AIRPLANE FLIGHT MANUAL

Savannah™

LOG OF REVISIONS

Revision Number	Revised Pages	Description of Revision	Date
00	All	New emission	03/01
01	All	Corrections	04/01
02	6 to11,18, 21,24,28, 32,34	Corrections	10/02
03	2,3,14,	Correction	10/02
04	2,3,14	Note on Instruments	July '03
05	2,3,5,8,9, 10	Note on Engine	July '03
06	2,3,6		
07	2,3,15	Update on angles	Apr.05
08	2, 3, 29	Note on mooring	July 05
09	2, 3, 37	New weight and balance chart	14/09/05
10	2, 3, 29	New mooring procedure	16/09/05
11	1,2,3,37	Add phrase and copyright in the first and latest pages	03/11/05
12	2, 3, 26, 27	Normal procedures upgraded	24/02/06
13	7,15,31	Added Jabiru engines	20/03/06
14	All	General revision	13/04/06
15	16	Modified flap escursion	27/04/06
16	8	Added engines web site	18/05/06
17	5,6	Modified three view	23/05/06
18	19	Modified speed limits	4/07/06
19	7	General revision	10/07/06
20	9,10,18	General revision	19/07/06

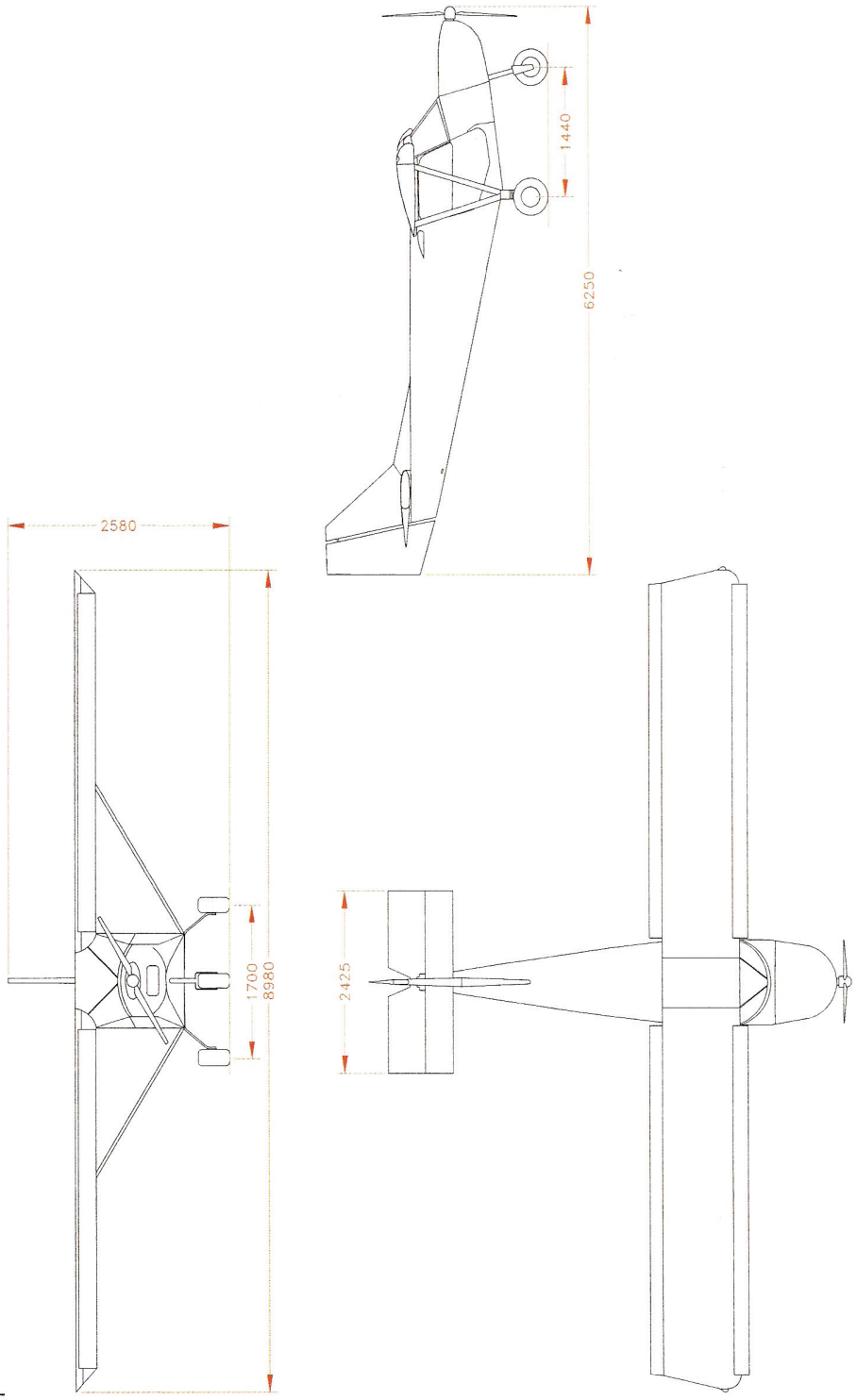
TABLE OF CONTENTS

TABLE OF CONTENTS

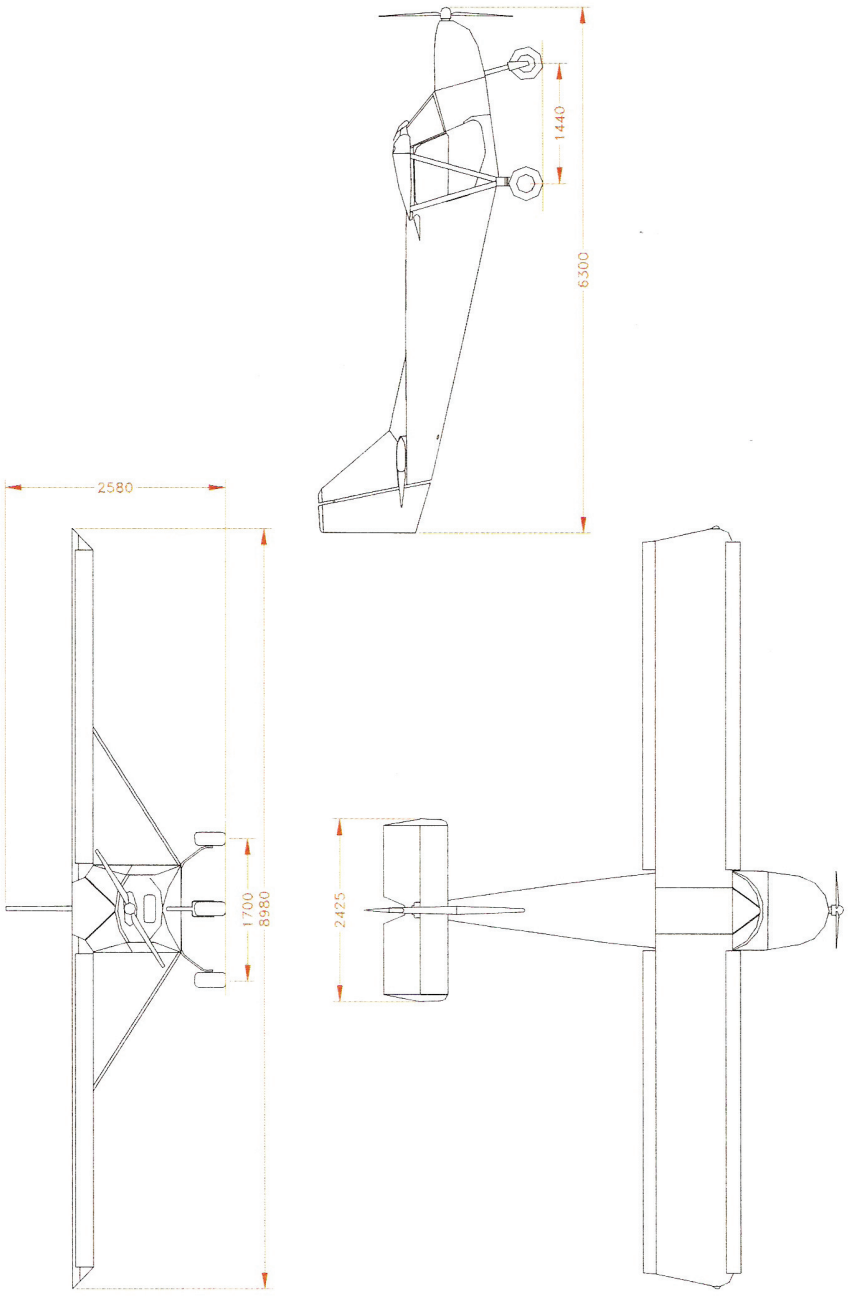
SECTION 1

AIRPLANE TECHNICAL DESCRIPTION

AIRPLANE THREE VIEW (Rotax 912/912 S)



AIRPLANE THREE VIEW (Jabiru 2200)



1.1 GENERAL SPECIFICATIONS

Dimensions

Wing span	30.0/8.98	ft/m
Wing area	141/12.7	sq. ft/m^2
Length	21.3/6.25	ft/m
Height	8.0/2.45	ft/m
Propeller diameter	68/1.73	in/m

Weights

Maximum take-off weight	1000/454	lbs/kg
Empty weight	600/272	lbs/kg
Useful load	400/182	lbs/kg

NOTE: empty weight may increase and is depended on the optional equipment installed as per the customer requirements

Powerplant

Engine	DIMENSION	ROTAX 912 UL	ROTAX912 ULS	JABIRU2200
Take off performance		59.6 kW (5800 rpm)	75.3 kW (5800 rpm)	(63.4 kW) 3300rpm
Displacement	cu.in/cm^3	73.9/1211	82.5/1352	134/2200
Compression ratio		9.0:1	10.5:1	8:1
Fuel consumption (75% power)	gph/lt/h	4.3/16.2	4.9/18.5	3.5/13

Fuel and oil

Fuel capacity	72	lt
Fuel grade	Mogas/Avgas	100/100 LL
Oil capacity	3/3.16	lt/US qts

Landing gear

Wheel track	5.6/1.7	ft/m
Tire size	6	in
Tire pressure	14.5/1	psi/bar

1.2 STRUCTURE

The aircraft is a monoplane type, with two side-by-side seats, fitted with a high wing supported by struts. The wing presents a "high lift" NACA 650-18 modified airfoil with fixed slats along the full wing span and Junkers type flaperon (aileron + flap). The airframe structure is a full-metal one with load-resisting panels. The horizontal tailplane features a simmetric bi-convex airfoil. The rudder is attached to the fixed vertical fin. The dorsal fin is fitted to improve the directional stability.

1.3 LANDING GEAR

The aircraft is fitted with a tri-cycle type landing gear. The main landing gear is made by a single-piece aluminium alloy single-leaf leg. The nose landing gear is fitted with a telescopic, elastic chord shock absorber, and is steerable in order to ease the taxying.

1.4 ENGINE

The engines installed onboard the aircraft are the ROTAX 912 ULS or ROTAX 912 UL. Please refer to Engine manual for any data and specifications.
WARNING:Because of several emission of service bulletins and information bulletin from Rotax, the ICP Srl doesn't intend any more to pass these comunication to the Rotax engine's owers these documentation are available on site www.rotax-aircraft-engines.com.
Service bulletins of Jabiru2200 engine are available on site www.jabiru.net.au.

WARNING: the installed engine, by its design is subject to sudden stoppage. Engine stoppage can result in crash landings, forced landings or no power landings. Such crash landings can lead to serious bodily injury or death. Never fly the aircraft equipped with the engine at locations, airspeeds, altitudes, or other circumstances from which a successful no power landing cannot be made, after sudden engine stoppage. Aircraft equipped with this engine must only fly in DAYLIGHT VFR conditions. The installed engine is not a certificated aircraft engine. It has not received any safety or durability testing, and conforms to no aircraft standards. This is for use in experimental, uncertificated aircraft and vehicles only in which an engine failure will not compromise safety. User assumes all risk of use and acknowledges by his use that he knows this engine is subject to sudden stoppage.

1.5 ENGINE CONTROLS

There are two vernier type (push-pull) throttle controls fitted with a friction adjusting knob. The mixture control is located near to pilot's side throttle control. The air-box control (Rotax 912 ULS) is located near the throttle control: pull for hot air to carburators, push for cold air to carburators (for values of temperature to maintain see chapter 2.3).

The key-operated master switch connects the electrical system to the 12V battery. The whole electrical system is protected by thermal type re-settable breakers.

The engine can be operating with the master switch OFF and the breakers OFF since the ignition system is independent and can be cut-off by switching OFF the two magneto switches only. With the master switch OFF any electrical instrument and all other electrical devices, electric engine starter included, won't be operating.

WARNING: The engine may be started-up with the master switch OFF if even one magneto switch only is ON, when the propeller is hand rotating or due to windmilling. For safety, it's strongly recommended to pull-out the master switch key when the engine is shut-off.

The master switch key is located near to the pilot's throttle. All the switches and the engine controls commute to ON if moved UPWARD or FOREWARD. The mixture control only, is activated pulling it BACKWARD.

1.6 PROPELLER

The aircraft features the following propeller:

- "DUC Helice", 3 blades in carbon fiber (Rotax 912 ULS), adjustable on ground.
- "DUC Helice", 2 blades in carbon fiber (Rotax 912 UL), adjustable on ground.

1.7 FUEL SYSTEM

With reference to fig. 1 on page 12, the fuel system is equipped with two tanks (1, 2). They are installed into the wings and have a 72 lt. capacity. The filler caps include a vent hole. The reservoirs features an overcapacity fuel pipe ending below the wing. The left fuel tank is with a visual fuel level indicator located on left wing first rib. The drain valve (5.) is located in the fuel bowl (3.) installed in the fuselage, on the right side; a fuel reserve warning is installed on the bowl to indicate low remaining fuel. A fuel valve is fitted (7.): this fuel valve is held in the OPEN position by a safety wire. That safety wire can be broken in an emergency. This safety wire must be used to prevent an accidental in-flight fuel valve closure leading to an engine shut-down or, even worse, to a closed fuel valve take-off. The fuel pump (8.) is mechanically cams operated. A fuel pressure gauge is installed.

1.8 ELECTRICAL SYSTEM

With reference to fig.2 on page 13, the airplane's electrical system includes a 12V battery, a generator, wiring and switches to supply and connect the engine starter, an auxiliary fuel pump, anti-collision and navigation lights, and the avionics. A voltmeter is provided as a standard equipment.

The key-operated master switch connects the electrical system to the 12V battery. The whole electrical system is protected by thermal type re-settable breakers.

With the master switch OFF any electrical instrument and all other electrical devices, electric engine starter included, won't be operating.

With reference to fig. 2:

A. starter relais
B. regulator
C. electric fuel pump
D. master switch
E. power supply
F. elevator trim motor
G. battery
4. revolution counter supply
5. hourmeter
6. voltmeter
7. left head temperature
8. right head temperature
9. oil temperature
10. oil pressure
15. low voltage warning lamp
18. elevator trim switch
21-25 switches
26-27 breakers

1.9 CABIN

Two large lateral doors allow an easy indipendent access to the cabin. They are hinged by means of two hinges on the upper edge of the doors , and may be closed by a key handle located in the lower edge and a latch in the front edge. The doors may be removed unscrewing the hinges bolt as required for flying in hot regions or to take pictures. Those windows MUST NOT be opened in flight.

WARNING: close latch in the front edge before flight.

1.10 CABIN FEATURES AND UPHOLSTERY

The cabin arrangement features two canvas covered side-by-side seats.

1.11 VENTILATION

The cabin's ventilation is provided by an opening between the doors and the upper part of the cabin door frame. A dynamic air scoop intended to extract the cabin air is fitted at the bottom of the baggage compartment. It's possible to improve the cabin ventilation by using two rotating air scoops in the doors windows. It's important to get an efficient cabin ventilation to avoid the windshield frosting in high humidity, low temperature and rainy weather.

1.12 CABIN HEATING

On the right-upper side of the instruments panel there is a push-pull control. Pull it for having a hot ventilation in the cockpit.The outlet may be opened by a rotating panel on the cockpit skin. The air is heated by the heat exchanged integrated the silencer.

FUEL SYSTEM

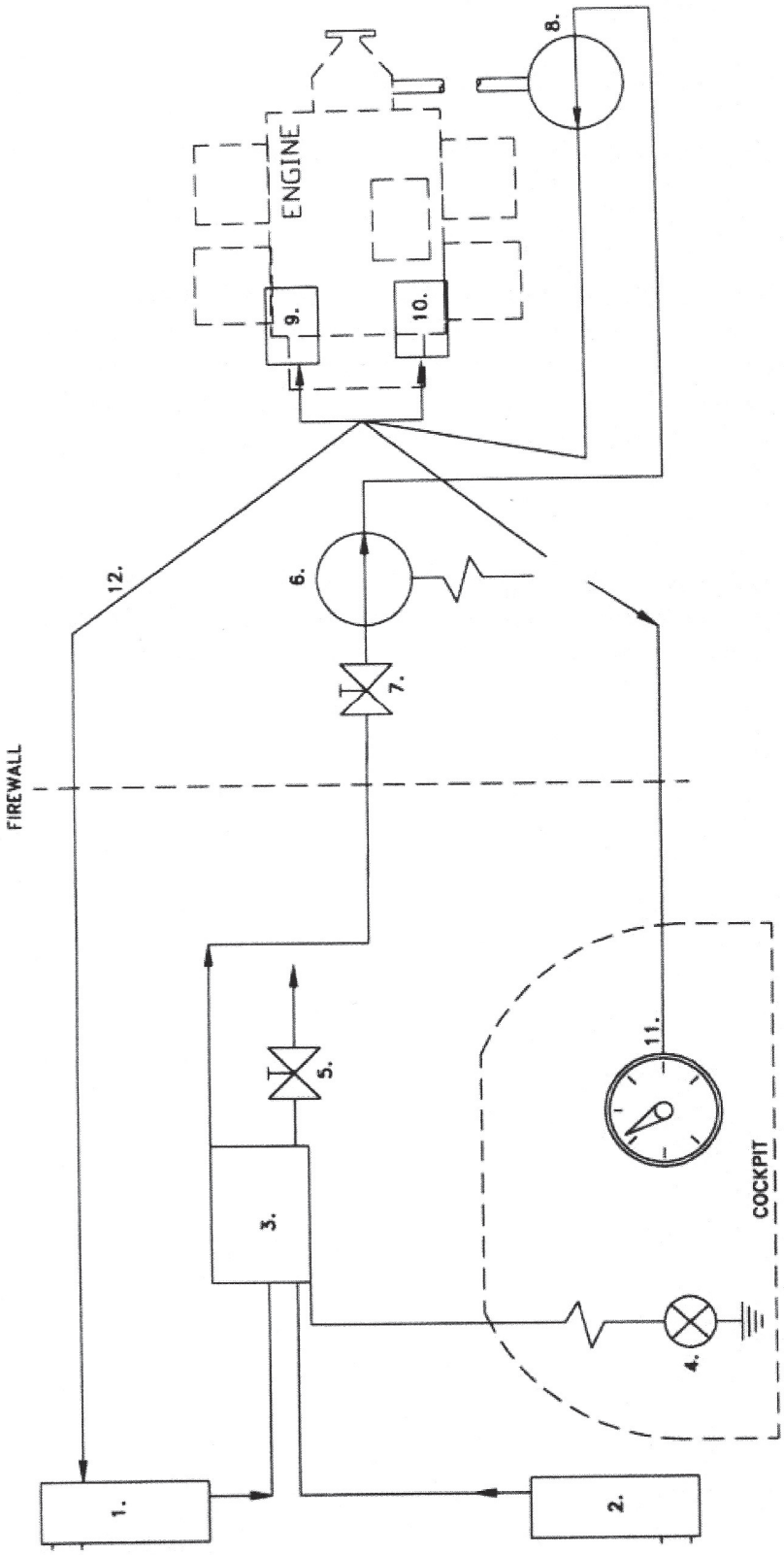


Figure nr.1

ELECTRIC SYSTEM (engines ROTAX 912 and 912S)

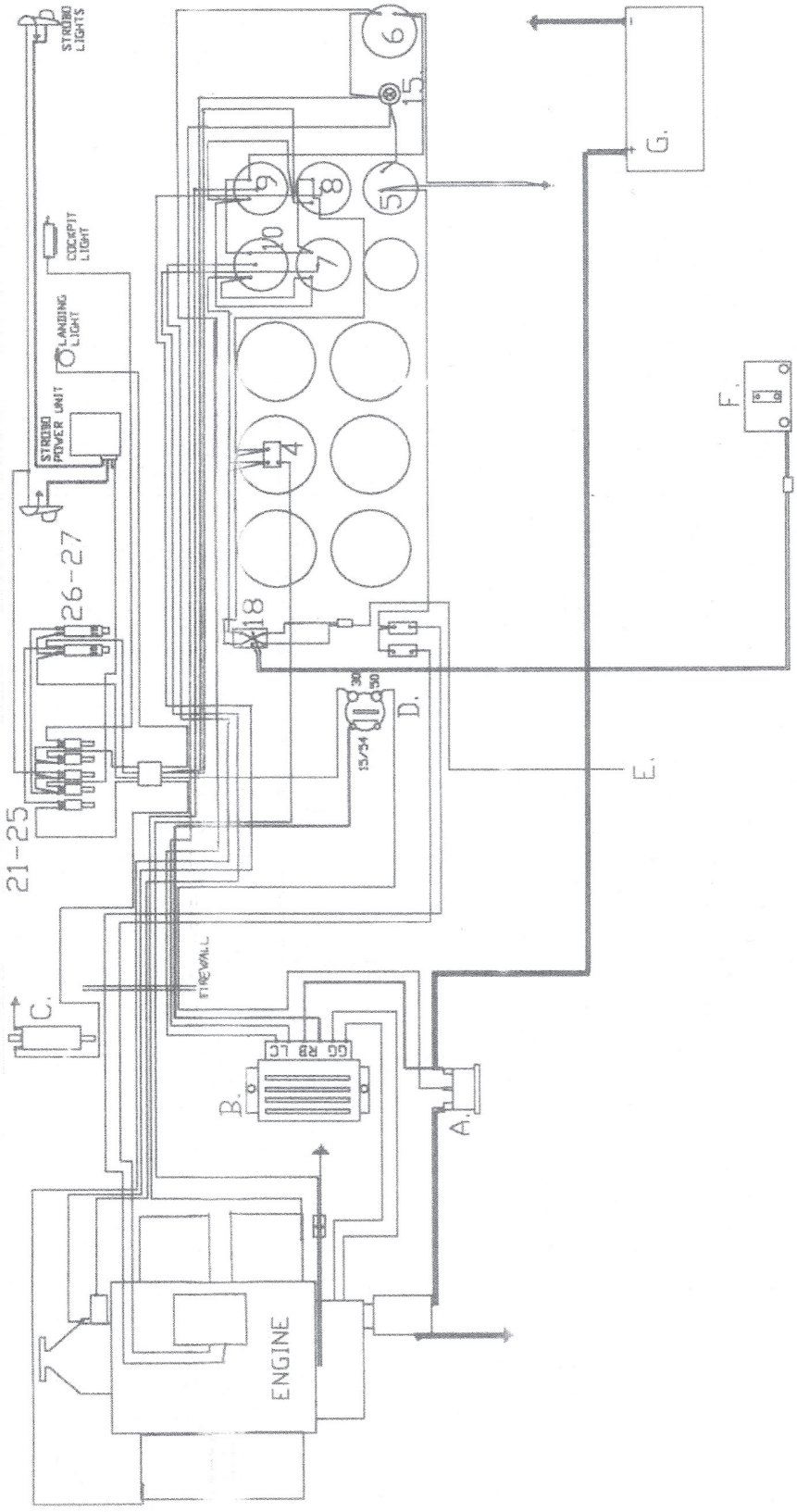


Figure nr.2

ELECTRIC SYSTEM (engine JABIRU 2200)

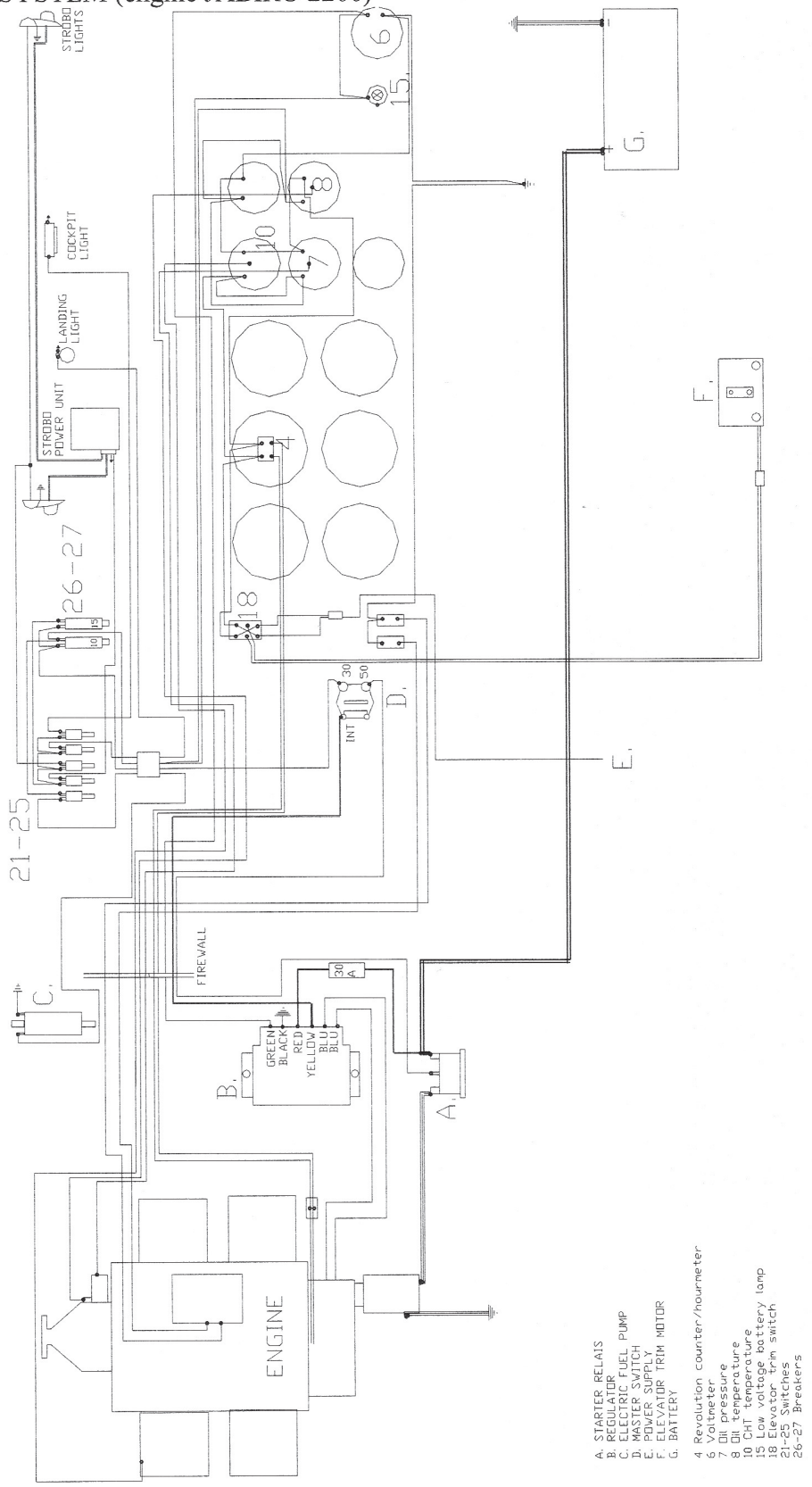
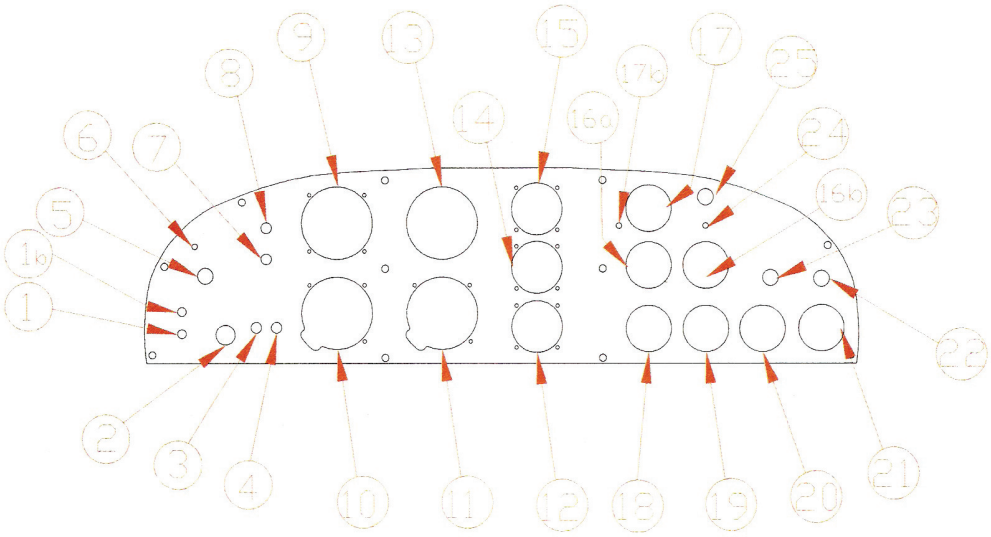


Figure nr.2bis

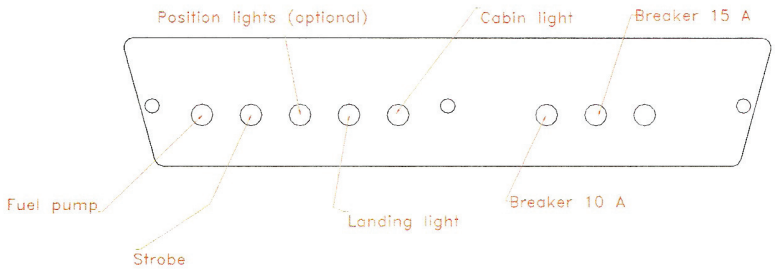
1.13 INSTRUMENT PANEL

ATTENTION: the installed instruments are not certified according to any aeronautical regulation: it is advisable to avoid dangerous flight conditions and do not consider the values given by the instruments as an absolute value.

As standard equipment the following instruments are fitted:



1 Choke actuator
1b Airbox control (Only Rotax 912 ULS)
2 Master switch
3,4 Magneto switches
5 Pilot side accelerator
6 PTT switch (optional)
7 Elevator trim switch
8 not used
9 Anemometer
10 Altimeter
11 Variometer
12 Radio-intercom (optional)
13 Revolution counter
14 Fuel pressure indicator
15 Slip indicator
16a Left cylinder head temperature
16b Right cylinder head temperature
17 External temperature (912 UL) + Airbox temperature (912 ULS)
17b Switch external temperature - airbox temperature (only 912 ULS)
18 Oil pressure indicator
19 Oil temperature indicator
20 Hourmeter
21 Voltmeter
22 Low battery voltage warning lamp
23 Passenger side accelerator
24 Reserve fuel tank (Nurise) test button
25 Fuel reserve warning lamp



Instruments for each aircraft may vary according to the requirements of the customers.

1.14 FLIGHT CONTROLS

The aircraft is equipped with a single "Y" shaped stick and dual conventional rudder pedals fitted with toe operated brake controls on the pilot's side only. The aircraft is provided with one longitudinal trim electrically operated. Longitudinal trim: by pushing upwards the toggle switch the pilot achieves a nose-down attitude.

Flaperons range: ±15° (±2°)
Elevator: UP 29°±3°, DOWN 25°±3°
Rudder range: ±25° (±2°)

1.15 FLAPS CONTROL

This system controls the "flaperons", full-span trailing edge movable surfaces, and is located on the cabin floor. With the stick in the center and the control lever full forward the flaps are fully retracted. In the intermediate position the flap results 20° (±3°) extended the flap results 35° (±3°) lowered

1.16 PITOT-STATIC SYSTEM

The total pressure to the instruments is supplied by the Pitot tube located on the left hand forward wing strut. No static pressure source is provided since it is assumed the static pressure is equal to the pressure inside the cabin.

WARNING: blowing into the Pitot tube may results in an airspeed indicator damage.

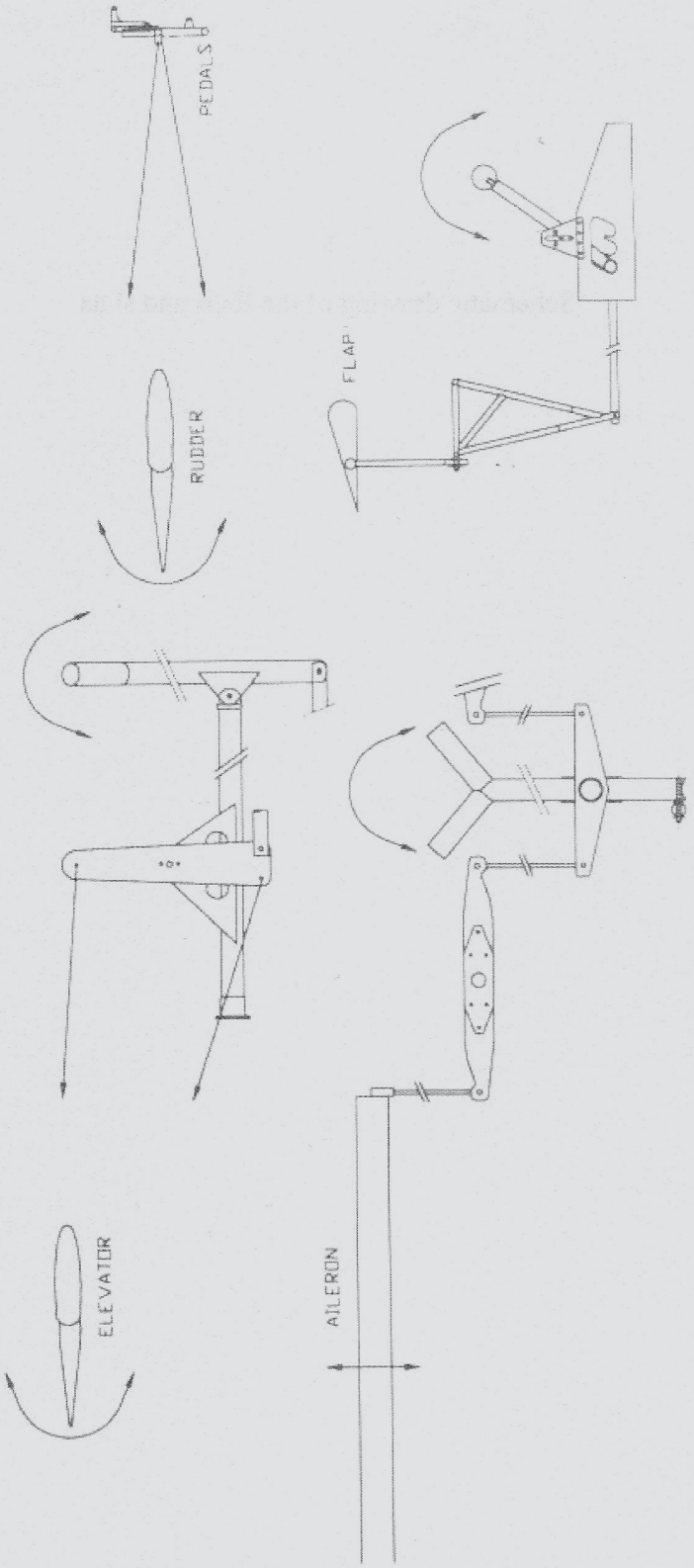
1.17 BAGGAGE COMPARTMENT

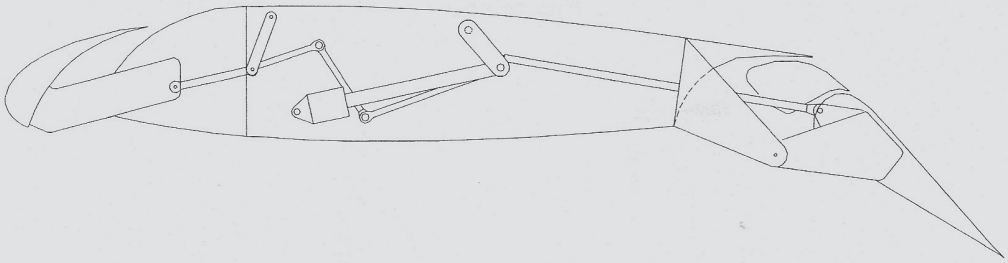
An open space behind the seats is provided to carry some baggage up to 45 lbs. The luggage MUST be evenly arranged on the baggage compartment floor and firmly fastened.

NOTE: the pilot MUST check, for every configuration, that the weight and balance of the aircraft are within the allowed limits.

FLIGHT CONTROLS

Figure nr.3





Schematic drawing of the flaps and slats

TABLE OF CONTENTS

SECTION 2

LIMITATIONS

2.1 SPEED LIMITS

NOTE: the following speed limits (IAS) are set at a maximum take off weight of 1000 lbs/454 kg

Stall speed, full flaps, Vso	30 mph / 48 km/h
Flaps range (white arc)	30-60 mph / 48-96 km/h
Stall speed, no flaps, Vs	35 mph / 56 km/h
Normal operating range (green arc)	35-100 mph / 56-160 km/h
Max. maneuvering speed (1)	70 mph / 112 km/h
Attention zone (yellow arc) (2)	100-125 mph / 160-201 km/h
V_{mo}	100 mph / 160 km/h
Never exceeding speed, Vne (red line)	125 mph / 201 km/h
Flaps speed limit	60 mph / 96 km/h

NOTES:
(1): the maximum maneuvering speed is the maximum speed at which the flight controls may be fully operated (maximum movable surfaces deflection angles);
(2): when flying in turbulence conditions this speed range has to be avoided.

2.2 LOAD FACTORS

Flaps retracted	+ 4 g	- 2 g
Flaps full extended	+ 2 g	----

NOTE: the maximum load factors (limit load factors) are obtained multiplying the above indicated values by the coefficient 1,5.

2.3 ENGINE OPERATING LIMITS

- Maximum RPM for T/O and climb — 5800 RPM (5 min.) (red line)
- Caution range — 5500-5800 RPM (yellow arc)
- Normal range — 1400-5500 RPM (green arc)
- Maximum continuous power — 5500 RPM
- Idle speed — around 1400 RPM
- Oil pressure — normal range 2-5 bar (29-73 psi) (green arc)
  caution range 5-7 bar (73-102 psi) (yellow arc)
  min. 0.8 bar (12 psi) (red line), max 7 bar (102 psi) (red line)
- Oil temperature — normal range 90-110 °C (green arc)
  caution range 50-90 / 110-140 °C (yellow arc)
  max 140 °C (red line)
- Fuel pressure — max 0.4 bar (5.8 PSI)
  Min 0.15 bar (2.2 PSI)
- Air-box temperatures (*Only 912 ULS*) — Caution range 18 °C – 20 °C (yellow arc)
  Caution range 24 °C – 35 °C (yellow arc)
  Normal range 20 °C – 24 °C (green arc)
  Minimum air box temp. 18 °C
  Maximum air-box temp. 35 °C (red line)

ENGINE OPERATING LIMITS (engine JABIRU 2200)

- Maximum RPM for T/O and climb — 3300 RPM (red line)
- Continuous RPM — 3300 RPM
- Idle speed — around 900 RPM
- Oil pressure — normal range 220-525 kPa (green arc)
  min. 80 kPa (red line), max 525 kPa (red line)
- Oil temperature — normal range 80-100 °C (green arc)
  min temp for operation 15°C (red line)
  max 118 °C (red line)
- Fuel pressure — max 20 kPa (2.9 PSI)
  min 5 kPa (0.7 PSI)
- CHT temperature — Normal range 180 °C (356 °F) – 200 °C (392 °F) (green arc)

2.4 WEIGHT LIMITATIONS

Maximum take off weight:	454 kg
Minimum take off weight (minimum pilot weight 86 kg and ½ h flight fuel):	367 kg

2.5 C of G LIMITATIONS

Forward C of G limit:	30% MAC
Rear C of G limit:	38.5% MAC

See also section 6.

2.6 KIND OF OPERATIONS

The airplane can be operated only in day-VFR conditions.

2.7 KIND OF MANEUVERINGS

The airplane is intended for non-aerobatic operations only.

2.8 MAX CROSSWIND FOR T/O AND LANDING

The maximum cross-wind component allowed during take-off and landing is 30/48 mph/km/h.

TABLE OF CONTENTS

SECTION 3

EMERGENCY PROCEDURES

3.1 EMERGENCY LANDING

Best descent ratio speed	60 mph/96 km/h
Flaps	Retracted
Fuel valve	Shut-off
Engine	Shut-off
Seat belts	Fastened and tightened
Steep turns	Avoid
Flaps in final	Fully extended, 40°
Landing	Normal landing

3.2 FIRE ON THE GROUND

Starter	Keep engaged
Fuel valve	Shut-off
Throttle	Fully open, to burn the fuel and stop the fire

3.3 FIRE ON THE GROUND, ENGINE OPERATING

Fuel valve	Shut-off
Throttle	Fully open, to burn the fuel and stop the fire

3.4 IN FLIGHT FIRE

Fuel valve	Shut-off
Engine	Stop Don't try to restart the engine
Electrical system	All switches OFF
Landing	Go on to an emergency landing

3.5 CABIN FIRE

Electrical system	All switches OFF
Fire extinguisher	Operate

3.6 UNINTENTIONAL SPINS

Rotation	To stop the rotation push the pedal opposite the rotation direction
Control stick	Center, slightly forward
Upon taking aircraft's control	Level flight attitude

3.7 ENGINE FAILURE DURING T/O

Magneto switches	OFF
Master switch	OFF
Throttle	Idle
Fuel valve	Shut-off
Brake	Fully operated

Immediately after take off

Airspeed	Keep 60 mph IAS and first notch of flap
Eventual landing	Check for adequate spaces within 30° left and 30° right
Throttle	50%, fuel pump ON and try to restart the engine
If previous point fails	Before touching the ground, magnetoes OFF, master switch OFF, throttle idle, fuel valve shut off
Flaps	Fully deflected
On the ground	Touch and brake

3.8 ENGINE START DURING FLIGHT

Throttle	Idle
Magneto switches	ON
Master switch	ON
Fuel pump	ON
Restart the engine	---------
RPM	As requested for the type of flight

TABLE OF CONTENTS

SECTION 4

NORMAL PROCEDURES

NOTE: The flight characteristics of the **Savannah** are conventional. There is no needing of exceptional piloting skills to manage the aircraft within its flight envelope.

4.1 BEFORE FLIGHT CHECKS

Master switch	OFF
Magnetos	OFF
Fuel selector	OPEN
Flight controls	UNLOCKED
Fuel gascolator	DRAIN
Powerplant fairings	FASTENED
Pre-flight/Daily inspection	PERFORM

4.2 EXTERIOR CHECKS

Propeller and engine	Visual check to bolts and nuts, oil leaks
Forward landing gear	Visual check of connection pionts
Main landing gear and strut attachments	Visual check to bolts and nuts
Slat	Visual check to damages and dirt
Ailerons	Visual check of hinges bolts and nuts
Horizontal and vertical tail	Visual check to attachment bolts and nuts
Coolant radiator	Visual check to absence of dirt, insects

4.3 ENGINE START-UP

COLD ENGINE	==========
Master switch	ON
Magnetos	ON
Brakes	OPERATE
Throttle	FULLY CLOSED
Choke	ON
Starter	ENGAGE
NOTE	Upon engine start-up let the engine run for some seconds then gradually release the mixture control while slightly pushing the throttle control

HOT ENGINE	==========
NOTE	Perform the same as for COLD ENGINE items except pulling the choke control
NOTE	The engine starts easily with the throttle full closed. In case of fuel flooding only it's useful to open the throttle to supply a large amount of air to recreate the normal carburation condition.
NOTE	It's strongly recommended the pilot, immediately before to engage the engine starter, call with loud voice "BEWARE OF PROPELLER". Then, upon making sure himself none is close to the propeller, he can start the engine. If someone is standing close to the aircraft, it would be his responsibility to stay away enough and answer the pilot "PROPELLER CLEARED".
Engine warm-up	WAIT FOR PROPER CHT READING
Instruments operation	CHECK
Windshield cleanliness	CHECK
Brake effectiveness	CHECK
Safety belts and shoulder harnesses	FASTENED AND CHECKED
Fuel quantity	CHECK
Electrical devices operation	CHECK

4.4 TAXYING

POWER	Apply reduced engine power and use the brakes at the minimum
STEERING	The steering should be obtained by using the rudder pedals and not the brakes
CROSSWIND	In the event of a stronger than 19 mph/30 km/h crosswind, taxy at a very low speed and move the control stick laterally towards the up-wind wing; this will raise the up-wind wing flaperon thus avoiding the wing accidental raising.
NOTE	Use rudder holding the heels on the floor: in that way there will be no accidental brake operation.

4.5 BEFORE TAKE-OFF

Altimeter	ADJUST
Trim	ADJUST to neutral position
Flaps retracted	CHECK
Flight controls freedom of movement and correct movement of surfaces	CHECK
Doors closed and locked	CHECK
Safety belts fastened	CHECK
Fuel level	CHECK
Engine instruments in correct working range	CHECK
NOTE	The engine has been running at 2.500/3.000 RPM while warming-up; the CHT reading has risen to 60 °C, oil 50 °C.
Magnetos; check the RPM drop: one magneto at a time at 3.000 RPM (the max. allowed speed drop with only one ignition circuit is 300 RPM) (the max difference of speed by use of either circuit is 115 RPM max)	CHECK
Magnetos	BOTH ON
Full power check	AS REQUIRED
Runway and circuit traffic	CLEARANCE CHECK
Runway threshold	LINE-UP

4.6 TAKE-OFF AND CLIMB

Flaps, 20°	SET
Brakes	RELEASED
Air-box control	COMPLETELY PUSHED FOR COLD AIR
Throttle (operate progressively)	FULLY OPENED
Engine RPM	CHECKED
Control stick	SLIGHTLY PULLED
NOTE	The aircraft will take-off at a 30-35 mph speed and will keep climbing at a 40-45 mph speed
NOTE	While take-off running, be sure to hold your heels in contact with the cabin floor to avoid to inadvertently operate the brakes
Flaps, at a safety altitude	FULLY RETRACTED
Climb airspeed at 60-65 mph	SET
Upon reaching the required altitude	LEVEL
Cruise speed as required, RPM as required	SET
Trim (to get no reaction on the control stick)	SET
SHORT TAKE OFF	
Flaps, 40°	SET
Brakes	FULLY APPLIED
Throttle	FULLY OPENED
Air-box control	COMPLETELY PUSHED FOR COLD AIR
Brakes	RELEASED
Pilot's heels	ON THE FLOOR
Nose-up attitude, control stick pulled-on until taking off	SET AND HOLD
Climb airspeed at 45 mph until the 50 ft obstacle clearing	SET
Flaps, upon reaching a safe altitude and airspeed	FULLY RETRACTED

NOTES:

- the best rate of climb makes the aircraft climb to the required altitude in the shortest flight time;
- the best angle of climb makes the aircraft climb to the required altitude in the shortest distance;
- in normal flight conditions, set the flaps to 20° to shorten the take-off roll in order to clear a 50 ft. high obstacle. That's possible since the aircraft flies at a lower airspeed but the extended flaps decrease the rate of climb.
- in case of operation from high elevation airfields and/or at high ambient temperature the extended flaps induced drag increase affects the aircraft's performance as far as to increase the take-off run. So it's recommended to check the take-off performance chart to determine if it is advantageous the flaps extension in the take-off.

The above indicated data are medium ones since they may be varied with relation to the aircraft's weight, balance and configuration.

4.7 CRUISE

The cruising speed is achieved by applying the 75% of the engine power available at the propeller. Normally the propeller required power (fixed pitch propeller only) decrease by 50% following a 20% RPM decrease only. So, at a constant aircraft's configuration, the propeller will use the full engine power (full RPM) while, at 4.600 RPM, the propeller will be supplied with half the full engine power.

The cruise speed is 90 mph (5000rpm/27.2in.HG) with Rotax 912 UL and 95mph (5000rpm/26 in.HG) with Rotax 912 ULS and 85 mph with Jabiru 2200; remember that the fastest will run the engine the highest will be its fuel consumption and the lowest its operating life, while a slow running engine, for the same power output, will have its mechanical components loaded by greater forces and torques, thus increasing the risk to break rods, crankshaft and the other moving (rotating) parts. Low RPM settings DON'T increase safety!

Low RPM settings produce low power output thus a lower airspeed would be achieved.

By increasing the flight altitude the engine power output will decrease as well as the propeller's thrust: to compensate it, it's required to increase the engine's RPM. The normal engine running speed is 4,000 to 5,400 RPM for Rotax 912 and 912S and 2500 RPM for engine Jabiru 2200.

The engine has been designed to be safely and continuously operated at the maximum RPM setting.

Air-box control: keep 20-24 °C of temperature. (Only Rotax 912 ULS)

4.8 DESCENT

During the descent it's recommended not to operate the engine at idle to avoid a hard engine cooling which could lead to cylinder heads cracks.

Keep air-box control pulled for hot air.

4.9 APPROACH AND LANDING

Throttle	IDLE
Airspeed	60 mph / 97 km/h (IAS)
Flaps	20 °
Airspeed	45 mph (IAS)
Flaps	40°
Airspeed	40 mph / 64 km/h (IAS)
Brakes, upon touching down	APPLY

If a higher rate of descent is required, fully extend the flaps. The angle of the descent path may be slightly varied by throttle operation as required to modify the gliding path. The flare will be flown in a nose-up attitude. Upon touching down, by releasing the control stick, the aircraft's nose will lower.

If downwind attitude, keep air-box control pushed for cold air. (Only Rotax 912 ULS)

4.10 CROSS-WIND LANDING

In the event of a crosswind the approach has to be flown lowering the up-wind wing or applying the yaw control to achieve a nose-into-the-wind aircraft's attitude or using both the two control techniques at the same time as required.

The aircraft must be lined-up along the runway shortly before the ground contact.

The maximum cross-wind component allowed during take-off and landing is 30/48 mph/km/h.

4.11 ABORTED LANDING (GO-AROUND)

Throttle, full power	SET
Flaps, when reaching a 54 mph (IAS) airspeed	RETRACT

The throttle control must be pushed smoothly and gradually to avoid an engine flooding or, worse, an engine shut-down.

4.12 ENGINE SHUT-DOWN

Engine operating, low RPM	2 MINUTES
Throttle	IDLE
Magnetos	OFF
Master switch	OFF

It's recommended to keep the engine running at low RPM for as long as two minutes in order to avoid a thermal shock and to achieve a thermal balance between the different engine's components. Moreover it will be achieved a good pistons and piston rings lubrication so the engine will be let in the best condition to the next start-up.

4.13 PARKING AND MOORING

It must be remebered that mooring the airplane to the ground is a temporary solution and not prolonged in the time: moreover, if conditions may happen during which mooring could cause damage to the bound parts, it is recommended an accurate inspection before restart the flight acitivity.

To moore the aircraft tie two ropes to the mooring rings fitted under the wings near the strut attachments and a third one to the rear mooring ring.

The tie down rings are must be used when the the ground wind speed doesn't exceed 100km/h=62mph; when the wind speed exceed this value also anchor in coorespondence of the wheel pins.

Tie the control stick together with the rudder pedals by using an elastic chord to lock all the movable surfaces.

Make sure the doors are closed and locked.

Put in place the optional windshield and windows protection canvas to prevent dust accumulation and scratches.

TABLE OF CONTENTS

SECTION 5

PERFORMANCE

5.1 STALL SPEED

NOTE: the speed values are expressed as anemometric (indicated) airspeed (IAS). It's assumed the aircraft and the powerplant are factory new and the airplane is flying in standard air condition.

Stall speed	Maximum weight (1000/454 lbs/kg)
Flaps retracted	35 mph/56 km/h
Flaps extended (40°)	30 mph/48 km/h

The above indicated airspeeds are achieved with engine set to IDLE: in those situations the aircraft simply sink without modifying the flight attitude while the control stick is pulled-up.

By applying power, the aircraft's nose go up to a great angle, the airspeed decrease until the stall occurs, followed by a quick nose lowering.

NOTE: the maximum flaps extended airspeed is 60/96 mph/km/h.

5.2 TAKE-OFF RUN

Take-off run (hard surface, flaps 20°)	Maximum weight (1000/454 lbs/kg)
Sea level (MSL)	115 ft/35 m
3,000 ft/900 m pressure altitude	160 ft/50 m
6,000 ft/1,800 m press. altitude	210 ft/63 m

NOTE: if the airplane is operated from a grass runway the take-off ground roll will increase.

NOTE: to clear a 50/15 ft/m high obstacle, a practical rule suggests to double the take-off ground roll.

5.3 LANDING DISTANCES FROM 15 m AND LANDING RUN

The airplane needs 150 m for landing upon a 15 m obstacle, and a 50 m of landing run, in no wind condition at full weight, with airspeed of 60-65 km/h IAS.

5.4 RATE OF CLIMB (Rotax 912 UL)

Rate of climb **Full power setting**	Maximum weight (1000/454 lbs/kg)
Sea level (MSL)	1,100 fpm/5.5 m/s 48 mph/77 km/h
3,000 ft/900 m pressure altitude	790 fpm/4.0 m/s 45 mph/72 km/h
6,000 ft/1,800 m press. altitude	520 fpm/2.6 m/s 40 mph/64 km/h
9,000 ft/2,700 m press. altitude	300 fpm/1.5 m/s 37 mph/60 km/h

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

The best rate of climb speed is 48/77 mph/km/h.

The best angle of climb speed is 45/72 mph/km/h.

The best gliding angle with flaps retracted is achieved at a 60/96 mph/km/h airspeed. The Lift to Drag ratio is 12.

The fuel consumption at 75% power setting amounts to 4.9/18.5 gph/lt/h for Rotax 912 ULS and 4.3/16.2 gph/lt/h for Rotax 912 UL; 14 l/h for Jabiru 2200.

TABLE OF CONTENTS

SECTION 6

WEIGHT AND BALANCE

6.1 GENERAL

The aircraft is allowed to have its CG (Centre of Gravity) within a quite large range thus easing the aircraft's loading and balancing. By knowing the weights of the people, fuel and baggage to be carried on board and using the attached W&B report, the pilot would be able to check for the proper aircraft's weight and balance configuration. To find out the CG position please refer to the attached table. Compute the total weight and the total moment, given by adding all the single moments. To be acceptable, the found point MUST be located into the WHITE area, between the two limit lines.

WARNING: a CG beyond the most foreward limit, as well as a CG beyond the most rearward limit may result in a VERY DANGEROUS flight condition.

NOTE: it's strictly forbidden to make any change or modification to the aircraft since those modifications may affect the balance limits set by the manufacturer.

6.2 WEIGHT AND BALANCE REPORT

Procedure to be used to determine the Centre of Gravity position:

- The aircraft MUST be weighed fitted with all equipments, accessories, engine oil, coolant and WITHOUT FUEL;

NOTE: all the fuel MUST be drained accurately.

- Put the aircraft on three weight measuring equipments (each under each wheel of the landing gear);
- Put the aircraft in the flight level position by using a level fitted on the aircraft's upper skin of fuselage near cabin;
- Record the three weight measuring equipments readings: the nose wheel weight will be called P1, the left wheel weight P2, the right wheel weight P3;
- By using a plumbing wire fixed to the leading edge, measure the distance D1 between the projection on the floor of the leading edge and the nose wheel axle, and the distance D2 between the same projected point and the main landing gear axle;
- By filling out the table below, make the calculations and find out the CG position. The airplane is in the correct balance if the line of the actual weight and the line of the actual total moment cross inside the white area.

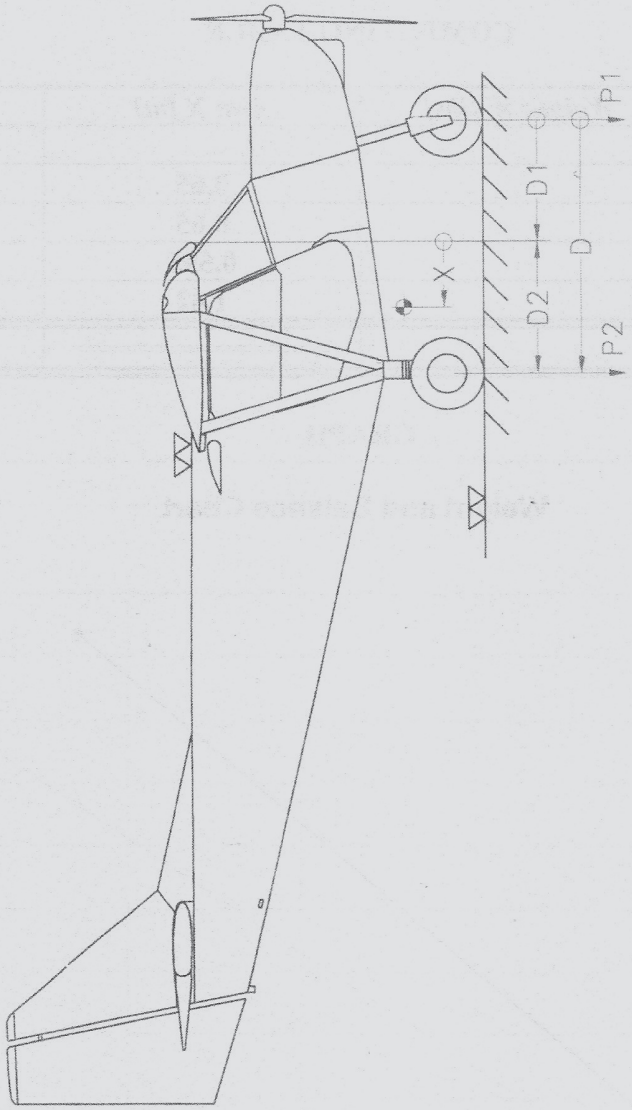
TABLE TO DETERMINE THE AIRCRAFT'S BASIC EMPTY WEIGHT

Aircraft serial number	
Weight measuring equipment	
Location and date	
Certifying staff	

	Weight (kg)	*Arm (m)*	*Moment (kg x m)*
Nose landing gear	P_1 =	D_1 =	
LH main landing gear	P_2 =	D_2 =	
RH main landing gear	P_3 =	D_2 =	
TOTALS			

Signature	

6.3 WEIGHT AND BALANCE DRAWINGS



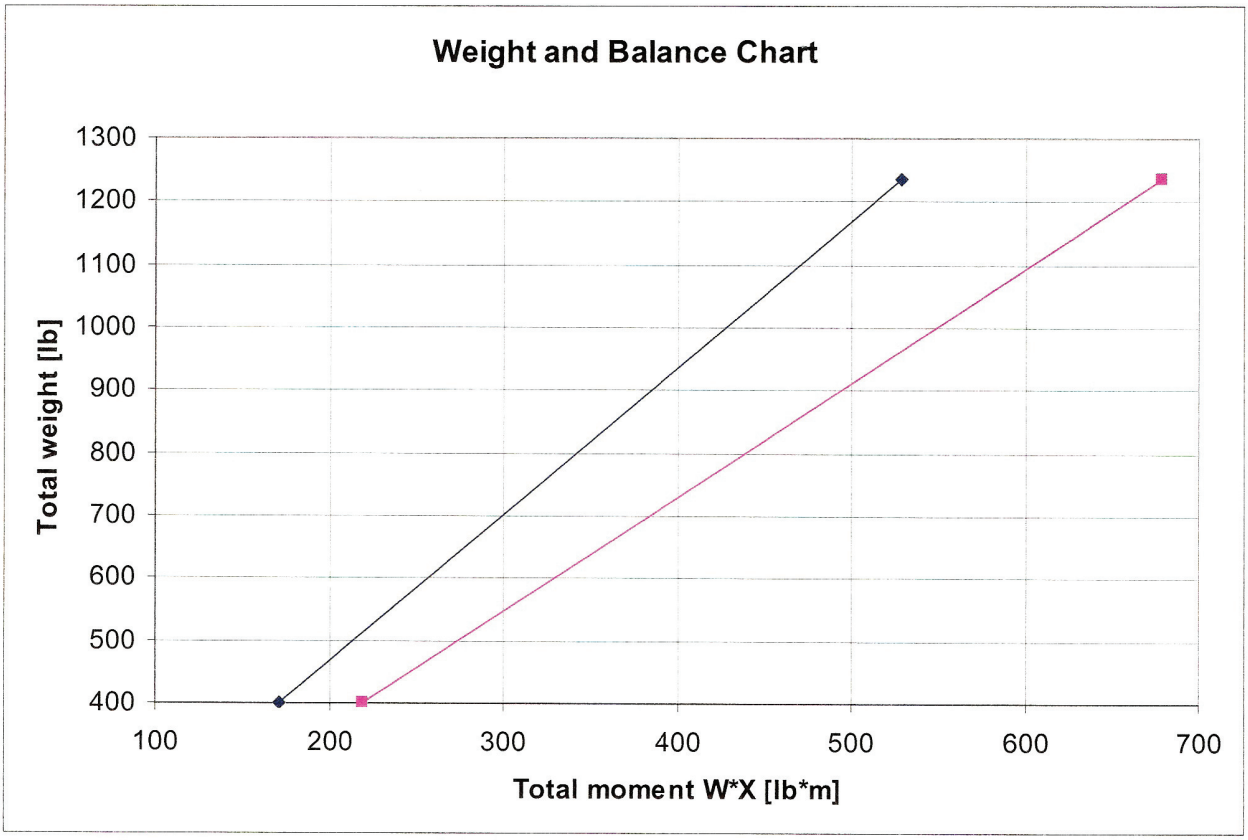
where:
D1=670 mm;
D2=770 mm;
P1=weight on forward gear;
P2=total weight on principal gear;
X=(P2*D)/(P1+P2)-D1

6.4 WEIGHT AND BALANCE PILOT'S COMPUTING TABLE AND GRAPH

COMPUTING TABLE

Item	*Weight W [lbs]*	*Arm X [m]*	*Moment [W x X]*
Basic empty weight			
Pilot		**0.65**	
Passenger		**0.65**	
Fuel (max 110 lb max)		**0.595**	
Baggage (45 lb max)		**1.42**	
TOTALS		==========	

GRAPH



Forward C of G limit: 30% MAC
Rear C of G limit: 38.5% MAC

MAINTENANCE MANUAL

Savannah™
Savannah™ ADV

LOG OF REVISIONS

Revision Number	Revised Pages	Description of Revision	Date
00	All	First version	Dec.99
01	2,3,5,9,14	Corrections	Ott. 02
02	2,3,16	Add check at 200 hours	Nov.02
03	2,3,9,11	Add check rotax service bulletin	Dec.02
04	2,3,9,12	Add check Air-box spring support	Gen.03
05	2,3,10	Add Check at 25 hours throttle lever	Giu.03
06	2,3,5,7,8, 17,18	Engine TBO at 1500 hours	July '03
07	2,3,19	Note on brake fluid	Ago.03
08	2,3,19	Updated engine oil	Ott.04
09	2,3,11	Add check to the wings attachment	*Gen 2005*
10	All	Updated for ADV	20/09/05
11	1,2,3,19	Add phrase and copyright in the first and latest pages	03/11/05
12	all	General revision	14/04/06

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION 1

INSPECTION SCHEDULE AND REPORTS

1.200 INSPECTION SCHEDULE

The aircraft's maintenance schedule is as indicated in the table below:

Daily/Pre-flight inspection	before the first flight each day
25 hours inspection	every 25 hours flight time
50 hours inspection	every 50 hours flight time
100 hours/6 months inspection	every 100 hours flight time/6 months calendar time
200 hours/12 months inspection	every 200 hours flight time/12 months calendar time
600 hours	every 600 hours flight time
1.200 hours flight time/72 months	every 1.200 hours flight time/72 months calendar time
1500 hours inspection (Engine overhaul)	every 1.500 hours flight time

1.2 MAINTENANCE HISTORIC REPORT

Sc. flight time	Sc. cal. time	Total time	Date	Location	Mechanic
25					
50					
75					
100	6 m				
125					
150					
175					
200	12 m				
225					
250					
275					
300	18 m				
325					
350					
375					
400	24 m				
425					
450					
475					
500	30 m				
525					
550					
575					
600	36 m				
625					
650					
675					
700	42 m				
725					
750					
775					
800	48 m				
825					
850					
875					
900	54 m				
925					
950					
975					
1.000	60 m				
1.025					
1.050					
1.075					
1.100	66 m				
1.125					
1.150					
1.175					
1.200	72 m				

Sc. flight time	Sc. cal. time	Total time	Date	Location	Mechanic
1225					
1250					
1275					
1300	78m				
1325					
1350					
1375					
1400	84m				
1425					
1450					
1475					
1500	90m				

1.3 INSPECTION REPORTS

NOTE:

Below are indicated the exact meaning of all the terms used in the inspection reports in order to avoid any possible misunderstanding.

Visual inspection	Inspection to be performed without using any instrument or testing device, by expert and trained eye only.
Functional inspection	Inspection to be performed by supplying the component to be inspected with the proper energy, in order to check its correct operativeness, without removing the component from the aircraft.
Test	It's a verification of a component, without disembarking it from the aircraft, to be performed by using a tester or other suitable instrumentation, to check its proper operation.
Check	It's a verification, typically to be performed by the pilot, without removing anything from the aircraft, to determine whether there is a correct cause-effect relation produced by engaging the device to be checked.
Bench test	It's a verification of a component, disembarked from the aircraft, to be performed by connecting it to a testing bench or other laboratory suitable instrumentation, to check its proper operation and measure some significant parameters values.

1.3.1 DAILY/PRE-FLIGHT INSPECTION

N.	DESCRIPTION	MECH.	CER. ST.
1	Without moving the aircraft, drain the airplane fuel system		
2	Check all the airplane surfaces to assure there's no noticeable defects or any accumulation of slush, snow or other detrimental material.		
3	Remove all the mooring ropes and the gust lock devices.		
4	Check there aren't any defects in the windshield or windows.		
5	Check the landing gear for no defects, no damaged tires, and tires for proper inflation.		
6	Check all the fairings and inspection panels for general condition, safety and no loosen or missing fastener.		

IMPORTANT: *Your airplane is made with aeronautic alluminium (6061 T6) with good anticorrosion characteristics, but however simple cleaning procedures are always necessary. It is important to avoid water stagnation making appropriate drying. Don't use pressure jet of water to avoid infiltration into not accesible point.*

The original finishing will remain for a long period, if periodically the airplane is washed with a wet sponge and a car detersive. Rinse always with a lot of water.

Periodically, use a good not abrasive car wax.

If the airplain lies in an saltish ambient, (near the sea) it must be washed frequently with fresh water; repeat treatment with a good not abrasive car wax.

IMPORTANT: *due to continuous emission of Service Bullettins and Service Informations by Rotax, I.C.P. Srl does not intend to transmit anymore those informations to Rotax engines owners. Those informations are available on web site www.rotax-aircraft-engines.com in section "Documentation": we also suggest to contact the official Rotax dealer in your country.*

I.C.P. Srl does not take any responsability of eventual damage to persons and things due to lack of application of Rotax prescriptions.

1.3.2 25 HOURS INSPECTION

N.	DESCRIPTION	MECH.	CER. ST.
1	Remove all the engine fairings		
2	Open the inspection panel on the bottom of the fuselage		
3	Check the general conditions of the whole airframe		
4	Check the propeller for dents and cracks; check the blades leading edge protection for condition; NOTE: if some vibrations are noted the prop should be balanced		
5	Check for presence and integrity of the safety nuts or the safety wire on the propeller's hub		
6	Check the battery for proper liquid level, drain pipe condition, corrosion due to acid spills and for electrodes condition		
7	Check the flight controls for freedom of movement, excessive play; all screws and nuts must be in place, properly tightened and fitted with their safety devices		
8	Check the flight controls cables, their end fittings and the nicopresses; to check out for broken wires in cable, touch it along by hand and by a soft fabric piece; if required, replace the cable with an original spare		
9	Check the pulleys and the teflon guides		
10	Lubricate all the moving parts		
11	Check all the components for freedom of movement and excessive play		
12	Check the flight controls cables tension; the proper tension is 18-24 lbs (9-12 kg); greater tension induce too high load on the aircraft's structure and make the flight controls too hard to operate, lower tension induce a very imprecise and not ready response; at the worst, some flutter at the moving surfaces may arise; the too low tension cables ARE VERY DANGEROUS		
12b	On ADV, check the aileron control levers, cables, bearings, push pull rods inside the wings trought the inspection panels on the lower skin of wings		
12c	On ADV, check the free movement of the slats slides, and absence of excessive play, check the integrity of the rubber between wing and slat		
12d	On ADV, check flap movement and hinges		
12e	Check throttle lever on firewall and in particular the welding on the 4 levers		
13	Check the radiator is fully accessible by the cooling air and the duct isn't obstructed by grass, leaves or other debris; check for coolant leaks, all the hoses and clamps are in place and properly secured		

14	Parachute: if installed, check for security, bridles condition, that the hook is locked, the control cable for condition		
15	Check the electric wires for condition, routing and security; check the anti-collision lights control box for condition, if installed		
16	Check the flaperon and elevator springs for security; adjust if required		
17	Visually inspect the fuselage interior; close the inspection panel at the fuselage bottom		
18	Check the landing gear for general condition; check the wheel fairings if installed, the tires for wear and proper pressure		
19	Check and, if required, adjust the brake control		
20	Check the nose gear elastic chord and the sliding strut for excess of play, clean and lubricate properly		
21	Check the pedal rods and rod-ends; clean and lubricate properly		
NB	WARNING: following a hard landing, particularly if happened in a crosswind situation, check the wheel fork alignment.		
22	Check all the bolts, nuts and attachment connections of the wings: all the safety locking devices should be in place and not broken		
23	Check the flaperon hinges: they should be show freedom of movement and no play and be fitted with the safety locks		
24	Clean all the flaperon hinges and lubricate		
25	Check all the empennages hinges for freedom of movement and no play, clean and lubricate; Check the cable end attachment fittings for condition, freedom of movement, no play, cleanliness and lubrication		
26	Inspect for condition and security the four (4) horizontal tailplane to fuselage attachment connections		
27	Check all the inspection panels for condition and security, their hinges and fasteners; clean and lubricate properly		
28	Inside the cabin check for general condition, open the control stick repair, check all hinges, screws, nuts, safety locks, for freedom of movement, excessive play		
29	Lubricate the control stick mechanism (3 spots)		
30	Close the control stick repair; make sure to fix it.		
31	Visually inspect the cabin electrical system, the brake system's pipes and cables, the cabin switches, breakers, all controls		
32	Lubricate the brake system cables and the rudder pedals		
33	Clean all inside the cabin		
NB	**NOTE: to properly maintain the engine it's strongly recommended to follow the engine manufacturer instructions and all Rotax service informations**		

34	Fuel system: visually inspect pipes, clamps, fuel filter, electric pump and mechanical pump; clean the gascolator, check and clean the carburettors' filters		
35	Check and lubricate throttle and mixture cables and linkages; if required, adjust engine idle and idle carburation		
36	Check the air hoses and air filters condition		
37	Lubrication system: check for condition all pipes and clamps; check for the proper oil level, refill if required		
38	Cooling system: check for condition all pipes and clamps, coolant level and coolant level in the coolant recovery reservoir, check all cooling system components are properly secured		
39	Engine electrical system, ignition system: check for general condition, properly fastened electrical connections, no damaged wires, no connections oxidation, etc.; check the ignition harnesses be properly connected to the spark plugs		
40	Spark plugs cleaning; re-gap or replace as required		
41	By using a suitable tester (differential pressure gauge) check the engine compression		
42	Check the engine silent-blocks, the engine and engine mount attachments		
43	Check the exhaust system for cracks, loose fasteners, springs in place and oxidation		
44	Thoroughly clean both the engine and its accessories		
45	Check for condition of the air-box support spring		

1.3.3 50 HOURS INSPECTION

NOTE: The 50 hours inspection requires that a 25 hours inspection is carried out plus the checks below stated.

N.	DESCRIPTION	MECH.	CER. ST.
1	Check out all the movable surfaces' deflection angles; make reference to the attached drawing		
2	Check the nose landing gear wheel and vertical tailplane alignment		
3	Check the brakes operating effectiveness; clean or replace the pads as required		
4	Change oil filter		
5	Change oil with recommended type		

1.3.4 100 HOURS/6 MONTHS INSPECTION

NOTE: The 100 hours/6 months inspection requires that a 50 hours inspection (25 hours plus the 50 hours adding checks) is carried out plus the checks below stated.

N.	DESCRIPTION	MECH.	CER. ST.
1	Thoroughly check the nose landing gear steering and shock absorbing systems; recover excessive plays as required		
2	Thoroughly inspect the firewall for corrosion, cracks, security and general condition		
3	Fuselage: carefully inspect the fuselage interior and exterior for loose rivets, unproperly tightened bolts, corrosion and panel deformations which can be caused by excessive dynamic loads or hits		
4	Flight controls: check for excessive play, weared components, attachment fittings for condition		
5	Check the movable surfaces travel stops		
6	Check the flaperon attachment fittings		
7	Wings and wing struts: thoroughly check the wing skin for loose rivets, corrosion, panels deformation and damage, inspect the wing leading and trailing edges; check all the bolts and safety locks		
8	Empennages: thoroughly the empennages skin for loose rivets, corrosion, panels deformation and damage, inspect the empennages leading and trailing edges; check all the bolts and safety locks		
9	Drain and refill the engine oil		
10	Replace the oil filter		
11	Check fuel main valve functionality: • Brake air plane with the wedge and with brake pedals • Start engine (3000 RPM) and close the fuel main valve (take out safety wire); wait until engine stop Open the fuel main valve and make again the safety wire.		
NB	NOTE: the maximum allowed play in the flight controls system hinges is 0,6 mm; when a greater play is found, please contact the manufacturer		
	NOTE: before replace a loose or a corroded rivet, please contact the manufacturer		
	NOTE: if a skin panel crack is found, before next fly, please contact the manufacturer		

N.	DESCRIPTION	MECH.	CER. ST.
	NOTE: in the event of a hit on the wing leading edge, it has to be understood they don't reduce the wing structural resistance until they become more than 15 mm long over each 1 m wing span; they could slightly affect the in-flight aircraft's trimming; periodically check for a crack that could arise		

1.3.5 200 HOURS/12 MONTHS INSPECTION

NOTE: The 200 hours/12 months inspection requires that a 100 hours inspection (25 hours plus the 50 hours adding checks, plus the 100 hours adding checks) is carried out plus the checks below stated.

N.	DESCRIPTION	MECH.	CER. ST.
1	Check the fuel pipes, replace the fuel filter and the gascolator valve gasket		
2	Drain and refill the coolant fluid in the cooling system		
3	Replace the spark plugs		
4	Remove, clean and reinstall the oil reservoir		
5	Check carefully the silencer		

1.3.6 600 HOURS INSPECTION

NOTE: that inspection requires some mid-life engine checks ONLY be carried out as per the following table:

N.	DESCRIPTION	MECH.	CER. ST.
1	Check the carburettors' valve play; the valve must be replaced if the play exceeds 0.5 mm)		
2	Check the friction, if installed		

1.3.7 1.000 HOURS/72 MONTHS INSPECTION (AIRCRAFT OVERHAUL)

NOTE: the aircraft overhaul must be carried out by the manufacturer or by a specifically approved maintenance facility.

N.	DESCRIPTION	MECH.	CER. ST.

1.3.8 1.500 HOURS INSPECTION (ENGINE OVERHAUL)

NOTE: the engine overhaul must be carried out by the engine manufacturer only.

1.3.9. CONSUMER MATERIAL

- Engine oil:	Multigrade oil according to API classification(API SG or JASO MA). Castrol GPS
- Cooling liquid:	Castrol Long Life Coolant **Attention**: use EVANS NPG+ if showed on the label on the liquid bottle
- Brake liquid:	MINERAR BASIS OIL FOR HIDRAULIC USE (DO NOT USE SINTETIC OIL TYPE DOT4).
- Plug:	NGK DCPR7E (Rotax 912 UL) NGK DCPR8E (Rotax 912 ULS)