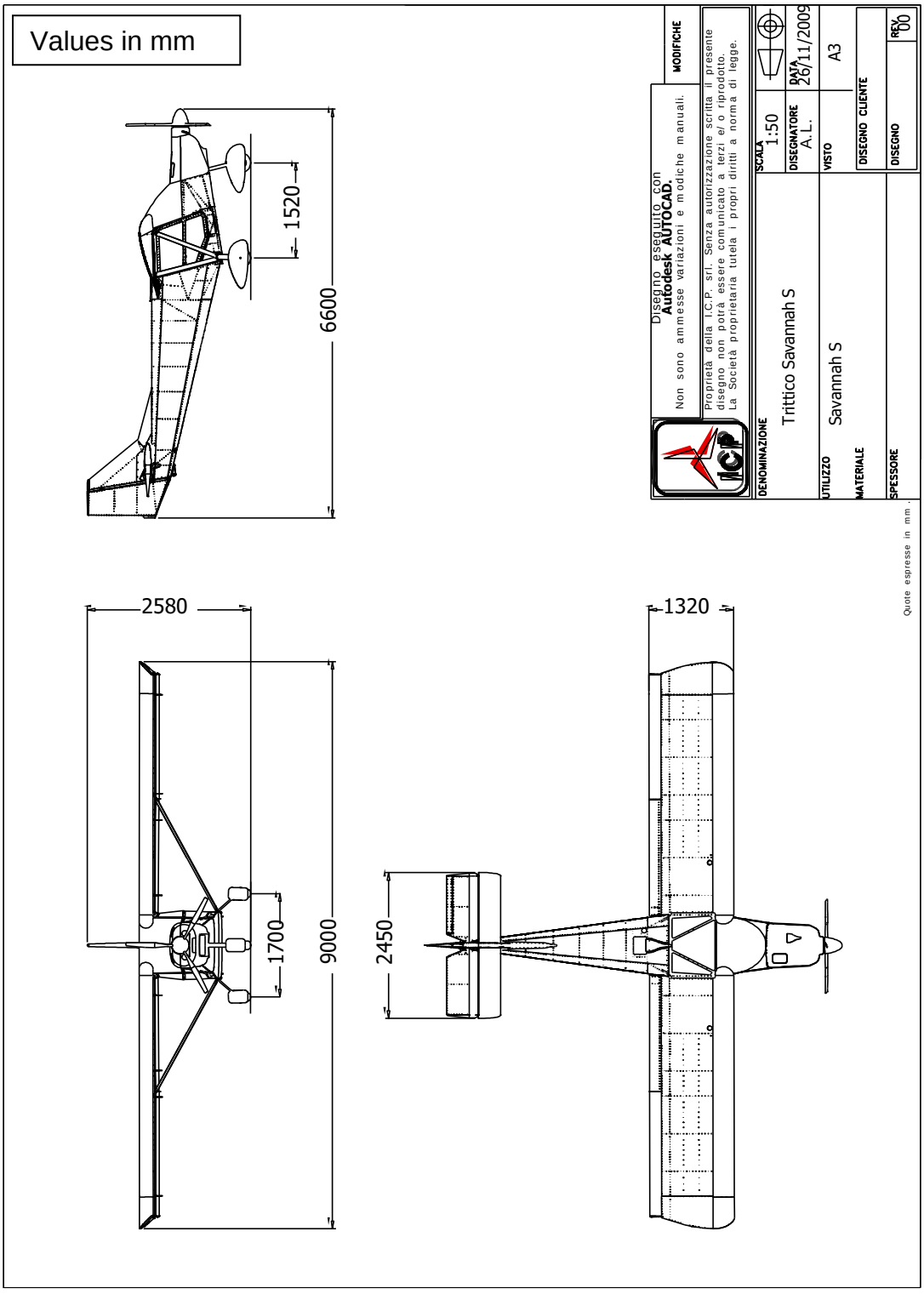
Attitudes different from straight and level could leads to erroneous readings. Fuel level should be checked in straight and level flight.
Side slip could cause fuel transfer "in the ball direction" if flight condition is maintained for long periods.

Fuel reserve warning lamp will light as soon as the fuel level in the collector tank start to decrease. When reserve warning lamp is lit, only 6 litres reserve fuel remains.

2.9. AIRCRAFT TECHNICAL SPECIFICATIONS

Power-plant		
Manufacturer	Bombardier-Rotax GmbH	
Model	912 UL	912 ULS/iS
Type	Four horizontal opposed cylinders, normal aspirated	
Displacement	1211 cm^3	1352 cm^3
Maximum takeoff power	80 hp (59.6 KW) at 5800 RPM	100 hp (73.5 Kw) at 5800 RPM
Maximum continuous power	78 hp (58 KW) at 5500 RPM	92 hp (69 Kw) at 5500 RPM
Cylinder cooling	Air	
Head cooling	Liquid	
Gear reduction ratio	2.27	2.43
Fuel system		
Wing tanks capacity	2 x 36 litres	
Sump	6 litres	
Oil system		
Type	engine driven oil pump	
Tank capacity	2.5 litres	
Cooling system		
Type	air-liquid mix	
System capacity	3.3/3.5 litres	
Battery	min 9Ah	
Generator	250 W	
Starter	electrical	
Spark plugs	912 UL NGK DCPR7E	912 ULS NGK DCPR8E
Geometrical characteristics and dimensions		
Wing span	9 m	29.53 ft
Maximum height	2.58 m	8.3 ft
Maximum length	6.6 m	21.65 ft
Maximum fuselage width	1.16m	3.80 ft
Maximum luggage weight	20 Kg	44 lbs
C of G front limit position	25% MAC	
C of G rear limit position	38.5 % MAC	
Number of seats	2	

Wing load (MTOW 450 Kg/992 lbs.)	38 Kg/m^2	7.8 lb/ft^2
Wing load (MTOW 600 Kg/1320 lbs.)	50.7 Kg/m^2	10.4 lb/ft^2
Mean aerodynamic chord	1.320 m	3.83 ft
Wing surface	11.88 m^2	127.82 ft^2
Wing aspect ratio	6.8	
Taper ratio	1	
Flaperon surface	0.81 m^2	8.72 ft^2
Flaperon opening	3.858 m	12.65 ft
Flaps angle	0°; 13.5°$\pm 2^0$; 27°$\pm 2^0$	
Aileron rotation angle (flaps UP)	$\pm$ 15.5°$\pm 2^0$	
Horizontal tail plane surface	2 m^2	21.5 ft^2
Horizontal plane taper ratio	1	
Horizontal plane span	2.45 m	8 ft
Elevator rotation angle	+25°$\pm 2^0$; -25° $\pm 2^0$	
Trim surface	0.08 m^2	0.86 ft^2
Vertical tail plane surface	1.12 m^2	12.05 ft^2
Rudder excursion	+28° $\pm 2^0$; -28° $\pm 2^0$	
Nose landing gear suspension	Bungee	
Main landing gear suspension	Single-piece aluminium alloy spring leg	
Steering	Rudder pedals commanded nose wheel	
Wheel dimension	6" x 6" (option 4"x6" or Tundra tyres)	
Wheel inflation pressure	1.4 / 1.6 bar for 6" and Tundra, 2.0/2.5 bar for 4"	
Brakes	Disk brake, hydraulic drive	
Track	1.7 m	5.57 ft
Axes distance	1.52 m	5 ft


Values in mm
1520
6600
2580
1700
9000
1320
2450
Disegno eseguito con Autodesk AUTOCAD.
Non sono ammesse variazioni e modiche manuali.
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SCALA 1:50
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DENOMINAZIONE Trittico Savannah S
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SPESSORE
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3. OPERATING LIMITATIONS

The present section reports the operational limits of the aircraft. Those limits when possible are reported with marks on the flight instruments and placard on the cabin. The following limits should be adhered strictly in order to avoid structural damage or dangerous situations.

3.1. STALL SPEEDS (V_{S1} AND V_{S0})

A/C mass	992 Lbs. / 450 kg	1320 Lbs. / 600 kg
Flaps retracted	35 mph / 56 kph / 30 knots	40 mph / 65 kph / 35 knots
Flaps (1/2)	31 mph / 50 kph / 27 knots	36 mph / 58 kph / 31 knots
Flaps extended (Full)	30 mph / 48 kph / 26 knots	35 mph / 55 kph / 30 knots

3.2. FLAPS EXTENDED SPEED (V_{FE})

Maximum speed with flaps extended **V_{FE}** : 69mph / 111kph / 60KIAS

3.3. MANEUVERING SPEED (V_A)

V_A= 85mph / 137kph / 74KIAS

Above this speed, full flight control deflections could cause structural damage.

3.4. NEVER EXCEED SPEED (V_{NE})

V_{NE}= 143mph / 230kph / 124KIAS

Never exceed speed

3.5. CROSSWIND AND WIND LIMITATIONS

Maximum cross-wind component for take-off and landing: 30 mph / 48kph / 26 knots.

3.6. SERVICE CEILING

The maximum ceiling: 14,000 ft /4200 m pressure altitude.

3.7. MANEUVERING LIMIT LOAD FACTOR

Design positive and negative load factor limits at 600 Kg (1320 lbs.):

Flaps retracted	+4.0 g / -2.0 g
Flaps extended	+2.0 g / 0 g

Ultimate load factor safety factor: 1.5.

3.8. PROHIBITED MANOEUVRES

Aerobatic manoeuvres are not allowed.
The aircraft can be used in VFR daylight flight conditions only.

WARNING

Flight in I.M.C or without visual ground contact is prohibited.

3.9. ENGINE LIMITS (from engine manufacturer)

ENGINE TYPE	912 UL	912 ULS	912 iS
MAX RPM	**5800 RPM (5'max)**	**5800 RPM (5'max)**	**5800 RPM (5'max)**
MAX CONT. RPM	**5500 RPM**	**5500 RPM**	**5500 RPM**
OIL TEMP. LIMIT	**50°C-140°C (122°F- 285 °F)**	**50°C-130°C (122°F- 266 °F)**	**50°C-130°C (122°F- 266 °F)**
OIL TEMP NORMAL	**90°C-110°C (190°F- 230 °F)**	**90°C-110°C (190°F- 230 °F)**	**90°C-110°C (190°F- 230 °F)**
OIL PRESS. LIMIT	**0.8 bar - 7 bar (12psi - 102psi)**	**0.8 bar - 7 bar (12psi - 102psi)**	**0.8 bar - 7 bar (12psi - 102psi)**
OIL PRESS NORMAL	**2.0 bar - 5.0 bar (29psi - 73psi)**	**2.0 bar - 5.0 bar (29psi - 73psi)**	**2.0 bar - 5.0 bar (29psi - 73psi)**
FUEL PRESS. LIMIT	**0.15-0.4 bar (2.2 – 5.8 psi)**	**0.15-0.4 bar (2.2 – 5.8 psi)**	**2.8-3.2 bar (42 – 45 psi)**
COOLANT TEMP.	**120 °C / 248 °F**	**120 °C / 248 °F**	**120 °C / 248 °F**
CHT	**150 °C / 302 °F**	**135 °C / 275 °F**	**-**

For detailed information about engine operation refer to engine manufacturer operator manual.

3.10. WEIGHT AND BALANCE LIMITATIONS

Weight reported are design weight, local regulation may limit flight to lower value.

Maximum take-off weight M.T.O.W.	600 Kg / 1320 lbs
Maximum landing weight M.L.W	600 Kg / 1320 lbs
Maximum weight in the luggage compartment	20 Kg / 44 lbs

NOTE
Check your local law regarding the MTOW before flying!

Take off and flight center of gravity should remain within reported limits:

C. of G. forward limit position:	25% CMA
C. of G. rear limit position:	38.5% CMA

Notes: CMA = Mean Aerodynamic Chord

Centre of gravity position are reported as fraction of mean aerodynamic chord, distances are referred to wing leading edge in backward direction.

3.11. FLIGHT CREW AND PASSENGERS

Minimum flight crew: 1 pilot

Maximum person on board: 2

4. WEIGHT AND BALANCE

The following paragraphs explain the procedure to calculate and verify the weight and balance of the aircraft.

WARNING

It is pilots responsibility to verify that take off and flight weight and balance conditions are within limits. Failure to respect appropriate limits could lead to dangerous situations

4.1. STANDARD INSTALLED EQUIPMENT LIST

SAVANNAH^{TM}-S

- Engine Rotax 912 ULS 100HP
- Airbox with airfilter and airbox temperature sensor
- propeller "DUC Helice Swirl fixed pitch adjustable on ground.
- 70lt wing tanks + 6lt collector in the fuselage
- Visual fuel level indicators
- Anti vapour lock fuel return line
- Central control stick with mechanical flaps
- 4" tyres with disc brake system
- fabric seats
- 12V/DC plug
- cabin light
- landing light
- cabin heating
- electric elevator
- auxiliary electric fuel pump
- doors snap vents
- tie down kit
- flight and maintenance manual
- Basic flight instruments

NOTE

Installed options may vary total weight and weight distribution. If a configuration change occurs, weighing should be performed to update weight and balance data.
Refer to the supplements pages (listed in the C*hapter 10* of the present manual) to check the configuration and installed *Equipment List* and the *Weight and Balance* of the aircraft, issued in detail where the National Regulation or LSA registration of the airplane requires that documents

4.2. BASIC EMPTY WEIGHT AND BALANCE DETERMINATION

Forward	C of G limit:	25% +/- 0.9 %	MAC
Rear	C of G limit:	38.5%+/- 0.9 %	MAC

The aircraft is allowed to fly within a quite large weight and balance range thus easing the aircraft's load and balance.
Pilot should file the weight and balance table with crew's weight, on board fuel weight and luggage weight then check if condition remanis within limits, if not aircraft loading should be revised.

WARNING
Failure to respect appropriate limits could lead to dangerous situations

In order to calculate weight and balance the basic empty weight and centre of gravity position should be determined. Every time a configuration change occurs as addition or removal of options, it is the pilot/owner's responsibility to update the basic empty weight.

- The aircraft MUST be weighed fitted with all equipment, accessories, engine oil, coolant and WITHOUT FUEL. (NOTE: all the fuel MUST be drained accurately)
- Place the aircraft in level flight attitude, rear fuselage upper skin should be horizontal.
- Place the aircraft on three weight measuring equipment (one under each wheel of the landing gear).
- Record the three weight measuring equipment readings: the nose wheel weight will be called P1, the left wheel weight P2, the right wheel weight P3.
- Vertically project the leading edge position to the floor using a plumb bob, then measure the distance DF between the projection of the leading edge and the nose wheel axle, then the distance DR between the projection of the leading and the main landing gear axle.
- Fill in the basic empty weight table reported below and calculate the momentum

4.3. BASIC EMPTY WEIGHT TABLE

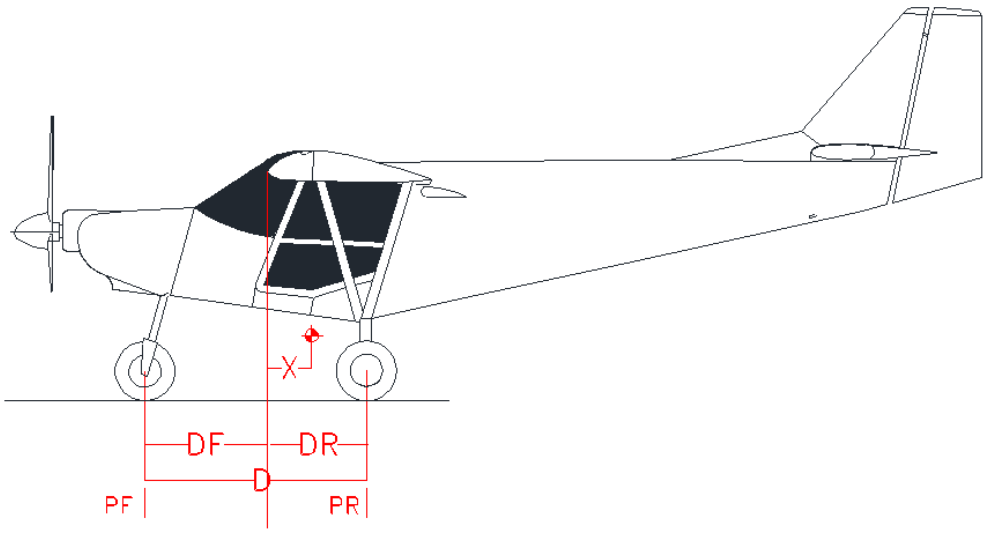
Aircraft serial number	
Weight measuring equipment	
Location and date	
Certifying staff	

	Weight [lbs] / [Kg]		Arm [ft] / [m]		Mom.[lbs x ft] / [kg x m]	
Nose L.G.	$P_F = P_1$		D_F			
Main L.G.	$P_R = P_2 + P_3$		D_R			
TOTAL						

The centre of gravity position of the aircraft measured from the wing leading edge can be found with the following formula:

$$X_{CG} = \left(\frac{P_R \cdot D_R - P_F \cdot D_F}{P_F + P_R} \right) = \_\_\_\_\_$$

Signature	



4.4. WEIGHT AND BALANCE COMPUTING TABLE AND GRAPH

Before any flight, the pilot must check the weight and balance compiling the following table:

- Compile the weight column with data from the empty weight table, crew weight, fuel weight, and baggage weight (if present).
- Compile the arm of the empty aircraft with the X_{CG} position previously obtained.
- Multiply weight and arm and compile the "Momentum" column.
- Sum the columns and compile the "Totals" line.

	Weight W [lbs]/[Kg]		*Arm X [ft]/[m]*		*Momentum [W x X]*
Empty aircraft					
Pilot			1.80	0.55	
Passenger			1.80	0.55	
Fuel			1.62	0.495	
Baggage			4.33	1.32	
TOTALS			========== ==========		

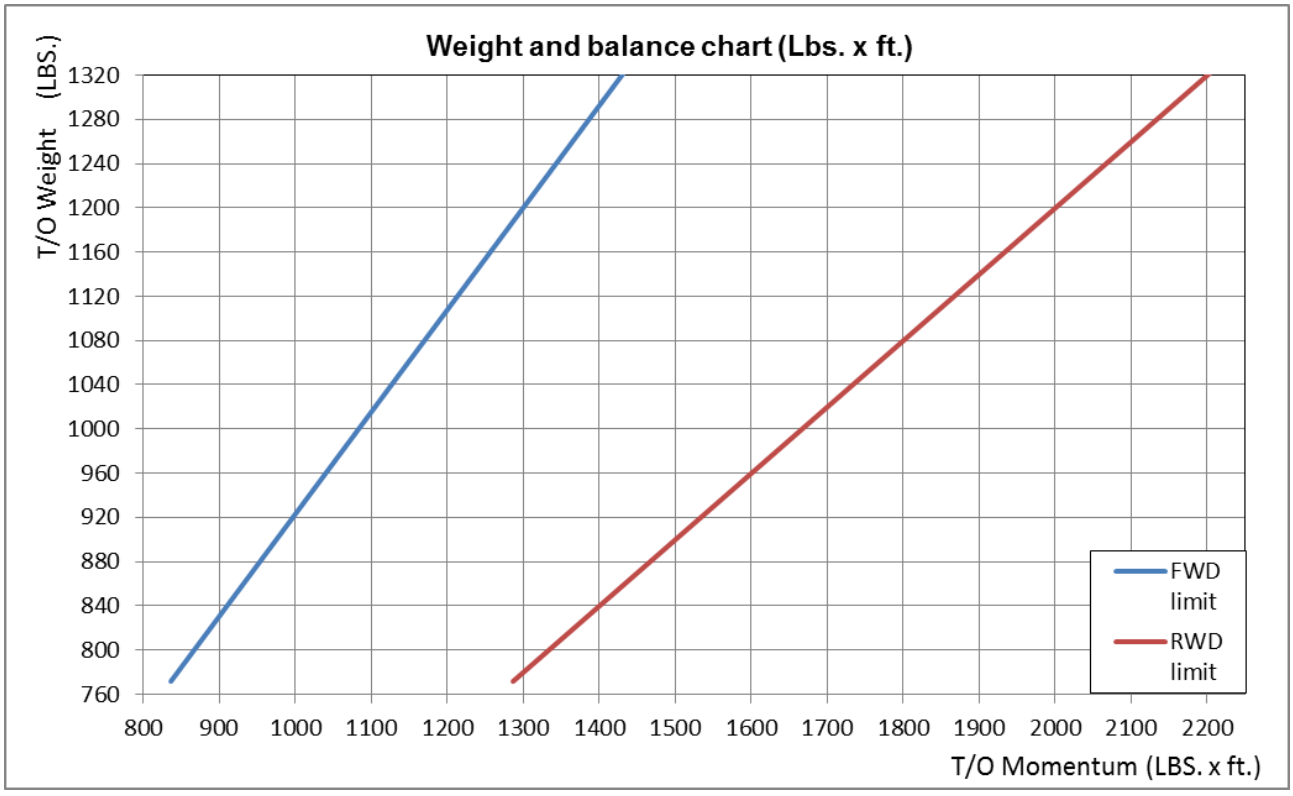
Actual centre of gravity position can be obtained with the following formula or from the following charts.

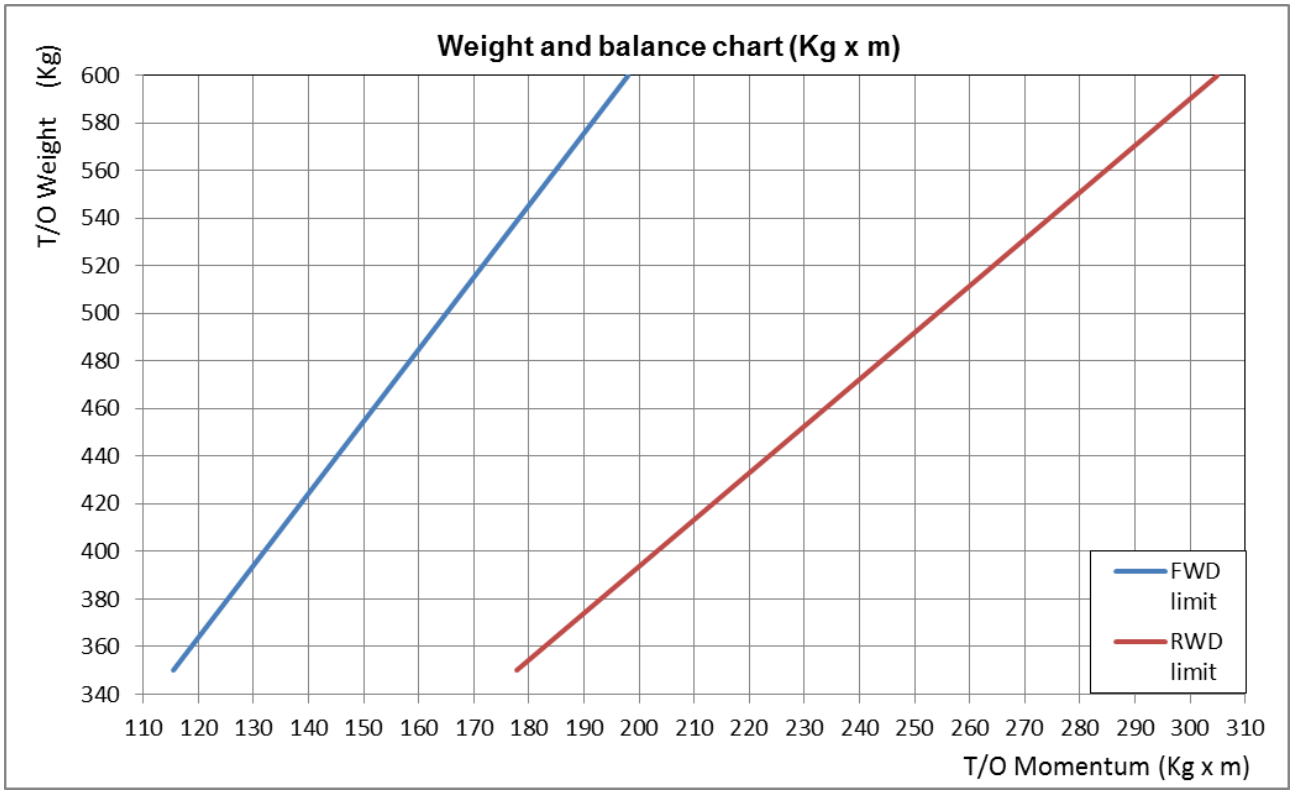
$$X_{CG}\% = \frac{\left(\frac{TotalMomentum}{Totalweight}\right)}{M.A.C.} \times 100$$

Where:

- Total weight is the total of the weight before considered in the table
- Total moment is the total of the moment before obtained in the table
- MAC is the Mean Aerodynamic Chord that is equal to 1320mm/4.33ft.

WARNING
Use homogenous unit of measure!


Weight and balance chart (Lbs. x ft.)
T/O Weight (LBS.)
1320
1280
1240
1200
1160
1120
1080
1040
1000
960
920
880
840
800
760
800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200
T/O Momentum (LBS. x ft.)
FWD limit
RWD limit


Weight and balance chart (Kg x m)
T/O Weight (Kg)
600
580
560
540
520
500
480
460
440
420
400
380
360
340
110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310
T/O Momentum (Kg x m)
FWD limit
RWD limit

5. PERFORMANCE

This section contains indications about airplane performance during take-off, climb, cruise and landing phase of flight. All speeds reported are IAS.

CAUTION

Airplane performances are influenced by weather conditions (temperature and humidity). All published data refer to Standard Atmosphere. For non-standard day corrections should be applied.

CAUTION

Runway surface, runway slope, propeller type and pitch setting and options installed as TUNDRA tyre may have influence on airplane performance.

5.1. TAKEOFF AND LANDING DISTANCES

Take-off run (hard surface, flaps ½)	T/O weight (990 Lbs. / 450 kg)	T/O weight (1320 Lbs. /600 kg)
Sea level (MSL)	115 ft / 35 m	170 ft / 51 m
3,000 ft / 900 m pressure altitude	160 ft / 50 m	235 ft / 72 m
6,000 ft / 1,800 m pressure altitude	210 ft / 63 m	310 ft / 94 m

In order to clear a 50 feet /15 m high obstacle, a practical rule suggests to take 2.5 times the take-off ground roll.

A/C weight	Landing Distance (hard surface flaps Full)	Landing Run (hard surface flaps Full)
990 Lbs. / 450 Kg	590 ft / 180 m	240 ft / 75 m
1320 Lbs. / 600 Kg	820 ft / 250 m	360 ft / 110 m

5.2. RATE OF CLIMB (ROTAX 912 ULS)

Best rate off climb speed (Vy):

A/C mass	992 Lbs. / 450 kg	1320 Lbs. / 600 kg
Best Climb	63 mph / 100 kph / 54 kts	73 mph / 118 kph / 64 kts

Best climb angle speed (Vx):

A/C mass	992 Lbs. / 450 kg	1320 Lbs. / 600 kg
Best Climb	56 mph / 90 kph / 48 kts	65 mph / 105 kph / 57 kts

Rate of climb Full power setting	A/C weight (992 / 450 lbs/kg)	A/C weight (1320 / 600 lbs/kg)
Sea level (MSL)	1,200 fpm / 6 m/s 63 mph /102 kph / 55 kts	900 fpm / 4.5 m/s 73 mph / 118 kph / 64 kts
3,000 ft / 900 m pressure altitude	900 fpm / 4.5 m/s 50 mph / 81 kph / 43 kts	680 fpm / 3.5 m/s 58 mph / 94 kph / 50 kts
6,000 ft / 1,800 m press. altitude	600 fpm / 3.0 m/s 43 mph / 70 kmph / 38 kts	450 fpm/2.3 m/s 50 mph/81 km/h/44 kts

5.3. CRUISE SPEED

Performance with standard propeller @ 4800 rpm:

ROTAX 912 UL (80hp)	100 mph / 160 kph
ROTAX 912 ULS/iS (100hp)	110 mph / 176 kph

5.4. RPM

Data with standard propeller:

	912 UL	912 ULS/iS
Takeoff rpm	5500	5400
Max. continous performance	5500	5500
Min RPM before takeoff	5200	5200
Idle speed	1400-1500	1400-1500
Maximum RPM (redline)	5800	5800
Cruising flight RPM	4600-5200	
75 percent cruise RPM	5000	5000

5.5. FUEL CONSUMPTION

	912 UL	912 ULS	912iS
at take-off power setting	24 lt/h	27 lt/h	26.1 lt/h
at max. continuous power setting	22.6 lt/h	25 lt/h	23.6 lt/h
at 75% continuous power setting	16.2 lt/h	18.5 lt/h	16.5 lt/h
specific consumption at max. continuous power setting	285g/kWh	285 g/kWh	250 g/kWh

CAUTION

During flight planning always add reserve fuel for minimum 30 minutes of flight.

5.6. STALL SPEED

NOTE: the speed values are expressed as anemometric (indicated) airspeed (IAS)

A/C mass	**992 Lbs. / 450 kg**	**1320 Lbs. / 600 kg**
Flaps retracted	35 mph / 56 kph / 30 knots	40 mph / 65 kph / 35 knots
Flaps (1/2)	31 mph / 50 kph / 27 knots	36 mph / 58 kph / 31 knots
Flaps extended (Full)	30 mph / 48 kph / 26 knots	35 mph / 55 kph / 30 knots

The above indicated airspeeds are achieved with engine set to IDLE and slow deceleration: in this condition the aircraft will sink without modifying the flight attitude, stall condition can be maintained with full back stick without wing drop.
Power on Stall will happen at a greater AoA and even lower speed (almost zero IAS). On this condition rudder should be used with decision to counteract P-factor. Stall will be more net and could develop a nose down or wing drop always controllable by stick release.

5.7. OTHERS

The maximum ceiling is 14,000 ft/4200 m pressure altitude at the maximum weight.

Best glide with flaps retracted:

A/C mass	**992 Lbs. / 450 kg**	**1320 Lbs. / 600 kg**
Best glide IAS	63 mph / 100 kph / 54 kts	73 mph / 118 kph / 64 kts

The Lift to Drag ratio is 10,5.

6. EMERGENCY PROCEDURES

This section contains the procedures to be used in case of emergency.
Pilots should become familiar with contents of this section in order to clearly remember the list and sequence of task to perform should an emergency situation arise.
The risk of engine failure is to be kept in mind in any case when planning and performing the flight.
It is good practice to set maximum power for at least 5 second prior to take off after engine warm up and magnetos test, during this test verify fuel pressure, engine instruments and that T/O rpm are achieved.
Avoid low level flight and always respect aircraft limits. If possible, plan to cruise at an altitude that permits to select an appropriate area to perform an emergency landing.
Always avoid weather condition that can compromise flight safety.
It is good practice to perform with an instructor some simulated emergency landing manoeuvres to build experience on aircraft behaviour during glide.

6.1. ENGINE FAILURE

- **ENGINE FAILURE DURING TAKEOFF ROLL**
  If runway available permits:
  Break normally to stop the aircraft.
  If runway available does not permit to stop the aircraft within its length:
  - Brake hard;
  - Switch off the battery master
  - Close the fuel Shut-off valve;

- **ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF**
  - Keep 70 Kph (43 mph / 38 KIAS);
  - Set Flaps ½;
  - Close the fuel "Shut-off" valve;
  - Set Flap ad required;
  - Switch off the battery master;
  - Switch off magnetos;
  - Locate the best landing spot available in front of you;
  - DO NOT attempt to return on the runway.

- **ENGINE FAILURE DURING FLIGHT**
  - Keep best glide speed;

A/C mass	992 Lbs. / 450 kg	1320 Lbs. / 600 kg
Best glide IAS	63 mph / 100 kph / 54 kts	73 mph / 118 kph / 64 kts

  - Verify Flaps UP;
  - Find and fly to the best available landing spot;
  - Verify on board fuel quantity;
  - Verify magnetos switch to be in the ON position;
  - Switch ON carburettor heat (if installed);
  - Switch ON electrical fuel pump;
  - Set throttle 1 cm above idle;
  - Attempt engine restart;
    - If engine restart return to normal flight altitude and land ASAP.
    - If engine does not restart perform emergency landing (power off).

6.2. ENGINE FIRE

- **On ground**
  - Stop the plane
  - Close fuel shutoff valve;
  - Set throttle fully open;
  - Electric fuel pump OFF;
    - When engine stops
  - Magnetos OFF;
  - Battery master OFF;
  - Abandon the aircraft;
  - If possible extinguish fire

- **In flight**
  - Close fuel shutoff valve;
  - Fully open throttle;
  - Fuel electric pump OFF;
    - When engine stops
  - Magnetos OFF;
  - Battery master OFF;
  - Perform emergency landing (power off).

6.3. ENGINE ROUGHNESS

  - If carburettor ice is suspect pull carburettor heat lever;
  - Verify magnetos switch to be in the ON position;
  - Verify engine instruments and switch ON electric fuel pump if needed;
  - If engine continue to run rough, land ASAP;

6.4. LOSS OF OIL PRESSURE

- Land ASAP;
- Prepare for possible power off landing;

6.5. LOSS OF FUEL PRESSURE

- Switch ON electrical fuel pump;
- Land ASAP;
- Prepare for possible power off landing;

6.6. ALTERNATOR FAILURE

- Reduce electrical load to minimum;
  - When battery discharged:
- Prepare for loss of communication;
- Engine restart will not be available;
- Electric instruments as engine monitoring will not be available;
- Land as soon as practicable;

6.7. ELECTRICAL FIRE (Smoke in cabin)

- Switch off the battery master;
- Snap vents fully open;
- Land ASAP;

6.8. EMERGENCY LANDING (POWER OFF)

- Keep best glide speed;
- Locate the best landing spot available, pay attention to power lines, upslope surfaces should be preferred;
- Conduct the plane in a pattern around selected landing spot;
- Close the fuel "Shut-off" valve;
- Set Flap as required for the operation;
- Switch off the battery master;
- Switch off magnetos;
- Perform base and final turn slightly high in respect of a normal landing;
- Use side slip to adjust glide slope;
- When stabilized set Full flap and prepare to flare;
  - If electric Flap are present:
- Master battery On;
- Set Full Flap;
- Master battery Off.

6.9. EMERGENCY LANDING (POWER ON)

- Locate the best landing spot available, pay attention to power lines, upslope surfaces should be preferred;
- Conduct the plane in a pattern around selected landing spot;

- If landing surface will probably lead to extended damage, perform a power off emergency landing;
- If landing spot is suitable for safe landing, perform normal or short field landing;

6.10. SPIN RECOVERY

- Set Full Rudder opposite to direction of rotation;
- Control stick full forward while centring ailerons;
- Throttle idle;
  - When rotation stops
- Regain level flight attitude;

6.11. BALLISTIC RECOVERY SYSTEM ACTIVATION (If installed)

Refer to the operation manual of the rescue system supplied by the system manufacturer.

7. NORMAL PROCEDURES

These procedures are provided to supply information on procedures and as a source of reference and review. Pilots should familiarize themselves with these procedures to become proficient in the normal operation of the airplane.

7.1. PREFLIGHT CHECKLIST

NOTE

When prompted to verify items, look for: cracks, corrosion, deformations, bolts not tight, etc.

Fuel Drain

1. Prior to move the aircraft, perform fuel drain from collector tank under the rear fuselage, verify fuel clear of deposits and water;

Cockpit

2. Magnetos switches OFF;
3. Baggage and loose item **FIXED**, verify flight controls and flaps free movement;
4. Verify fuel level;
5. Switch ON battery master;
6. Verify Fuel reserve light (push to test button);
7. Set Elevator trim to zero and verify operability;
8. Switch OFF battery master;
9. Wing – Cabin frame FWD attachments: verify;
10. Wing – Cabin frame RWD attachments: verify;
11. Stick and rudder hinges, check split pins and verify;
12. Fuel lines: verify;
13. Fuel shut off valve, verify open and safety wire locked;

Engine compartment and propeller

14. Remove engine cowling;
15. Verify Fuel, Oil and water lines for leakage or damage;
16. Verify oil and water radiator for leakage or damage;
17. Verify exhaust system and attachment springs (3 per collector);
18. Verify carburettors attachment and intake duct rubber;
19. Verify carburettor control cable;
20. Oil quantity check: open oil cap then rotate slowly the propeller Counter Clock Wise until a gurgle comes from the oil tank, verify oil level (**CHECK magnetos OFF**);
21. Cooling liquid quantity check;
22. Propeller and Spinner: verify integrity and cleaning;
23. Close engine cowling and verify fixing dzus;

CAUTION

For complete engine checks refer to Rotax documentation.

Lh Wing and Gear

24. Verify Nose Landing Gear wheel and axle safety wire;
25. Verify wheel fairing (if present);
26. Verify *NLG attachment and bungee integrity;*
27. Verify LH Main Landing Gear wheel, brake and axle fixing washer;
28. Verify wheels fairing (if present);
29. Wing struts and MLG attachment plate: verify;
30. Wing jury strut: verify;
31. Pitot: remove cap and verify;
32. Fuel cap: closed and verify venting line;
33. Wing leading edge: verify, and look for missing VG;
34. Lights: verify;
35. Flaperon hinges: check split pins, verify absence of play;
36. Flaperon trailing edge: verify;
37. Flaperon actuator: verify and check free movement;

Rear fuselage

38. Verify antennas attachment;
39. Verify general integrity;
40. Verify under fuselage and rear inspection hatch are present and fixed;
41. Verify tail skid integrity

Horizontal tail

42. Verify Stabiliser attachment points;
43. Verify Stabiliser leading edge;
44. Verify Elevator hinge points and split pins;
45. Verify Trim Tab hinge and control lever;
46. Verify Elevator control cables attachments and split pins;
47. Verify elevator trailing edge;
48. Verify Elevator free movement;

Vertical tail

49. Verify Fin attachment points;
50. Verify Fin leading edge;
51. Verify Rudder hinge points and split pins;
52. Verify Rudder control cables attachments and split pins;
53. Verify elevator trailing edge;
54. Verify Rudder free movement;

Rh Wing and Gear

55. Flaperon actuator: verify integrity and free movement;
56. Flaperon hinges: check split pins, verify integrity and absence of play;
57. Flaperon trailing edge: verify;

58. Lights: verify;
59. Wing leading edge: verify and look for missing VG;
60. Fuel cap: closed and verify venting line;
61. Wing jury strut: verify;
62. Wing struts and MLG attachment plate: verify;
63. Verify RH Main Landing Gear wheel, brake and axle fixing washer;
64. Verify wheel fairing (if present);

7.2. ENGINE START

1. Apply Brake, **do not** use parking brake (optional);
2. Apply choke (not needed if Hot engine);
3. Set throttle fully closed (1/2 inch open if Hot engine);
4. Switch ON Battery master;
5. Switch on fuel electric pump and verify normal fuel pressure;
6. Switch off fuel electric pump and verify fuel pressure slowly decrease to zero, if not verify fuel return line;
7. Verify propeller clear;
8. Magnetos switch both ON;
9. Engage starter;
10. After engine start verify oil pressure;
11. Adjust throttle to warm up engine at 2000 rpm;
12. Switch ON avionics
13. If carburettor icing condition exist, Use CARB HEAT;

7.3. TAXIING CHECKLIST

1. Fasten seat belt;
2. Check passenger seat belt;
3. Doors secondary locks both locked;
4. Check fuel levels;
5. Set Flaps UP to improve taxi visibility;
6. During taxi verify breaking action;

7.4. BEFORE TAKE-OFF CHECKLIST

1. Prior to perform ignition checks verify that aircraft blown air will not cause damage;
2. Set 4000 RPM then perform **Magnetos Check**:

   MAX DROP 300 RPM
   MAX DIFF 150 RPM

3. Verify fuel and oil pressure;

7.5. NORMAL TAKE-OFF CHECKLIST

4. Set Flap 1/2;
5. Set Trim neutral;
6. Switch ON Electric Fuel Pump and EXT. LIGHTS;
7. Verify CARB HEAT not used;
8. Throttle advance to max power;
9. Verify T/O RPM;

CAUTION

During take-off run remember to keep the heels on the floor to avoid braking.

10. Rotate at 65 kph / 41 mph / 35 kts @ 500 kg;
11. Accelerate to best climb speed 105kph /65 mph / 57 kts @ 500 kg;
12. Retract Flaps;
13. At safe altitude, reduce throttle;
14. If ice condition exists, apply Carb heat;

CAUTION

Hot air from Airbox (Carb heat) will decrease the probability of carburettor ice, but does not completely prevent it, Carburator ice conditions should be avoided and carburettor heat should be used each time suspect of icing conditions exist.

7.6. SOFT/SHORT FIELD TAKE-OFF CHECKLIST

15. Set Flap 1/2;
16. Set Trim neutral;
17. Switch ON Electric Fuel Pump and EXT. LIGHTS;
18. Verify CARB HEAT not used;
19. Throttle advance to max power;
20. Verify T/O RPM;
21. Apply back pressure on the stick in order to lift off Nose landing gear ASAP;

CAUTION

During take-off run remember to keep the heels on the floor to avoid braking.

22. Accelerate with nose up attitude until lift off occurs (do not use excessive nose up attitude, just enough to lift off nose wheel);
23. As soon as Main landing gear leave the ground reduce attitude and accelerate in ground effect;
24. Accelerate to best climb or best angle speed while retracting Flaps;
25. At safe altitude, reduce throttle;
26. If ice condition exists, apply Carb heat;

7.7. APPROACH and LANDING

1. Switch ON Electric Fuel Pump and EXT. LIGHTS
2. Apply Carb heat
3. On downwind slow down to 90 kph, 56mph, 48 kts @ 500 Kg;
4. Set Flaps 1/2;
5. On final Set Full Flap;
6. Slow down to 75 kph , 47 mph, 41 kts @500 Kg;

7.8. ENGINE STOPPING

1. Flaps retracted;
2. Electric fuel pump OFF;
3. Avionics and electrical switches OFF;
4. Throttle idle;
5. Magnetos both OFF;
6. Battery master OFF;

7.9. PARKING / MOORING

1. Parking brake SET (if present);
2. FLAPS UP;
3. Control stick, secure with seat belt;
4. Tie down the plane from wing attachment points and propeller shaft;

8. Aircraft Ground Handling and Servicing

8.1. AIRCRAFT TOWING

Prior to Tow the airplane, verify that both magnetos switches are in the OFF position and parking brake released. Tow the plane by hands from the propeller root **(never pull up the plane from the spinner)** or use a Towing Bar connected to relevant housing on the nose landing gear arm.

CAUTION

Never push or pull the plane from wing struts, flight controls or the spinner!
If the plane is pulled by the propeller, always verify magnetos switches position.

8.2. AIRCRAFT REFUELLING

Verify battery master is OFF and the plane stopped by parking brake or chocks. Ground the plane by the exhaust muffler.
Close the doors, fuel will damage the windows if spilled on it.
Perform refuelling, remember that the two wing tanks are interconnected but the fuel will take a while to level. Avoid overfilling the tanks, excessive fuel will be expelled by the venting line if the plane is not kept level on ground or if even light side slip is applied in flight.
When finished refuelling close the fuel cap and verify venting line status.

CAUTION

Close the doors during refuelling, fuel will damage the windows if spilled on it.
If fuel source is not controlled, It is good practice to filter the fuel for water and dirt prior or while refuelling.

8.3. TIE DOWN

1. Parking brake SET (if present);
2. FLAPS UP;
3. Control stick, secure with seat belt;
4. Tie down the plane from wing attachment points and propeller shaft;

WARNING

Never use other points to moor the airplane..

CAUTION

The mooring point on the wings must be used only in the event of wind not exceeding 100 Km/h, in the event of wind over 100 Km/h perform mooring also from wheel axle.

CAUTION

Ground mooring has to be considered as a temporary solution.
In the event of weather conditions that may lead to overstress tie down points, it is recommended to carry out a thorough inspection before flying.
The parking brake (option) MUST be used only for short period, always verify brakes functionality after parking brake release.
Excessive snow accumulated on horizontal surfaces may overstress the airframe.

NOTE

The aircraft is not water-proof: rain can enter from the roof and from passages left for the parachute bridles (if installed). In case of rain cover the aircraft.

9. REQUIRED PLACARD AND MARKINGS

9.1. AIRSPEED INDICATOR ARCS

ARC	SPD RANGE (mph)	SPD RANGE (Kph)	SPD RANGE (KIAS)	NOTE
White	34-69	55-111	30-60	Flaps extended spd range
Green	40-112	65-180	35-97	Normal operation spd range
Yellow	112-143	180-230	97-124	Calm air operation spd range
Red line	143	230	124	Speed never exceed

9.2. OPERATING LIMITATIONS ON INSTRUMENTS

Revolution counter	red line		5800 RPM
Oil pressure	red line	max	102 psi / 7 bar
	red line	min	12 psi / 0.8 bar
Oil temperature	red line	912ULS	max 266 F / 130°C
	red line	912UL	max 285 F / 140°C
CHT	red line	912ULS	max 300 F / 150°C
		912UL	max 275 F / 135°C
COOLANT TEMP	red line		max 248 F / 120° C
Fuel pressure	red line		max 0.4 bar / 5.8 psi
	red line		min 0.15bar / 2.2psi

9.3. WARNING PLACARD

For LSA compliant aircraft, the following placard are present in the instrument panel:

- Passenger Warning indication;
- Aerobatic not allowed;
- IFR flight not allowed.

9.4. MISCELLANEUS PLACARD AND IDENTIFICATION PLATE

The aircraft must have the identification fixed by rivets on the right rear fuselage, near the under the stabilizer.

Serial number explanation YY-MM-54-XXXX:

- YY – the year of construction
- MM – the month of construction
- 54 – The model of the aircraft (Savannah^{TM}-S)
- xxxx – the progressive serial number of the aircraft.

CAUTION

This identification plate is an integral part of the airplane; its removal causes the loss of the warranty.

10. SUPPLEMENTARY INFORMATION

Where the airplane has been declared compliant to the LSA requirements, the POH supplementary information listed below are attached to the end of the POH manual:

- Equipment list of the airplane;
- Weight and balance of the airplane;
- Manufacturer Flight Test Report;
- Flight Training Supplement (only USA registered aircraft).

11. LIST OF REVISIONS

A list of all revisions made to the Pilot Operating Handbook since its original issue are resumed in the table below.

Revision No.	Date	Chapters	Pages, notes
Original Issue	15.11.2009	N/A	N/A
Revision 1	14.06.2010	4.4,4.9,10.1	21,22,49
Revision 2	09.12.2011	3.11	19
Revision 3	23.01.2012	3.7,5.1,8.2,8.3,8.8,9.2	13,25,42,43,45,49
Revision 4	27.06.2013	2.1, 3.5,3.11,4.7,4.11	5,11,19,21,24
Revision 5	05.12.2014	GENERAL REVISION	GENERAL REVISION
Revision 6	30.01.2015	2.1,2.3,2.6,2.9,3.1,3.9,5.1 5.3,5.4,5.5,5.6,6.1,6.8,7.5 7.7,9	8,11,13,19,20,22,23, 30,31,32,33,35,40,41,43
Revision 7	12.03.2015	1.5, 2.1	7, 8
Revision 8	18.04.2019	6.8	35
Revision 9	13.04.2022	2.9, 9	19-20, 43
Revision 10	07.11.2022	2.8, 4., 9.3., 10.	18, updated NOTE 25, updated NOTE 43, updated placard 44, added list of Supplementary Information
Revision 11	22.11.2022	2.2	9, updated propellers
Revision 12	04.01.2023	Front pages Ch. 1	First page with Serial Number of a particular Aircraft and the rest of manual with Generic Serial Number applicable to the A/C Type. Revision pages must be added easily, if any. Page 5: added reference to the ICP website for manual revisions