

FLY SYNTHESIS STORCH S

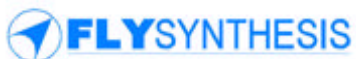


FLIGHT MANUAL

(for Rotax 912 UL and Jabiru 2200 engines versions)

04	17/07/08	Correction of aircraft data and refuelling procedure	C. Cosatto	C. Cosatto	C. Cosatto
03	20/12/06	Complete manual revision	M. Fiorindo	M. Fiorindo	C. Pinzana
02	01/dic/05	Correction of performances and limitations	M. Fiorindo	R. Ciotti	R. Ciotti
01	11/lug/05	Complete manual revision	M. Fiorindo	R. Ciotti	R. Ciotti
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REVISION					





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IDENTIFICATION:

Model:	FLYSYNTHESIS STORCH
Version:	STORCH S
Engine:	
Serial number:	
Registration:	
Date:	
Signature:	
Stamp:	



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LOG OF REVISIONS:

All the revisions to this flight manual MUST BE recorded in following table:

Revision n.	Revision	Date	Signature
01	Complete manual revision	July 05	M. Fiorindo
02	Correction of performances and limitations of engine and aircraft	Dic.05	M. Fiorindo
03	Complete manual revision	Dic.06	M. Fiorindo
04	Correction of descriptive aircraft datas and refueling procedure	July 08	C. Cosatto

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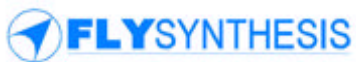
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1.1 INTRODUCTION

This manual contains the necessary information for a sure and efficient employment of the aircraft **FLYSYNTHESIS STORCH S ROTAX 912 UL 80 CV** and **STORCH S JABIRU 2200 85 CV**.

1.2 WARNINGS, SUGGESTIONS AND NOTES

The observance of this manual is **compulsory** for the aircraft's use.

FLYSYNTHESIS S.r.l. declines every responsibility for any damage to person and thing derived by a missed or partial observance of the prescriptions contained in this manual.

FLYSYNTHESIS S.r.l. reserves it, to terms of law, the exclusive ownership of this manual and also forbids the partial or integral reproduction of it and however to communicate it to competing firms without a preventive written authorization.

1.3 DESCRIPTIVE AIRCRAFT DATAS

TYPE OF AIRCRAFT

Storch S is ultra light aircraft with airframe, the wing and control surfaces in composite materials. The tail beam is made of aeronautical aluminum alloy, fixed on composite structure. The high wing with laminar profile and rectangular plant, is provided of ailerons and traditional flaps, the vertical tail control surface is composed by a fixed fin and by a mobile rudder, the horizontal tail control surface is completely mobile, hinged in the central part with integrated trim. The tricycle type landing gear is fixed, with damped nose wheel and with main legs in steel or aeronautical aluminium alloy.

DIMENSIONS (valid for Rotax 912 ULS and Jabiru 2200 engines)

General

Wing span: 9.320 m
Length: 5.950 m
Height: 2.450 m

Wing

Surface: 10.250 m²
Wing chord: 1.100 m
Wing load: 44.500 kg/m²

Flap

Surface: 0.620 m²
Span: 2.230 m
Chord: 0.280 m
Travel: 0° - 40°

Aileron

Surface: 0.410 m²
Span: 1.650 m
Chord: 0.250 m
Travel: down 17° / up 22°

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Stabilator

Surface: 1.650 m²
Span: 2.450 m
Chord: 0.700 m
Travel: down 12° / up 17°

Vertical fin (with rudder)

Surface: 1.120 m²
Height: 1.280 m
Mean chord: 1.930 m

Rudder

Surface: 0.600 m²
Height: 1.200 m
Mean chord: 0.480 m
Travel: +/-22°

WEIGHTS

	Rotax 912 ULS	Jabiru 2200
Empty weight	275 kg	272 kg
Maximum allowed weight in baggage compartment	12 kg	12 kg
Maximum Take Off Weight	450 kg	450 kg
Minimum single pilot weight	55 kg	55 kg

LANDING GEAR (valid for Rotax 912 ULS and Jabiru 2200 engines)

Type: Tricycle type landing gear with dampered nose wheel
Main gear track: 1.640 m
Wheelbase: 1.400 m
Tyre: Main: 4.00x6"
Nose wheel: 4.00x4"
Tyre pressure: Main: 2.2 - 2.4 bar
Nose wheel: 0.8 bar
Brakes: Main wheels disc.

FUEL PLANT (valid for Rotax 912 ULS and Jabiru 2200 engines)

Type: Two lines with mechanical and auxiliary electric fuel pump
Fuel plant draining system and return line system in the left tank
Refueling by fuel load pump
Tanks: Two integrated tanks in glass fibers with 45 liters of capacity for each tank
Fuel tank caps
Non-usable fuel: 2 liter for each tank
Fuel filter: Gascolator on firewall, entry fuel line filtered

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ELETRIC PLANT (valid for Rotax 912 ULS and Jabiru 2200 engines)

Type: 12 V CC eletric plant with starting battery
Electrical plant protected with fuses
External rectifier-regulator

POWERPLANT

Engine: Rotax 912 UL
Type: 4 strokes, 4 cylinder horizontal opposed, spark ignition engine, liquid cooled cylinder heads, ram air cooled cylinders, two constant depression carburettors, mechanical fuel pump, dry sump forced lubrication.
Ignition: eletric ignition system
Battery: 12 V
Standard propeller: DUC composite three blades propeller, diameter 1670 mm, ground variable pitch.
DUC composite two blades propeller, diameter 1670 mm, ground variable pitch
GT-2 wood two blades propeller, diameter 1660 mm, fixed pitch 1450 mm.

Engine: Jabiru 2200
Type: 4 strokes, 4 cylinder horizontal opposed, spark ignition engine, ram air cooled cylinders, 2 carburatori a depressione costante, two constant depression carburettors, mechanical fuel pump, warm air at carburettor system.
Ignition: eletric ignition system
Battery: 12 V
Standard propeller: DUC composite three blades propeller, diameter 1520 mm, ground variable pitch. DUC composite two blades propeller, diameter 1620 mm, ground variable pitch
GT-2 wood two blades propeller, diameter 1510/1520/1570 mm, fixed pitch 1050/1000 mm.

INSTRUMENTS (valid for Rotax 912 ULS and Jabiru 2200 engines)

Standard instruments: air speed indicator, altimeter, vertical speed indicator, magnetic compass, bank indicator, flap angular range indicator, two low fuel level amber lamp, CHT, EGT, RPM, oil temperature indicator, oil pressure indicator, fuel pressure indicator, engine run time indicator, 12 V aux socket.

OTHER STANDARD EQUIPMENTS (valid for Rotax 912 ULS and Jabiru 2200 engines)

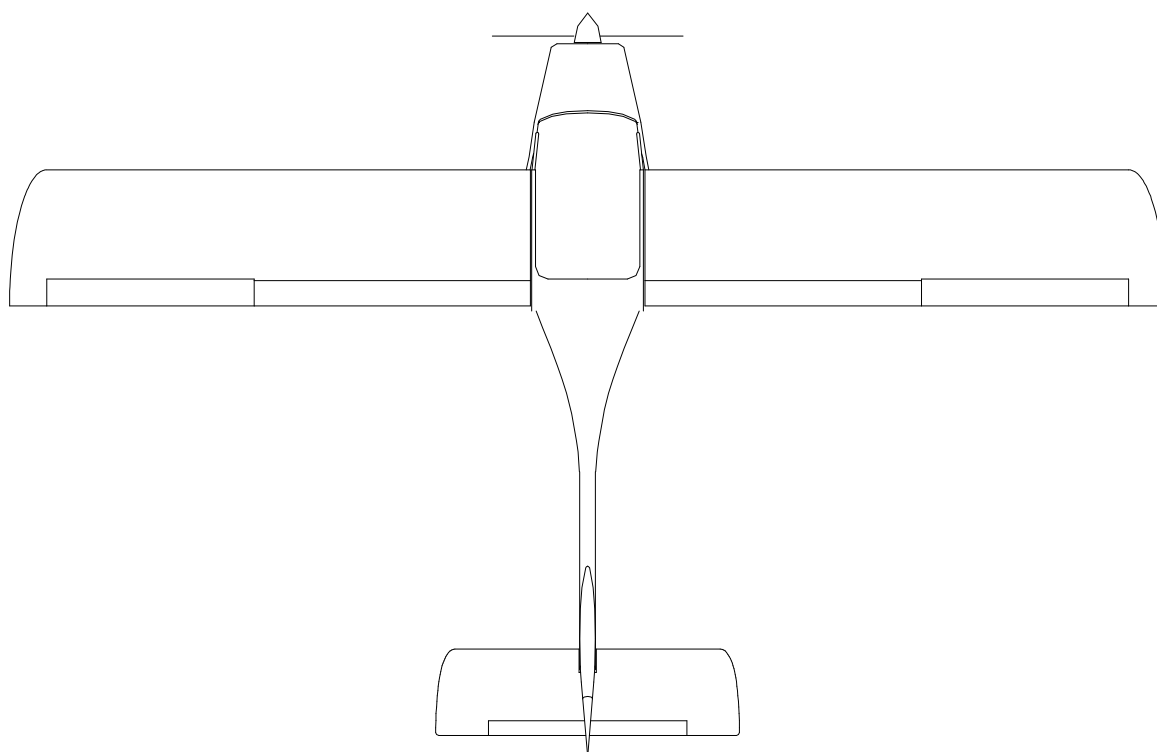
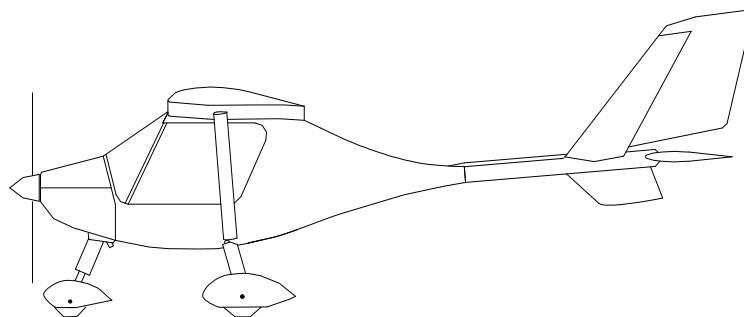
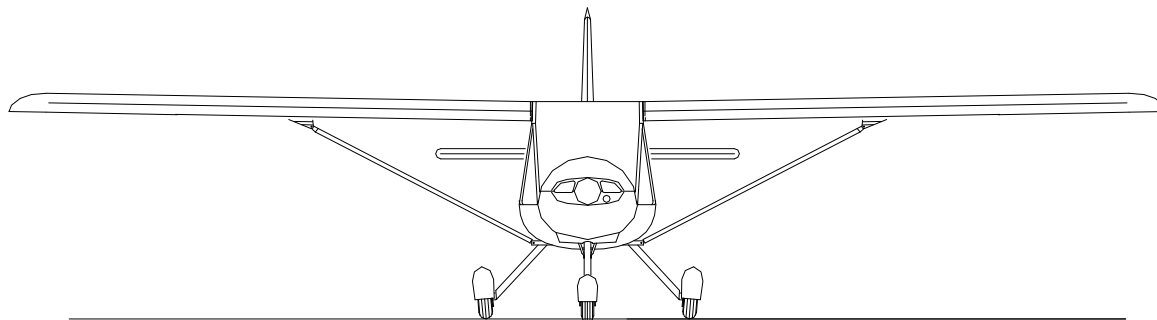
Main wheels and nose wheel fairings, main legs and nose camper aerodynamic fairing, four points safety belts, electric flap system (travel: 0° - 40°), manual trim regulation system, full moquette cabin covering, baggage compartment with baggage net.

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1.4 AIRCRAFT THREE VIEWS



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2.1 INTRODUCTION

This section contains the operational limitations and the instruments marking for use in safety condition the aircraft, the engine, the equipments and standard plant. The limitations of speed are been calculated following the BCAR-S rules, the structures are been tested following the same rules.

2.2 AIRSPEED LIMITATIONS

	Speed	Rotax 912 ULS IAS	Jabiru 2200 IAS	Notes
Vne	Never Exceed speed	220 km/h 118 KTS	220 km/h 118 KTS	Never exceed this speed in every condition or configuration
Vmo	Maximum Structural Cruising Speed	160 km/h 86 KTS	160 km/h 86 KTS	Never exceed this speed in turbulent air condition
Va	Manoeuvring speed	130 km/h 70 KTS	130 km/h 70 KTS	Do not use full stick and full rudder deflections above this speed
Vfe	Maximum speed with full flaps	105 km/h 57 KTS	105 km/h 57 KTS	Do not exceed this speed with flap extended
Vs	Stall speed without flap	65 km/h 35 KTS	65 km/h 35 KTS	Do not descende this speed without flap to avoid undesired stall conditions
Vs1	Stall speed in take off position (15°)	63 km/h 34 KTS	63 km/h 34 KTS	Do not descende this speed with flap in take off position to avoid undesired stall conditions
Vs0	Stall speed in landing position - full flap (40°)	59 km/h 32 KTS	59 km/h 32 KTS	Do not descende this speed with flap in landing position to avoid undesired stall conditions

2.3 ANEMOMETERS MARKING

(valid for Rotax 912 ULS and Jabiru 2200 engines)

Marking	Speed range (IAS)	Definition
White arc	[Vs0 - Vfe] 59 - 105 km/h [Vs0 - Vfe] 32 - 57 KTS	Speed range where flap may be extended
Green arc	[Vs - Vmo] 65 - 160 km/h [Vs - Vmo] 35 - 86 KTS	Speed range of normal operation
Yellow arc	[Vmo- Vne] 160 - 220 km/h [Vmo- Vne] 86 - 118 KTS	Manoeuvre the aircraft with great caution
Red line	[Vne] 220 km/h [Vne] 118 KTS	Maximum speed allowed

2.4 POWERPLANT AND PROPELLER LIMITATIONS

(Refer always to Rotax's or Jabiru operator manual)

Engine manufacturer:	Rotax Bombardier	Jabiru Aircraft
Engine model:	912 UL	2200
Maximum take off power:	60 kW	63.4 kW
Maximum continuos power:	58 kW	63.4 kW
Maximum take-off RPM:	5800 rpm	3300 rpm

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Maximum continuous RPM:	5500 rpm	3300 rpm
Minimum cylinder head temperature:	150°C	200°C
Maximum oil temperature:	140°C	118°C
Minimum oil pressure:	1.5 bar	2.2 bar
Maximum oil pressure:	7 bar	5.25 bar
Minimum fuel pressure:	0.15 bar	0.05 bar
Maximum fuel pressure:	0.4 bar	0.2 bar
Usable type of fuel:	minimum 95 RON	minimum 95 RON
Usable type of oil:	See engine manual specifications	

Propeller manufacturer:	DUC Hélices	GT Propellers
Propeller model:	Carbon three-blades	Wood two-blades
	Carbon two-blades	
	Ground variable pitch	Fixed pitch
Maximum diameter:	1670 mm	1660 mm

2.5 POWERPLANT INSTRUMENTS MARKING

Rotax 912 UL engine version

Strumento	Red line Inf. limit	Inf. yellow arc -Caution	Green arc-normal operations	Sup. yellow arc -Caution	Red line Sup. limit
RPM indicator	nd	nd	1.400 - 5.500 rpm	5.500 - 5.800 rpm	5.800 rpm
Fuel pressure gauge	0.15 bar	nd	0.15 - 0.4 bar	nd	0.4 bar
Oil pressure gauge	0.8 bar	0.8 - 2 rpm	2 - 5 bar	5 - 7 rpm	7 bar
Oil temp. gauge	50°C	50° - 90°C	90° - 100°C	110° - 140°C	140°C
CHT	50°C	nd	50° - 100 °C	110° - 150°C	150°C

Jabiru 2200 engine version

Strumento	Red line Inf. limit	Inf. yellow arc -Caution	Green arc-normal operations	Sup. yellow arc -Caution	Red line Sup. limit
RPM indicator	nd	nd	900 - 3.300 rpm	nd	3.300 rpm
Fuel pressure gauge	0.05 bar	nd	0.05 - 0.2 bar	nd	0.2 bar
Oil pressure gauge	0.8 bar	nd	2.2 - 5.25 bar	nd	5.25 bar
Oil temp. gauge	15°C	15° - 80°C	80° - 100°C	100° - 118°C	118°C
CHT	50°C	nd	50° - 180 °C	180° - 200°C	200°C
	Below 70% of power		Above 70% of power		
EGT	680° - 750°C		640° - 780°C		

2.6 WEIGHT LIMITATIONS

	Rotax 912 ULS	Jabiru 2200
Empty weight	275 Kg	272 Kg
Maximum fuel weight	46 Kg	46 Kg
Maximum allowed weight in baggage compartment	12 Kg	12 Kg
Maximum Take Off Weight	450 Kg	450 Kg

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2.7 CENTER OF GRAVITY LIMITATIONS

With the purpose to get the best performances of flight and operations in complete safety, according to the procedures described in this manual, the aircraft must have employed respecting all the schemes of load and balancing pointed out in the following pages.

Pilot must consider the limit of weighing and all correlated parameters.

Before the delivery of the airplane, centre gravity position and weight of the airplane are verified.

NOTE: Empty weight & Centre gravity position must be updated after a new weighing, in the following case:

- Substitution and/or modify of one or plus accessories and equipment;
- After painting or reparations of fuselage.

Weight and Centre Gravity position must be reported after every relief in the weighing report inside this manual only by authorized personnel.

The location of the CG can be defined by reference to the % MAC.

Maximum anterior limit: 30% M.A.C. correspondent to 330 mms

Maximum back limit: 36% M.A.C. correspondent to 396 mms

For methodology and conditions for weight and balance procedure, see section 6.

2.8 MANOEUVRE LIMITATIONS

All aerobatics maneuvers are prohibited.

The normal flight operations are the followings:

- Every connected manoeuvre to the normal flight operation,
- Stalls, with exclusion of the accelerated stall (superior to 1 g)
- Low speed eight figure, chandelle, turns below 60°

The use of the aircraft has to be conforming with the Rules of the State within it fly.

WARNING

Flight in known icing conditions, snow and heavy rain is prohibited.

The pilot is responsible for determining the airworthiness of the aircraft for each flight including on board fuel lever verification.

All maneuvers at load factor less than - 0.5 g, must be performed for no longer than 5 seconds.

In single pilot operation, belt and shoulder harness of the vacant seat must be secured to avoid uncontrolled movement of seat back and belt.

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2.9 LOAD FACTOR LIMITATIONS

The load factors limit used for the calculation of the structures are conforming with BCAR-Section S rules:

Flap retracted

- Maximum positive load factor **4.0 (+)**
- Maximum negative load factor **2.0 (-)**

Flap extended

- Maximum positive load factor **2.0 (+)**
- Maximum negative load factor **0.0 (+)**

2.10 CREW

The minimum crew for flight operations is a person. The owner can choose the place of pilotage to the right or to the left. The maximum number of people permitted on board is two.

2.11 PLACARDS

**FLY SYNTHESIS**

Storch S s/n: _____ Fuselage s/n: _____
Date of manufacture: _____

**FLY SYNTHESIS**

BAGGAGE COMPARTMENT
Maximum 12 Kg

Evenly distributed

**FLY SYNTHESIS**

Engine type: _____
Engine s/n: _____
Propeller type: _____
Blades s/n: _____
Semi-Hub s/n: _____

**FLY SYNTHESIS**

Vs, Stall speed without flap	65 Km/h (35 KTS)
Va, Design manoeuvring speed	130 Km/h (70 KTS)
Vfe, Maximum extended flap speed	105 Km/h (57 KTS)
Vne, Never exceeded speed	220 Km/h (118 KTS)
Range of center of gravity	30% - 36%
Maximum take off weight	450 Kg

All aerobatic manoeuvres including intentional spinning
are prohibited.

See Flight Manual for other limitations.

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3.1 INTRODUCTION

The emergency situation are extremely rare if daily pre-flight controls are meticulously effected by the pilot responsible of the aircraft and if he has been made a correct ordinary maintenance and, eventually, not ordinary maintenance. This section contains the operations to meticulously follow if a situation of emergency income. Such situations of emergency are separated for typology.

3.2 GROUND EMERGENCY PROCEDEDURES

ENGINE ON FIRE

- | | |
|---|---------------|
| 1. Fuel tank faucet | - Close |
| 2. Electric fuel pump | - Off |
| 3. Cabin heating | - Off |
| 4. Throttle | - All forward |
| 5. Master switch | - OFF |
| 6. Ignition magnets key | - OFF |
| 7. Get out of aircraft immediatly | |
| 8. If possible, use an extinguisher to extinguish the fire. | |

WARNING:

Not remove the engine cowling until the complete extinction of the fire.
Don't use water to extinguish the fire.

3.3 TAKE OFF EMERGENCY PROCEDURES

TAKE OFF INTERRUPTION (during take off run)

- | | |
|-------------------------|--|
| 1. Throttle | - All rearward (reduce to minimum RPM) |
| 2. Brakes | - Brake avoiding to stop the wheels |
| 3. Flap | - Retract |
| 4. Ignition magnets key | - OFF |
| 5. Master switch | - Off |
| 6. Fuel tank faucet | - Off |

ENGINE FAILURE DURING TAKE OFF (after rotation - below 50 mt)

- | | |
|---|----------------|
| 1. Fuel tank faucet | - Close |
| 2. Electric fuel pump | - Off |
| 3. Master switch & ignition magnets key | - Off |
| 4. Safety belts | - Tighten well |
5. Maintain a rectilinear line of flight, without turning if possible, and if the area allows it, get ready to a forced landing (see relative paragraph)

ENGINE FAILURE DURING TAKE OFF (during climb)

If the heighth allows it, procede in the following way:

- | | |
|-----------------------|------------------------------|
| 1. Best glide speed | - Km h 105 (57 KTS) |
| 2. Electric fuel pump | - Verify ON |
| 3. Fuel tank faucet | - Verify RH tank faucet open |
| 4. Fuel tank level | - check fuel quantity |

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- | | | |
|----|------------------------|---------------------------------|
| 5. | Fuel pressure | - Verify within limits |
| 6. | Ignition magnets key | - Verify ON |
| 7. | Throttle | - Position warm engine starting |
| 8. | Engine start procedure | |

*- If the engine immediately start up, climb to safety height and land ASAP for a check.
- If the engine doesn't start up choose a proper zone to an emergency landing and procede as follows:*

- | | | |
|-----|--------------------------------------|-----------------------------|
| 9. | Flap | - As necessary (30° or 40°) |
| 10. | Fuel tank faucet | - Close |
| 11. | Electric fuel pump | - Off |
| 12. | Master switch & ignition magnets key | - Both Off |

WARNING:

- Landing AS SOON AS POSSIBLE in case of fire on board.
- Never perform a turn of 180° to low height to try to return on runway.

3.4 DURING FLIGHT EMERGENCY PROCEDURES

ENGINE ROUGHNESS/ ENGINE SHUTDOWN

- | | | |
|-----|--|---------------------------------|
| 1. | Throttle | - Check position and friction |
| 2. | Check engine instruments | - Check parameters |
| 3. | Choke lever | - OFF / All rearward |
| 4. | Fuel tank faucet | - Select more full tank |
| 5. | Electric fuel pump | - ON |
| 6. | Fuel pressure | - Verify within limits |
| 7. | Warm air to carburettors | - ON |
| 8. | Ignition magnets key | - Both / Verify |
| 9. | Master switch | - Verify / ON |
| 10. | Throttle | - Position warm engine starting |
| 11. | Start | - Operate start procedure |
| 12. | Check all the engine parameters and land as soon as possible for a check | |

If the engine doesn't start up choose a proper zone to an emergency landing procedure

ENGINE ON FIRE

- | | | |
|----|--------------------------------------|---------------------|
| 1. | Fuel tank faucet | - Close |
| 2. | Electric fuel pump | - Off |
| 3. | Throttle | - All forward |
| 4. | Vent system | - All closed |
| 5. | Cabin heating system | - Off |
| 6. | Master switch & ignition magnets key | - Off |
| 7. | Best glide speed | - Km h 105 (57 KTS) |
| 9. | Landing ASAP | |

Non tentare la riaccensione del motore dopo un principio di incendio ma prepararsi per un atterraggio di emergenza.

STALL RECOVERY PROCEDURE

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1. Apply full power to reduce the loss of height.
2. Push softly forward the cloche to eliminate the stall conditions.

NON INTENTIONAL SPIN RECOVERY PROCEDURE

Warning: don't try to stop the rotation using the ailerons opposition

1. Throttle - At minimum RPM
2. Rudder pedals - All opposed to the sense of rotation
3. Cloche - Neutral, softly to dive
4. When the rotation stops and the aircraft is under control, return to level flight,

WARNING: do not overcome the Vne speed.

3.5 ELETTRIC PLANT FAILURE

GENERATOR WARNING LAMP LIGHTING

1. Voltmeter - Check (if installed)
2. Not necessary electric consumption - Off
3. Landing ASAP

The battery guarantees the operation of trim, flap and pump fuel auxiliary for about 20 minutes.

OVERTENSION (Voltmeter indication [if installed] over 16 V)

1. Master switch - Off
2. Voltmeter - Verify the decrease of voltage
3. Master switch - On
4. Voltmeter - Verify the increase of voltage (within limits)

If the check to the precedent point (4.) has negative result, proceed as it follows

5. Not necessary electric consumption must be excluded
6. Landing ASAP

The battery guarantees the operation of trim, flap and pump fuel auxiliary for about 20 minutes.

LOW TENSION IN FLIGHT

1. Possible causes
 - Excessive consumption (Too electric consumptions)
 - Damage of the alternator
 - Interrupted fuse
2. Landing ASAP

LOW TENSION ON GROUND

1. RPM - Reduce
2. Navigation and landing lights - Off
3. Voltmeter - Verify within limits
4. If the check has negative result - Shutdown engine

ELECTRIC PLANT ON FIRE

You can recognize the fire to the electric plant with this informations: white smoke and burnt plastic odor.

1. Master switch - Off
2. Vent system - All open
3. Cabin heating - Off
4. Landing ASAP

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WARNING: get ready to a landing without flaps and trim (if electric).

SMOKE ELIMINATION FROM CABIN

1. Vent system - All open
2. Cabin heating - Off
3. Master switch - Off
4. If the smoke remain dense land immediately

WARNING: absolutely do not open the canopy

3.6 LANDING EMERGENCY PROCEDURES

LANDING WITHOUT FLAPS

1. Verify flap/trim circuit breaker - ON
2. Verify the position of both the flaps visually

With flaps in symmetrical position (both retracted or extracted with the same angle)

3. Try to retract the flaps
4. Verify that there is enough free space from obstacles for landing
5. Landing as a normal condition but maintain a landing speed not inferior at 90 Km/h (48 KTS)

LANDING WITH DEFLATE TIRE

1. Landing as a normal condition
2. Before the ground contact shutdown the engine and turn off electric consumption
3. Landing maintaining high, until is possible, the side of the deflate tire
4. Get ready to a tendency of yawed by the side of the deflate tire
5. Maintain the directionality with rudder
6. If nose wheel is deflate pull cloche, trying to maintain the nose wheel in a central position.

FORCED LANDING

1. Best glide speed - Km h 105 (57 KTS)
2. Safety belts - Tighten well
3. Throttle - All rearward
4. Fuel tank faucet - Closed
5. Electric fuel pump - Off
6. Master switch & ignition magnets key - Off

Choose a proper zone to a forced landing, make sure that the area is free and sure

7. Flap - As necessary
8. Trim - As necessary
9. Final - Check velocity
10. Landing - Check velocity (atleast 70 Km/h (38 KTS), flap with 40°).

The contact with the ground has to happen to the minimum possible speed, maintaining lifted the nose wheel the for a longer time possible.

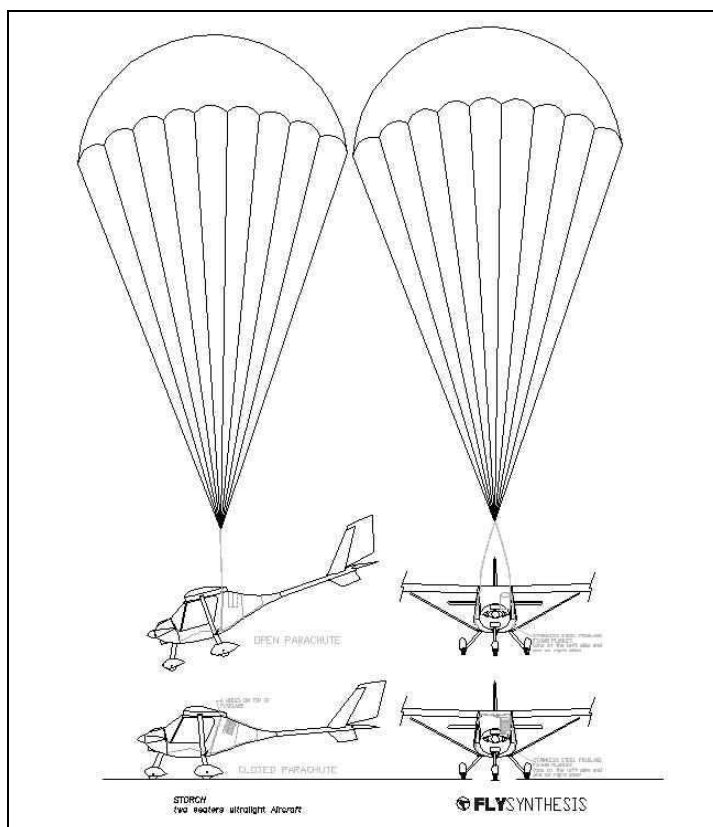
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3.7 OPENING PARACHUTE PROCEDURE (IF INSTALLED)

The emergency parachute is situated in the left back part behind the canopy, situated in a special container drawn inside the fuselage. The emergency parachute is fixed to the aircraft through four Kevlar ropes, passing in the external part of the fuselage, attached to antitorsional tube of the wing. The emergency parachute must be used only in case of complete loss of the control of the aircraft.



- Shutdown the engine (magnetos OFF)
- Pull red handle among the two seats, at least 20 centimeters,
- Close both fuel faucets
- Tighten the safety belts
- Shutdown the electric plant (Master OFF)
- To crouch and to protect the face with the hands

For further information and notes on the maintenances to consult the parachute manual.

3.8 OTHER EMERGENCY

OIL TEMPERATURE & PRESSURE IN YELLOW ARC OR REL LINE

If the oil pressure is low (yellow arc) but the oil temperature is in normal operation range (green arc)

- Landing following a normal procedure.

If the pressure indication is too much low or too much high (red arc)

- Land ASAP and get ready for a forced landing (see relative paragraph)

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LOW FUEL PRESSURE

1. Electric fuel pump - On
2. Fuel tank faucets - Open alternately the faucets for check the fule circuit
3. Fuel pressure - Check within limits

If the fuel pressure do not reach the normal operation range, landing **ASAP**

UNINTENTIONAL FLIGHT WITHIN ICING CONDITIONS

Flight in known icing conditions, snow and heavy rain is prohibited. If you meet unintentional icing condition during the flight, descend as soon as possibile to a lower height. If the wing leading edge and the stabilator leading edge are covered by icing formations, remeber that stall speed will increase, you will need more engine power to maintain the same velocity and the manoeuvrability of the airplane will decrease.

1. Carburettor heating system (if installed) - On
2. Engine RPM - Maintain the maximum continuos engine power
3. Cabin heating (if installed) - On
4. Move all control surfaces to break eventually icing formations.

ICING FORMATIONS ON CARBURETTORS

You can recognize icing formations on carburettors if RPM decresing without moving the throttle. You can find this phenomenon during a descent with low RPM in a day with a lot of humidity.

1. Carburettor heating system (if installed) - On
2. Throttle - All forward when RPM start to increase
3. Carburettor heating system (if installed) - Off
4. Repristinate normal flight conditions

ANOMALOUS ENGINE VIBRATIONS

1. Verify the reduction of the vibrations with a reduction of the RPMs
2. Landing as soon as possible
3. Get ready to an possible engine failure and to a forced landing

LANDING WITH BRAKE SYSTEM FAILURE

1. Look for a long grassy runway with absence of obstacles (the grass has a light braking action)
2. Land with the flaps to the maximum extension and the least maintenance speed

After touch the ground

3. Master switch & ignition magnets key - Off

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SECTION 4

Normal procedures

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4.1 INTRODUCTION

This section contain the informations for the normal flight conditions and the check list to follow before every flight.

4.2 SPEED FOR NORMAL EMPLOYMENT

Except otherwise suitable, the following speeds refer to the maximum weight of take-off equal to 450 Kgs and can be used for any inferior weight.

Take off (Flap 15°)

Rotax 912 ULS and Jabiru 2200

Rotation	75 Km/h (40 KTS)
Speed at 50 ft (15 m) obstacle	80 Km/h (43 KTS)

Climb, (Flap retracted)

Best angle of climb speed V_x , (5° flap),	95 Km/h (51 KTS)
Best rate of climb speed V_y , (0° flap)	125 Km/h (67 KTS)

Cruise

Manoeuvring speed (V_a)	130 Km/h (70 KTS)
Max speed in turbulent air conditions (V_{mo})	160 Km/h (86 KTS)
Never Exceeding Speed (V_{ne})	220 Km/h (118 KTS)

Landing approach	105 Km/h (57 KTS)
Landing (Flap 40°)	80 Km/h (43 KTS)
Touch & go (Maximum power, flap 20°)	85 Km/h (46 KTS)
Maximum demonstrated crosswind velocity	28 Km/h (15 KTS)

4.3 FUEL CIRCUIT DRAINING PROCEDURE AND REFUELLING OPERATIONS

The fuel circuit draining procedure must have effected before the first flight of the day, 10 minutes after the refuelling and if the aircraft has remained parked for more than three hours among two flights.

The fuel circuit draining is performed through the gascolator filter, situated in the right inferior part of the firewall. Use a transparent and clean container, drain about 80 - 100 ccs of fuel. Verify the absence of water.

Warning: Perform the fuel circuit draining operation before moving the airplane from the parking area, to avoid that the condensates water present on the fuel tanks will emulsify with the fuel. Repeat the fuel circuit draining operation one or more times.

Refuel through the fuel filler located on the upper layer of the wings, either by jerry cans or directly with the gasoline pump. An optional on board electric fuel refilling pump may also be used.

CAUTION: As the Storch S employs an overflow fuel system that returns excess fuel to the left hand side tank, it is recommended to always use the left side fuel tank. When the left tank is near empty use the right tank. To avoid the left tank being overfilled with excess fuel, frequently alternate the use of both fuel tanks during the cruise. The drawing of fuel simultaneously from both tanks is not recommended.

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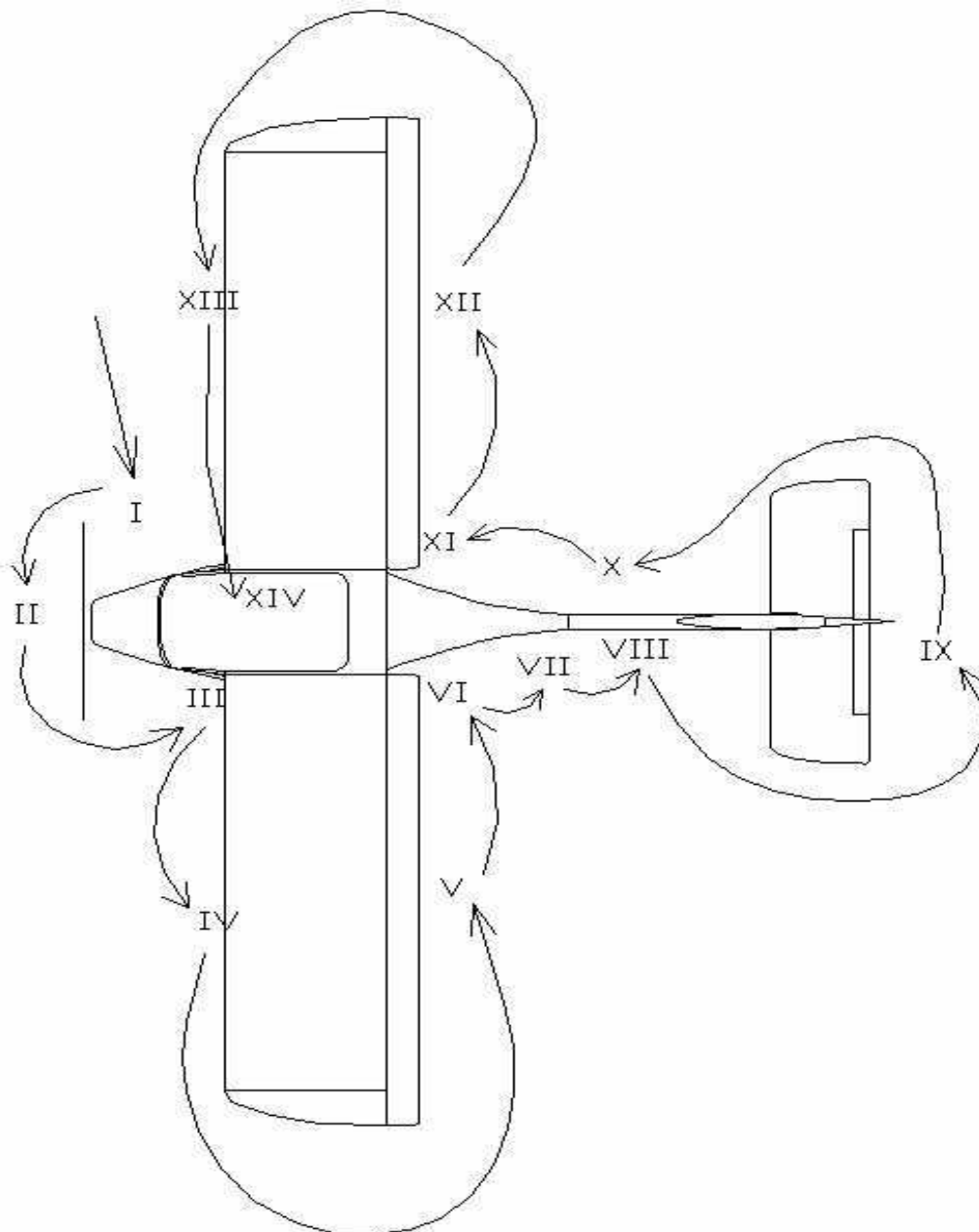
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4.4 PRE-FLIGHT INSPECTION

WARNING

Before every flight pilot must check completely the airplane with great attention and accuracy.
In this section there is a standard pre-flight check list. (Valid for each version)



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The pre-flight inspections must have effected **BEFORE EVERY FLIGHT**. The pilot is responsible of such inspections.

The inspection doesn't need of some particular tool, but it is important to verify that there are not evident defectiveness or problems that can engrave on the safety of the flight.

Remove all the protections

1. pitot-cover,
2. wheels stops,
3. mobile surfaces stops,
4. windshiel covering,
5. propeller protection,
6. fuel draining procedure.

Fuselage: left forward side (I)

Fixing axle bolts	check correct tightness
Wheel fairing	good conditions and free space between the wheel and it.
Tire	general good condition, inflated correctly
Dumper	no signs of cracks or distorsion, free movement
Nose wheel support structure	no signs of cracks or distorsion.
Alignment	check dumper-rudder alignment

Fuselage: frontal side (II)

Hub & blades	no signs of cracks & clean.
Spinner	no signs of cracks, fixed correctly

Fuselage: right forward side (III)

Upper cowl	remove
Oil tank	check level (for Rotax 912 UL remove the cap inside fuselage)
Refrigerant tank	check level (for Rotax 912 UL remove the cap inside fuselage)
Radiator and air inlet	no signs of cracks, free from obstructions
Engine	clean, no oil or refrigerant leakage
Muffler & silencer manifold	no signs of cracks, muffler hooked.
Oil and refrigerant tube system	correct functionality, no leakage
Ignition & electric plant	correct functionality.
Throttle & choke cables	free movement
Upper cowl	reinstall and check tightness

Right wing: forward side (IV)

Wing surface	absence of buckling absence of delaminations
Leading edge	absence of delaminations,
Hybrid Wing	check rivets on wing surface
Wing strut mount	check joint, no signs of cracks
Anemometric sonde	no defects, fixed correctly, check tubes joint

Right wing: rearward side (V)

Trailing edge	absence of delaminations, no signs of cracks
Flap & aileron	absence of delaminations, no signs of cracks, free movement, no excessive play on hinges, fixed correctly, balancing mass fixed correctly, <u>no signs of lateral movement.</u>

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Right main landing gear (VI)

Leg no distorsion, bolts locked, no sign of cracks on the weldings
Brake assembly condition and tightness
Tire general good condition, inflated correctly
Wheel fairing good conditions and free space between the wheel and it.

Fuselage: tail beam (VII)

Tail beam Check joint tail beam/fuselage
Bowden cables Check fixing

Empennage (VIII)

Vertical fin absence of buckling, absence of delaminations, check all rivets
Rudder absence of delaminations, hinges fixed correctly
Lower the tail of the aircraft to lift the nose wheel, check the free movement of the rudder, any problem on the hinge.
Bowden cables fixed correctly.
Stabilator free movement during all travel range, absence of buckling, absence of delaminations
Stabilator hinge absence of delaminations, fixed correctly, no play
Balancing mass fixed, no play
Hinge pins fixed correctly

Empennage (IX)

Trim tab free movement, absence of defects, no play.
Stabilator trailing edge absence of delaminations

Fuselage: tail beam (X)

Repeat point (VII)

Left main landing gear (XI)

Repeat point (VI)

Left wing: rearward side (XII)

Repeat point (V)

Left wing: forward side (XIII)

Repeat point (IV)

Check inside cabin (XIV)

Instruments panel fixed correctly, all placards
Master switch ON all instruments ON
Master switch OFF all instruments OFF
Cloche free movement, fixed correctly in its support
Rudder pedals no distorsion, no signs of cracks, correct functionality, fixed correctly in its support, correct functionality of centring system.
Throttle & choke levers free movement, fixed correctly in them support
Brake lever and parking brake Remove parking brake lock, check lever functionality. Insert parking brake.
Trim lever check correct functionality
Safety belts check correct functionality
Seats fixed correctly.

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Windshield	clean, fixed correctly on fuselage
Doors	clean, fixed correctly on fuselage, check locked system
Luggage	secured.
Weight&balance	calculated.
Flight book	record the effected control.

BEFORE STARTING ENGINE

Pre-flight check	- completed
Seats	- adjusted
Safety belts	- adjusted and fastened
Doors	- closed and locked
Parking brake	- ON
Flight controls	- free
Fuel faucets	- LH open, RH closed
Trim	- Neutral

ENGINE START

Choke lever:	engine cold	- ON (all rearward)
	Engine warm	- OFF (all forward)
Electric fuel pump		- ON for 10 sec. then OFF
Throttle		- At minimum + 1 cm.
Master key		- ON
Generator warning lamp		- ON
Ignition magnets switch		- each magnets ON

Warning: Ensure that the propeller area is clear of any person or object

Start button	- Max 20 sec., to attend one minute before retrying
Throttle	- 2500 RPM for R912 UL -1200 RPM for Jabiru 2200
Oil pressure	- Green arc in 5 sec.
Generator warning lamp	- OFF
Electric fuel pump	- OFF

BEFORE TAXIING

Electrical system	- ON and checked
Navigation instruments	- checked
Flaps	- Posizione di decollo (15°)
Parking brake	- OFF

TAXIING

Brakes	- check both operate equally
Flight control	- free full movement, stick and pedals
Flight instruments	- Check magnetic compass, bank indicator gyro, setting altimeter
Throttle	- As necessary

ENGINE CHECK

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Jabiru 2200

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Parking brake	- ON	- ON
Fuel tank faucets	- LH Open, RH Closed	- LH Open, RH Closed
Temperature & pressure	- Within limits, in green arc	- Within limits, in green arc
Trim	- Neutral	- Neutral
Flight controls	- Free	- Free
Check magnets	- 4000 RPM maximum decrease 300 RPM for each magnets	- 2000 RPM maximum decrease 300 RPM for each magnets
Throttle	- All forward, check minimum 5000 RPM +/- 150 for 5 sec.	- All forward, check minimum 3000 RPM +/- 150 for 5 sec.
Check minimum RPM	- 1400 RPM	- 900 RPM

WARNING

Don't apply full power before 60° C of CHT.

Don't allow, during the engine heating and taxing, to reach 135° C of CHT.

BEFORE TAKE-OFF

Flight controls	- Free
Trim	- Neutral
Electric fuel pump	- ON
Flaps	- Set for take-off (15°)
Fuel tank faucets	- LH Open, RH Closed
Engine instruments	- Within limits
Flight instruments	- Check an regulated
Safety belts	- adjusted and fastened
Canopy	- check 4 locks are engaged and locked
	- Check canopy open lamp OFF
Parking brake	- OFF

TAKE-OFF

Aircraft	- Align with runway
Throttle lever	- Full open smoothly
At 75 km/h (40 KTS)	- Rotation

Warning: for a take off from short runway with an obstable of 15 m, use flap with 20°.

- Rotation	- 75 km/h (40 KTS)
- Climb speed	- 90 km/h (48 KTS) (V _x)

At an altitude of 100 m (300 ft), if a steep climb is necessary to clear obstacles

Flaps	- Up
Trim	- As necessary
Speed	- V _x (flap 5°) or V _y (flap 0°)
Throttle	- As necessary
Electric fuel pump	- Off

Note : Don't maintain the flaps extended with speed higher than 105 km/h (57 KTS) (V_{fe}).

CLIMB

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	Rotax 912 ULS	Jabiru 2200
Engine RPM	- 5000 RPM.	- 3000 RPM.
Engine instruments	- Within limits	- Within limits
Trim	- As necessary	- As necessary
CRUISE		
	Rotax 912 ULS	Jabiru 2200
Throttle	- As necessary	- As necessary
Engine RPM	- Max continuous power 5500 RPM	- Max continuous power 3300 RPM
Engine instruments	- Within limits	- Within limits

WARNING

Check frequently engine instruments, do not overcome limits. Check fuel tank level.

DESCENT

Altimeter	- Setting
Warm air at carburettor system	- As necessary
Throttle	- As necessary
Trim	- As necessary
Engine instruments	- Within limits

LANDING

Speed	- 105 km/h (57 KTS)
Flap	- As necessary
Trim	- As necessary
Throttle	- As necessary
Electric fuel pump	- ON
Parking brake check (see note b)	- Check
Final Approach speed	- 90 km/h (48 KTS)
Touch down speed	- 75 km/h (40 KTS)

NOTE:

- a) In condition of strong lateral wind or in presence of wind-shear, increase the landing speed at least of 10 km/h. (5 KTS)
- b) Before landing check pressure plant make two series of complete movement of brake lever, to control if inside hydraulic plant there are pressure.

TOUCH & GO

Throttle	- All forward
Trim	- As necessary
Flap	- 15°
Speed	- V _x (flap 5°) o V _y (flap 0°)

If you touch the ground repeat take off procedure.

AFTER LANDING

Throttle	- Idle
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Flaps	- UP
Electric fuel pump	- OFF
Brakes	- Check functionality with “warm brakes”

ENGINE SHUTDOWN

Throttle	- Idle
Parking brakes	- ON
Electrical consumers	- OFF
Magnets	- OFF (one by one)
Master switch	- OFF
Fuel tank faucets	- closed

4.5 FLIGHT INSIDE OF HEAVY RAIN

Flying inside heavy rain, the visibility and performances of the flight are reduced. Reduce speed until 150 Km/h (81 KTS). Remember to increase the landing speed at least of 10 Km/h (5 KTS) with wet wing. **The activity of flight inside intense heavy rain is forbidden.**

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SECTION 5 - Performances

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5.1 General informations

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5.1 GENERAL INFORMATION

This section contains all the performance data required for accurate pre-flight planning.

SCHEME OF TAKE-OFF & LANDING PHASES

Figure 5-1 show the take-off and landing phases and medium value recorded

SPEED CONVERSION (DENSITY ALTITUDE)

The density altitude chart (figure 5-2) is provided to determine the density altitude for outside air temperature and pressure altitude combinations.

UNIT CONVERSION

Figure 5-3 shows the linear scales for conversion of [Km/h – KTS – m/s].

Figure 5-4 shows the linear scales for conversion of [m/s - feet/min and KTS – m/s].

Figure 5-5 shows the linear scales for conversion of [m –feet].

DEMONSTRATED CROSS WIND COMPONENT

The maximum demonstrated crosswind is 32 Km/h or 17 KTS

Figure 5-6 shows the RELATIVE WIND DIAGRAM VERSUS WIND COMPONENT

ENVELOPE DIAGRAM

Figure 5.7 shows the envelope diagram.

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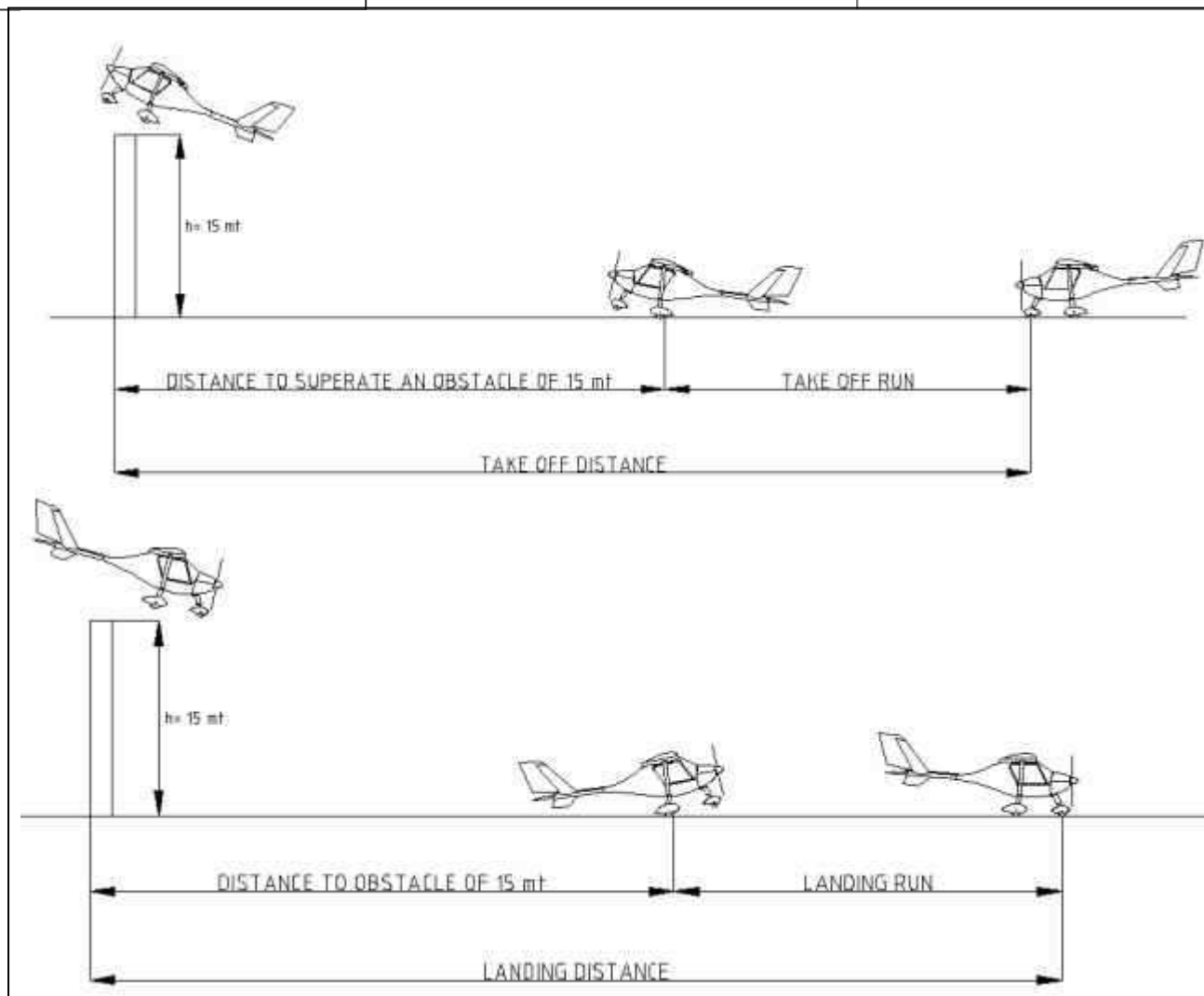


Figure 5-1

Take off run	Take off distance	Take off speed
140 m	250	85 Km/h
Landing distance	Landing run	Landing speed
200 m	125 m	90 Km/h

Note: remember that speed and distances are indicative

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SPEED CONVERSION (DENSITY ALTITUDE)

This table help you to calculate the TAS (true airspeed) from the IAS (indicated airspeed) using the simplified formula:

$$TAS = IAS * \text{Cor. factor}$$

ICAN (international comitee for air navigation) temperatures, relative pressure, relative density and IAS to TAS correction factors as related to altitude

Altitude		Temperature		Relative pressure	Relative density	Cor. factors
feet	metres	°C	°F			
-2.000	-610	18,96	66,13	1,074	1,059	0,971
-1	-305	16,98	62,56	1,036	1,029	0,995
0	0	15	59	1	1	1
1.000	305	13,01	55,43	0,964	0,971	1,014
2.000	610	11,03	51,86	0,929	0,942	1,029
3.000	914	9,056	48,30	0,896	0,915	1,045
4.000	1219	7,075	44,73	0,863	0,888	1,061
5.000	1524	5,094	41,16	0,832	0,861	1,077
6.000	1829	3,113	37,60	0,801	0,835	1,090
7.000	2134	1,132	34,03	0,771	0,810	1,110
8.000	2438	-0,850	30,47	0,742	0,785	1,128
9.000	2743	-2,831	26,90	0,714	0,761	1,145
10.000	3090	-4,812	23,33	0,687	0,738	1,163
11.000	3353	-6,793	19,77	0,661	0,715	1,182
12.000	3658	-8,774	16,20	0,635	0,693	1,201
13.000	3916	-10,75	12,64	0,611	0,671	1,220
14.000	4267	-12,73	9,074	0,587	0,649	1,240
15.000	4572	-14,71	5,507	0,564	0,629	1,260
16.000	4877	-16,69	1,941	0,541	0,608	1,281
17.000	5182	-18,68	-1,625	0,520	0,589	1,302

Figure 5-2

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STORCH S

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UNIT CONVERSIONS

kilometers per hour (km/h) - knots (kts) - metres per sec. (m/s)

km/h	kts	m/s	km/h	kts	m/s	km/h	kts	m/s
1,853	1	0,37	63,00	34	18,34	124,16	67	36,15
3,706	2	1,07	64,06	35	18,80	126,01	68	36,69
5,560	3	1,61	66,71	36	19,42	127,87	69	37,23
7,413	4	2,15	68,56	37	19,96	129,72	70	37,77
9,266	5	2,69	70,42	38	20,50	131,57	71	38,31
11,11	6	3,23	72,27	39	21,04	133,43	72	38,86
12,97	7	3,77	74,12	40	21,58	135,28	73	39,39
14,82	8	4,31	75,98	41	22,12	137,13	74	39,93
16,67	9	4,85	77,83	42	22,66	138,99	75	40,47
18,53	10	5,39	79,68	43	23,20	140,84	76	41,01
20,38	11	5,93	81,54	44	23,74	142,69	77	41,54
22,23	12	6,47	83,39	45	24,28	144,55	78	42,08
24,09	13	7,01	85,24	46	24,82	146,40	79	42,62
25,94	14	7,55	87,10	47	25,36	148,25	80	43,16
27,79	15	8,09	88,95	48	25,90	150,10	81	43,70
29,65	16	8,63	90,80	49	26,44	151,96	82	44,24
31,50	17	9,17	92,66	50	26,98	153,81	83	44,78
33,35	18	9,71	94,51	51	27,52	155,66	84	45,32
35,21	19	10,25	96,36	52	28,05	157,52	85	45,86
37,06	20	10,79	98,22	53	28,59	159,37	86	46,40
38,91	21	11,33	100,07	54	29,13	161,22	87	46,94
40,77	22	11,81	101,92	55	29,67	163,08	88	47,48
42,62	23	12,41	103,77	56	30,21	164,93	89	48,02
44,47	24	12,95	105,63	57	30,75	166,78	90	48,56
46,33	25	13,49	107,48	58	31,29	168,64	91	49,10
48,18	26	14,03	109,33	59	31,83	170,49	92	49,64
50,03	27	14,56	111,19	60	32,37	172,34	93	50,18
51,88	28	15,10	113,04	61	32,91	174,20	94	50,72
53,74	29	15,64	114,89	62	33,45	176,05	95	51,26
55,59	30	16,18	116,75	63	33,99	177,90	96	51,80
57,44	31	16,72	118,60	64	34,53	179,76	97	52,34
59,30	32	17,26	120,45	65	35,07	181,61	98	52,88
61,15	33	17,80	122,31	66	35,61	183,46	99	53,42

Figure 5-3

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metres per second (m/s) - feet per minute (100 ft/min)								
m/sec.	100 ft/min		m/sec.	100 ft/min		m/sec.	100 ft/min	
0,50	1	1,96	10,66	21	41,33	20,82	41	80,70
1,01	2	3,93	11,17	22	43,30	21,33	42	82,67
1,52	3	5,90	11,68	23	45,27	21,84	43	84,64
2,03	4	7,87	12,19	24	47,24	22,35	44	86,61
2,54	5	9,84	12,75	25	49,21	22,86	45	88,58
3,04	6	11,81	13,20	26	51,18	23,36	46	90,53
3,55	7	13,78	13,71	27	53,15	23,87	47	92,52
4,06	8	15,74	14,22	28	55,11	24,30	48	94,48
4,57	9	17,71	14,73	29	57,08	24,89	49	96,45
5,08	10	19,68	15,24	30	59,05	25,45	50	98,42
5,58	11	21,65	15,74	31	61,02	25,90	51	100,4
6,09	12	23,62	16,25	32	62,97	26,41	52	102,4
6,60	13	25,51	16,76	33	64,96	26,92	53	104,3
7,11	14	27,55	17,27	34	66,92	27,43	54	106,2
7,62	15	29,52	17,78	35	68,89	27,94	55	108,2
8,12	16	31,49	18,20	36	70,86	28,44	56	110,2
8,63	17	33,46	18,79	37	72,83	28,95	57	112,2
9,14	18	35,43	19,30	38	74,80	29,46	58	114,1
9,65	19	37,40	19,81	39	76,77	29,97	59	116,1
10,16	20	39,37	20,32	40	78,74	30,48	60	118,1

knots (kts) - metres per second (m/s)										
	0	1	2	3	4	5	6	7	8	9
0	0	0,51	1,02	1,54	2,05	2,57	3,08	3,60	4,11	4,63
10	0,51	5,65	6,17	6,66	7,20	7,71	8,23	8,74	9,26	9,77
20	10,28	10,80	11,31	11,83	12,34	12,86	13,37	13,89	14,40	14,91
30	15,43	15,94	16,46	16,97	17,49	18,00	18,52	19,03	19,54	20,06
40	20,57	21,09	21,60	22,12	22,63	23,15	23,66	24,17	24,69	25,20
50	25,72	26,23	26,75	27,26	27,76	28,29	28,80	29,32	29,83	30,35
60	30,86	31,38	31,89	32,41	32,92	33,43	33,95	34,46	34,98	35,49
70	36,00	36,52	37,04	37,55	38,06	38,58	39,09	39,61	40,12	40,64
80	41,15	41,67	42,18	42,69	43,21	43,72	44,24	44,75	45,27	45,78
90	46,30	46,81	47,32	47,84	48,35	48,87	49,38	49,90	50,41	50,90

Figure 5-4

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CROSS WIND TABLE

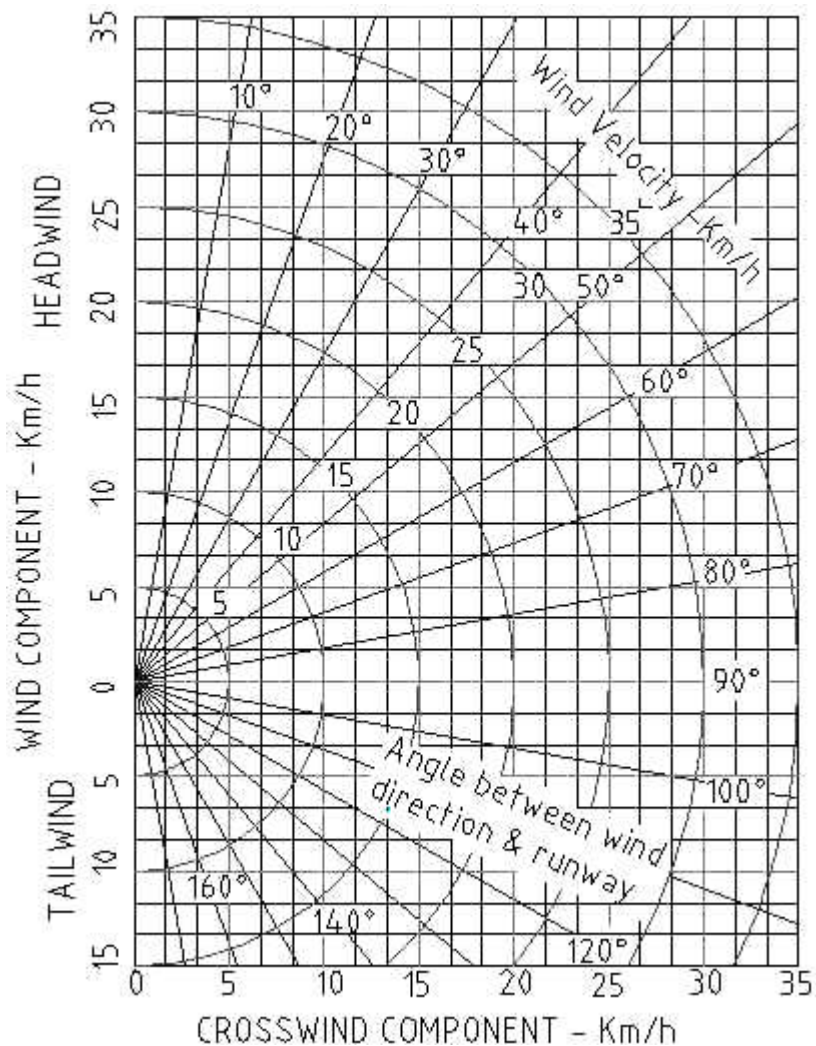


Figure 5-6

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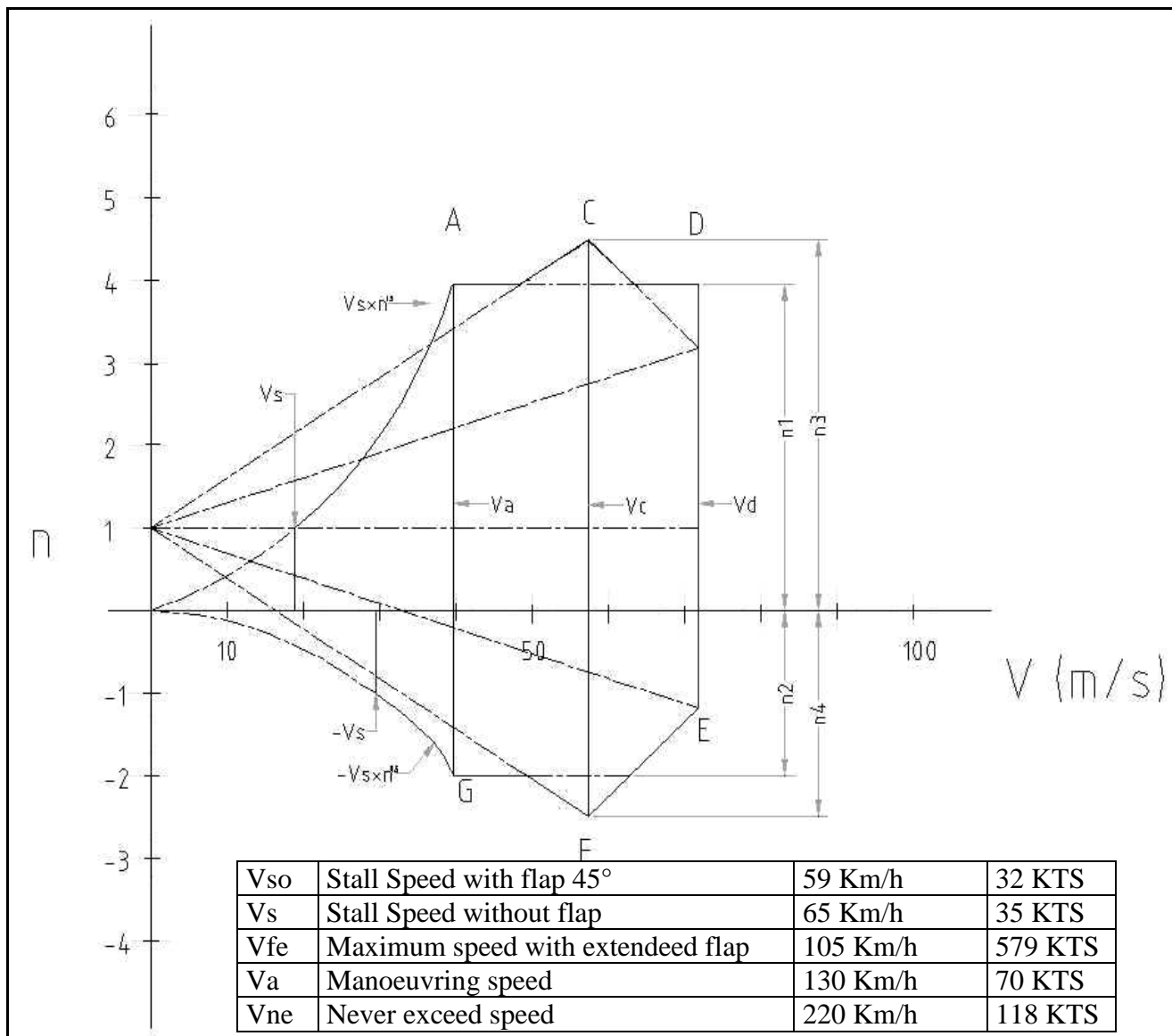
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ENVELOPE DIAGRAM



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SECTION 6 **Weight & balance**

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6.2 Weighing conditions	42
6.3 Weight & balance report	43

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6.1 INTRODUCTION

This section contains the informations for a correct procedure of weight and balance of the aircraft.

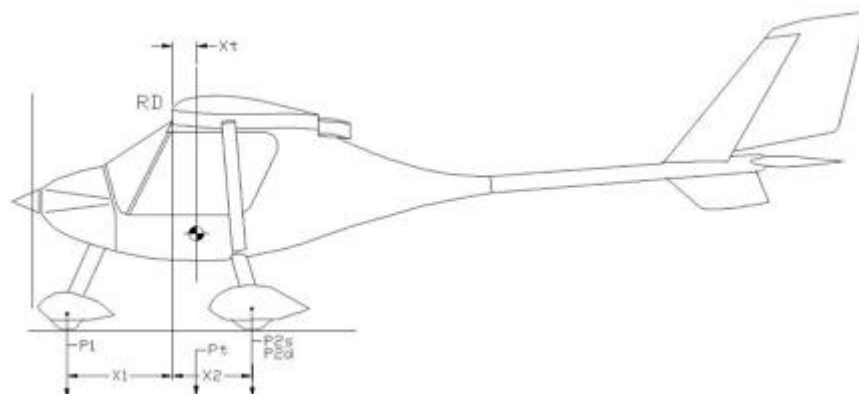
Warning: overcome the CG limits can provoke serious problems of stability and governability of the aircraft.

6.2 CONDIZIONI PER LA PESATA

For the weighing of the aircraft, must be respect the followings conditions:

- The equipments must be those foreseen by the list related to the aircraft in question.
- Must be included the liquid brakes, the oil motor, the liquid antifreeze and the non usable fuel.
- Must be necessary the use of a balance to three independent sensors and sets on the same horizontal plan and of a thread to lead.
- To determinate the empty weight and the position of the Center of Gravity, the aircraft must be positioned on three autonomous balances, one for wheel. It is fundamental that the longitudinal and lateral axis of the aircraft are both in horizontal position.

Using the thread to lead, must be determinate the projection to the ground of the plan of reference RD.



X1 is the distance from nose wheel axle center line to projection of RD.

X2 is the distance from main wheel axle center line to projection of RD.

The standard distance are:

$$X1 = 845\text{mm} (\pm 0.5\%)$$

$$X2 = 515\text{mm} (\pm 0.5\%).$$

The formula for CG calculation is the following:

$$Xt = ML / PT \quad [\text{CG position in mm on the wing chord}]$$

Where:

$$ML = (P2DX + P2SX) \times X2 - P1 \times X1$$

$$Xt\% = (Xt / MAC) \times 100 \quad [\text{CG position in percentage to the wing chord}]$$

ML = Empty weight moment

P2DX , P2SX = Weight measured on main wheel

P1 = Weight measured on nose wheel

Flight Manual STORCH S

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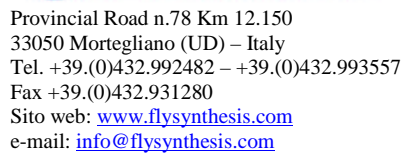
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6.3 WEIGHT & BALANCE REPORT

The first recording of the Weighing Report & the Centre Gravity Position of the aircraft, is effected in factory before the delivery of the same aircraft.

Every variation due to the installation of new components or reparation or painting, implicate a new calculation of the empty weight and the relative positioning of the center of gravity



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NOTE:

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