Aircraft Flight Manual

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TECNAM P2008 JC

MANUFACTURER: *COSTRUZIONI AERONAUTICHE* ***TECNAM*** *S.r.l.*
AIRCRAFT MODEL: ***P2008 JC***
EASA TYPE CERTIFICATE NO: **A .583** (DATED 2013, 27 SEPTEMBER)

SERIAL NUMBER: ...1070.....

REGISTRATION MARKINGS: ...HB-KML

This Aircraft Flight Manual is approved by ***European Aviation Safety Agency (EASA)*** *and applies only EASA CS-VLA certified airplanes.*

This Manual must be carried in the airplane at all times.
The airplanehas to be operated in compliance with procedures and limitations contained herein.

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SECTION 0

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1. RECORD OF REVISIONS

Any revision to the present Manual, except actual weighing data, is recorded: a Record of Revisions is provided in this Section and the operator is advised to make sure that the record iskept up-to-date.

The Manual issue is identified by Edition and Revision codes reported on each page, lower right side.

The revision code is numerical and consists of the number "0"; subsequentrevisions are identified by the change of the code from "0" to "1" for the firstrevision to the basic publication, "2" for the second one, etc.

Should be necessary tocompletely reissue a publication for contents and format changes, the Edition code will change to the next number ("2" for the second edition, "3" for the third edition etc).

Additions, deletions and revisions to existing text will be identified by a revision bar (black line) in the left-hand margin of the page, adjacent to the change.

When technical changes cause expansion or deletion of text which results in unchanged text appearing on a different page, a revision bar will be placed in the right-hand margin adjacent to the page number of all affected pages providing no other revision bar appears on the page.

These pages will be updated to the current regular revision date.

NOTE: It is the responsibility of the owner to maintain this handbook in a current status when it is being used for operational purposes.

Rev	Revised page	Description of Revision	Tecnam Approval			EASA Approval or Under DOA Privileges
			DO	OoA	HDO	
0	-	First issue	G. Paduano	M. Landi	M. Oliva	EASA approved as part of Type Investigation
1	0-4	Amend ROR	D. Ronca	M. Oliva	M. Oliva	EASA approval N°10052448
	0-8	Amend LOEP	D. Ronca	M. Oliva	M. Oliva	
	9-3	Amend Supplement List Index	D. Ronca	M. Oliva	M. Oliva	
	-	Add Supplement S3	D. Ronca	M. Oliva	M. Oliva	
2	0-4	Amend ROR	D. Ronca	M. Oliva	M. Oliva	Approved under the authority of DOA, ref EASA.21J.335 (MOD2008/038.150401)
	0-8	Amend LOEP	D. Ronca	M. Oliva	M. Oliva	
	3-5 and 7	Update procedure	D. Ronca	M. Oliva	M. Oliva	
	4-12 thru 13	Update procedure	D. Ronca	M. Oliva	M. Oliva	
	4-16 thru 17	Update procedure	D. Ronca	M. Oliva	M. Oliva	
	3N-5 thru 6	Update procedure	D. Ronca	M. Oliva	M. Oliva	
	4N-12 thru 13	Update procedure	D. Ronca	M. Oliva	M. Oliva	
	4N-15 thru 17	Update procedure	D. Ronca	M. Oliva	M. Oliva	
	9-3	Amend Supplement List Index	D. Ronca	M. Oliva	M. Oliva	
	-	Add Supplement S2	D. Ronca	M. Oliva	M. Oliva	
		Updated layout Supplement S3	D. Ronca	M. Oliva	M. Oliva	
3	9-3	Amend Supplement List Index	D. Ronca	M. Oliva	M. Oliva	EASA approval N°10053015
	-	Add Supplement S4	D. Ronca	M. Oliva	M. Oliva	
4	2-7,8,10	Add max limit of coolant temperature and coolant liquid specification amended	D. Ronca	M. Oliva	M. Oliva	EASA approval N°10054136
	2-23	Coolant placard amended	D. Ronca	M. Oliva	M. Oliva	
	3-12,13	Procedure amended for include CT	D. Ronca	M. Oliva	M. Oliva	
	4-14,15	Procedure amended for include CT	D. Ronca	M. Oliva	M. Oliva	
	6-12	Updated equipment list	D. Ronca	M. Oliva	M. Oliva	
5	9-3	Amend Supplement List Index	D. Ronca	C. Caruso	M. Oliva	Approved under the authority of DOA, ref EASA.21J.335 (MOD2008/067.151215)
	-	Add Supplement S5	D. Ronca	C. Caruso	M. Oliva	

Rev	Revised page	Description of Revision	Tecnam Approval			EASA Approval or Under DOA Privileges
			DO	OoA	HDO	
6	2-5 thru 30	Amended to add the wording "Approved" in order to better identify the pages approved according to EASA regulation	D. Ronca	C. Caruso	M. Oliva	Approved under the authority of DOA, ref EASA.21J.335 (MOD2008/068.160120)
	3-3 thru 22	Amended to add the wording "Approved" in order to better identify the pages approved according to EASA regulation	D. Ronca	C. Caruso	M. Oliva	
	4-3 thru 18	Amended to add the wording "Approved" in order to better identify the pages approved according to EASA regulation	D. Ronca	C. Caruso	M. Oliva	
	5-5, 5-7 thru 5-10, 14	Amended to add the wording "Approved" in order to better identify the pages approved according to EASA regulation	D. Ronca	C. Caruso	M. Oliva	
	-	Supplement List Index amended	D. Ronca	C. Caruso	M. Oliva	EASA approval N° 10041226
	-	Add Supplement S7	D. Ronca	C. Caruso	M. Oliva	

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2. LIST OF EFFECTIVE PAGES

The List of Effective Pages (LOEP), applicable to manuals of every operator, lists all the basic AFM pages: each manual could contain either basic pages or one variant of these pages when the pages of some Supplements are embodied.

Pages affected by the current revision are indicated by an asterisk (*) following the revision code.

Edition 1, Rev 0 ..... 30th July, 2013
Edition 1, Rev 1 ..... 25th March, 2015
Edition 1, Rev 2 ..... 07th April, 2015
Edition 1, Rev 3 ..... 13th April, 2015
Edition 1, Rev 4 ..... 14th July, 2015
Edition 1, Rev 5 ..... 15th December, 2015
Edition 1, Rev 6 ..... 20th December, 2016

Section	Pages	Revision
Section 0	Pages 1 thru 3, 6, 7, 9 thru 12	Rev 0
Section 0	Page 4	Rev 5
Section 0	Page 5, 8	Rev 6
Section 1	Pages 1 thru 14	Rev 0
Section 2	Pages 1 thru 4	Rev 0
Section 2	Pages 5 thru 30	Rev 6
Section 3	Pages 1 thru 2	Rev 0
Section 3	Pages 3 thru 22	Rev 6
Section 4	Pages 1 thru 3	Rev 0
Section 4	Pages 4 thru 22	Rev 6
Section 5	Pages 1 thru 4, 6, 11, 12, 13, 15, 16	Rev 0
Section 5	Pages 5, 7 thru 10, 14	Rev 6
Section 6	Pages 1 thru 11	Rev 0
Section 6	Page 12	Rev 4
Section 7	Pages 1 thru 16	Rev 0
Section 8	Pages 1 thru 10	Rev 0
Section 9	Pages 1, 2, 4	Rev 0
	Page 3	Rev 6

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3. FOREWORD

Tecnam ***P2008 JC*** is a single-engine two-seat aircraft with a strut braced high wing and fixed landing gear.

Section 1 provides general information and it contains definitions, symbols explanations, acronyms and terminology used.

Before using the airplane, you are recommended to read carefully this manual: a deep knowledge of airplane features and limitations will allow you for operating the airplane safely.

For further information, please contact:

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4. SECTIONS LIST

General (*)	Section 1
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(*) non-approved Section
(**) approved Section
(***) partially approved Section

SECTION 1 - GENERAL

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1. INTRODUCTION

The Flight Manual has been prepared to provide pilots and instructors with information for the safe and efficient operation of this very light airplane.

This manual includes the material required to be furnished to the pilot of CS-VLA. It also contains supplemental data supplied by the airplane manufacturer.

2. CERTIFICATION BASIS

This type of aircraft has been approved by the European Aviation Safety Agency in accordance with CS-VLA including Amendment 1 and the Type Certificate No.EASA.A.583 has been issued on (date) 27th September 2013.

Category of Airworthiness: Normal

Noise Certification Basis: EASA CS 36 Amendment 2.

3. WARNINGS – CAUTIONS – NOTES

Following definitions apply to warnings, cautions and notes used in the Aircraft Flight Manual.

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

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

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

4. THREE-VIEW AND DIMENSIONS

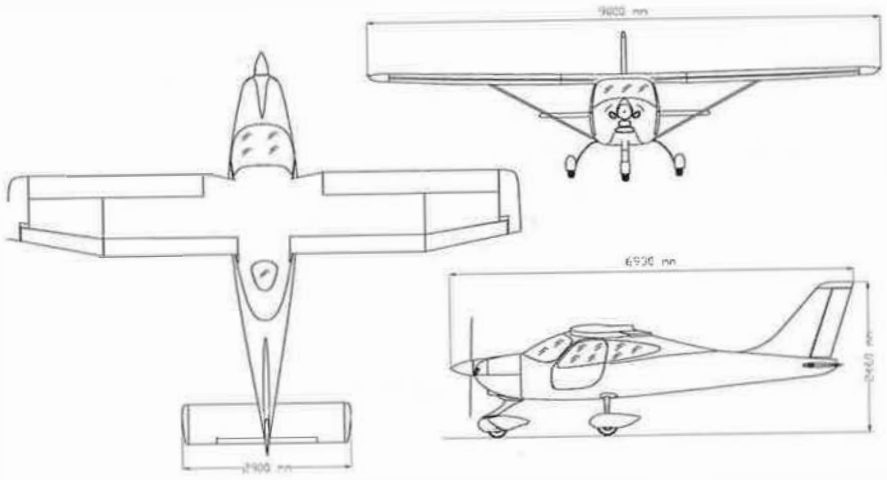

Figure 1 – General views

Dimensions

Wing

Wing Span	9.00 m (29.5 ft)
Wing Area	12.16 m^2 (130.9 ft^2)
Aspect Ratio	6.7
Taper Ratio	0.8
Wing chord	1.373 m (4.5 ft)

Fuselage

Overall length	6.93 m (22.9 ft)
Overall width	1.20 m (3.9 ft)
Overall height	2.67 m (8.8 ft)

Empennage

Stabilator span	2.90 m (9.51 ft)
Stabilator area	2.03 m^2 (21.8 ft^2)
Vertical tail area	1.06 m^2 (11.4 ft^2)

Landing Gear

Wheel track	1.8 m (5.9 ft)
Wheel base	1.94 m (6.4 ft)
Main gear tire	5.00-5
Nose Gear tire	5.00-5

5 ENGINE

Manufacturer	Bombardier-Rotax GmbH
Model	912 S2
Engine type	4 cylinders horizontally opposed with 1352 c.c. of overall displacement, liquid cooled cylinder heads, ram-air cooled cylinders, two carburetors, integrated reduction gear box with torsional shock absorber and overload clutch.
Maximum power (at declared rpm)	73.5 kW (98.6hp) @ 5800 rpm –5 minutes maximum. 69.0 kW (92.5hp) @ 5500 rpm (continuous)

6 PROPELLER

Manufacturer	Hoffman Propeller
Model	HO17GHM A 174 177C
Blades	2 blades of Laminated hard wood. Composite structure, epoxy fibre glass cover
Diameter	1740 mm
Type	Fixed pitch

7. FLIGHT CONTROL SURFACES TRAVEL

Ailerons	Up 22° Down 14 ° (± 2°)
Stabilator (refer to Trailing Edge)	Up 4° Down 15° (± 2°)
Stabilator trim tab (refer to Trailing Edge)	Up 2°; Down 12° (± 1°)
Rudder	RH 25° LH 25° (± 2°)
Flaps	0°; 35° (± 1°)

8. SPECIFIC LOADINGS

	MTOW 650 kg (1433lb)
Wing Loading	53.5 kg/m^2 (10.9 lb/sqft)
Power Loading	6.59 kg/hp (14.53 lb/hp)

9. ACRONYMS AND TERMINOLOGY

KCAS	Calibrated Airspeed is the indicated airspeed expressed in knots, corrected taking into account the errors related to the instrument itself and its installation.
KIAS	Indicated Airspeed is the speed shown on the airspeed indicator and it is expressed in knots.
KTAS	True Airspeed is the KCAS airspeed corrected taking into account altitude and temperature.
V_A	Design Manoeuvring speed is the speed above the which it is not allowed to make full or abrupt control movement.
V_{FE}	Maximum Flap Extended speed is the highest speed permissible with flaps extended.
V_{NO}	Maximum Structural Cruising Speed is the speed that should not be exceeded, except in smooth air and only with caution.
V_{NE}	Never Exceed Speed is the speed limit that may not be exceeded at any time.
V_O	Operating Manoeuvring speed is the speed above the which it is not allowed to make full or abrupt control movement
V_S	Stall Speed.
V_{S0}	Stall Speed in landing configuration (flaps extended).
V_{S1}	Stall speed in the given flap configuration.
V_X	Best Angle-of-Climb Speed is the speed which allows best ramp climb performances.
V_Y	Best Rate-of-Climb Speed is the speed which allows the best gain in altitude over a given time.
V_R	Rotation speed: is the speed at which the aircraft rotates about the pitch axis during takeoff

Meteorological terminology

ISA	International Standard Atmosphere: is the air atmospheric standard condition at sea level, at 15°C (*59°F*) and at 1013.25hPa (*29.92inHg*).
QFE	Official atmospheric pressure at airport level: it indicates the aircraft absolute altitude with respect to the official airport level.
QNH	Theoretical atmospheric pressure at sea level: is the atmospheric pressure reported at the medium sea level, through the standard air pressure-altitude relationship, starting from the airport QFE.
OAT	Outside Air Temperature is the air static temperature expressed in degrees Celsius (°C).
T_S	Standard Temperature is 15°C at sea level pressure altitude and decreased by 2°C for each 1000 ft of altitude.
H_P	Pressure Altitude is the altitude read from an altimeter when the barometric subscale has been set to 1013 mb.

Aircraft performance and flight planning terminology

Crosswind Velocity	is the velocity of the crosswind component for the which adequate control of the airplane during takeoff and landing is assured.
Usable fuel	is the fuel available for flight planning.
Unusable fuel	is the quantity of fuel that cannot be safely used in flight.
G	is the acceleration of gravity.
TOR	is the takeoff distance measured from actual start to wheel liftoff point.
TOD	is total takeoff distance measured from start to 15m obstacle clearing.
GR	is the distance measured during landing from actual touchdown to stop point.
LD	is the distance measured during landing, from 15m obstacle clearing to actual stop.
S/R	is the specific range, that is the distance (in nautical miles) which can be expected at a specific power setting and/or flight configuration per kilogram of fuel used.

Weight and balance terminology

Datum	"Reference datum" is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Arm	is the horizontal distance of an item measured from the reference datum.
Moment	is the product of the weight of an item multiplied by its arm.
C.G.	Center of Gravity is the point at which the airplane, or equipment, would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the aircraft.
Standard Empty Weight	is the weight of the aircraft with engine fluids and oil at operating levels.
Basic Empty Weight	is the standard empty weight to which it is added the optional equipment weight.
Useful Load	is the difference between maximum takeoff weight and the basic empty weight.
Maximum Takeoff Weight	is the maximum weight approved to perform the takeoff.

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10. UNIT CONVERSION CHART

MOLTIPLYING		BY →	YIELDS	
TEMPERATURE				
Fahrenheit	[°F]	$\frac{5}{9}\cdot(F-32)$	Celsius	[°C]
Celsius	[°C]	$\left(\frac{9}{5}\cdot C\right)+32$	Fahrenheit	[°F]
FORCES				
Kilograms	[kg]	2.205	Pounds	[lbs]
Pounds	[lbs]	0.4536	Kilograms	[kg]
SPEED				
Meters per second	[m/s]	196.86	Feet per minute	[ft/min]
Feet per minute	[ft/min]	0.00508	Meters per second	[m/s]
Knots	[kts]	1.853	Kilometres / hour	[km/h]
Kilometres / hour	[km/h]	0.5396	Knots	[kts]
PRESSURE				
Atmosphere	[atm]	14.7	Pounds / sq. in	[psi]
Pounds / sq. in	[psi]	0.068	Atmosphere	[atm]
LENGTH				
Kilometres	[km]	0.5396	Nautical miles	[nm]
Nautical miles	[nm]	1.853	Kilometres	[km]
Meters	[m]	3.281	Feet	[ft]
Feet	[ft]	0.3048	Meters	[m]
Centimetres	[cm]	0.3937	Inches	[in]
Inches	[in]	2.540	Centimetres	[cm]
VOLUME				
Litres	[l]	0.2642	U.S. Gallons	[US Gal]
U.S. Gallons	[US Gal]	3.785	Litres	[l]
AREA				
Square meters	[m^2]	10.76	Square feet	[sq ft]
Square feet	[sq ft]	0.0929	Square meters	[m^2]

11. LITRES / US GALLONS CONVERSION CHART

Litres	US Gallons
5	1.3
10	2.6
15	4.0
20	5.3
25	6.6
30	7.9
35	9.2
40	10.6
45	11.9
50	13.2
60	15.9
70	18.5
80	21.1
90	23.8
100	26.4
110	29.1
120	31.7
130	34.3
140	37.7
150	39.6
160	42.3
170	44.9
180	47.6
190	50.2
200	52.8

US Gallons	Litres
1	3.8
2	7.6
3	11.4
4	15.1
6	22.7
8	30.3
10	37.9
12	45.4
14	53.0
16	60.6
18	68.1
20	75.7
22	83.3
24	90.9
26	98.4
28	106.0
30	113.6
32	121.1
34	128.7
36	136.3
38	143.8
40	151.4
45	170.3
50	189.3
55	208.2

SECTION 2 – LIMITATIONS

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1. INTRODUCTION

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

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2. AIRSPEED LIMITATIONS

The following table addresses the airspeed limitations and their operational significance:

AIRSPEED		KIAS	KCAS	REMARKS
V_{NE}	Never exceed speed	**143**	**139**	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising speed	**111**	**110**	Do **not exceed** this speed except **in smooth** air, and only **with caution.**
V_A	Design Manoeuvring speed	**98**	**97**	Do **not make full or abrupt** control movement above this **speed, because under** certain conditions the aircraft may be overstressed by full control movement.
V_O	Operating Manoeuvring speed			
V_{FE}	Maximum flaps extended speed	**70**	**71**	Do not exceed this speed for indicated flaps setting.

3. AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their colour code are explained in the following table.

MARKING	KIAS	EXPLANATION
White arc	**40 – 70**	Positive Flap Operating Range (lower limit is V_{SO}, at specified maximum weight and upper limit is the maximum speed permissible with landing flaps extension).
Green arc	**49 – 111**	Normal Operating Range (lower limit is V_{S1} at specified maximum weight and most forward c.g. with flaps retracted and upper limit is maximum structural speed V_{NO}).
Yellow arc	**111 – 143**	Manoeuvres must be conducted with caution and only in smooth air.
Red line	**143**	Maximum speed for all operations.

4. POWERPLANT LIMITATIONS

Following table reports the powerplant operating limitations:

ENGINE MANUFACTURER: Bombardier Rotax GmbH.

ENGINE MODEL: 912 S2

MAXIMUM POWER:

	Max Power kW *(hp)*	Max rpm. Prop. rpm*(engine)*	Time max. (minutes)
Max. T.O.	73.5 *(98.6)*	2388 *(5800)*	5
Max. Cont.	69 *(92.5)*	2265 *(5500)*	-

Temperatures:

Max CHT*	135° C
Max CT	120°C
Min/Max Oil	50° C / 130° C

* *applicable for Engines up to serial no. 4924543(included) and repaired engine which doesn't change the cylinder head n°3 with new one (part no. 413195)*

Oil Pressure:

Minimum	12 psi	(below 1440propeller rpm)
Maximum	102 psi	(above 1440 propeller rpm)

CAUTION *In event of cold starting operation, it is permitted a maximum oil pressure of 7 bar for a short period.*

Engine starting: allowable temperature range

OAT Min	-25° C
OAT Max	+50° C

Fuel pressure:

Minimum	2.2 psi
Maximum	7.26 psi

5. FUEL

2 TANKS:	62 litres each one *(16.38 US gallons)*
MAXIMUM CAPACITY:	124 litres *(32.76 US gallons)*
MAXIMUM USABLE FUEL:	120 litres *(32 US gallons)*
APPROVED FUEL:	MOGAS ASTM D4814 (min RON 95/AKI 91)
	MOGAS EN 228 Super/Super plus (min. RON 95/AKI 91)
	AVGAS 100 LL (ASTM D910)

CAUTION

Prolonged use of Aviation Fuel Avgas 100LL results in greater wear of valve seats and greater combustion deposits inside cylinders due to higher lead content. Make reference to Rotax Maintenance Manual which prescribes dedicated checks due to the prolonged use of Avgas.

6. LUBRICANT

Recommended by Rotax:

BRAND	DESCRIPTION	SPECIFICATION	VISCOSITY	CODE
SHELL	AeroShell Sport Plus 4	API SL	SAE 10 W-40	2

NOTE

Use only oil with API classification "SG" or higher.
see Rotax SI-912-016 R4 for list of recommended commercial brands and types

7. COOLANT LIQUID

Refer to "Rotax Operators Manual" – last issue -, "Operating Media" Section.

NOTE: For the Engines affected by Rotax SB-912-066 R1, the waterless coolant is not permitted)

8. PAINT

To ensure that the temperature of the composite structure does not exceed limits, the outer surface of the airplane must be painted with white paint, except for areas of registration marks, placards, and ornament. Refer to Aircraft Maintenance Manual (AMM), Chapter 51, for specific paint requirements.

9. PROPELLER

MANUFACTURER:	Hoffman Propeller
MODEL:	HO17GHM A 174 177C
BLADES:	2 blades of Laminated hard wood. Composite structure, epoxy fibre glass cover
TYPE:	Fixed pitch
DIAMETER:	1740 mm

10. MAXIMUM OPERATING ALTITUDE

Maximum operating altitude is 13000ft (3962 m) MSL.

CAUTION

At altitudes above 10000ft (3048 m) up to and including 13000 ft (3962 m), flight crew is recommended to use supplemental oxygen.

11. AMBIENT TEMPERATURE

Ambient temperature: from -25°C to +50°C.

WARNING

Flight in expected and/or known icing conditions is forbidden.

12. POWERPLANT INSTRUMENTS MARKINGS

Powerplant instrument markings and their colour code significance are shown below:

INSTRUMENT		RED LINE Minimum limit	GREEN ARC Normal operating	YELLOW ARC Caution	RED LINE Maximum limit
Propeller	rpm	----	577 - 2265	2265 - 2388	2388
Oil temp.	°C	50	50-130	----	130
CHT*	°C	----	0-135	----	135
CT	°C	----	0-120	----	120
Oil pressure	psi	OP LOW WARNING 12 psi	----	-----	102
Fuel press.	psi	FP LOW WARNING 2.2 psi	2.2-7.26	----	7.26

*- applicable for Engines up to serial no. 4924543(included) and repaired engine which doesn't change the cylinder head n°3 with new one (part no. 413195

13. OTHER INSTRUMENTS MARKINGS

INSTRUMENT	RED ARC Minimum limit	GREEN ARC Normal operating	YELLOW ARC Caution	RED ARC Maximum limit
Voltmeter	10-10.5 Volt	12 – 16 Volt	--	16-16,5

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14. WEIGHTS

Condition	Weight	
Maximum takeoff weight	650 kg	1433lb
Maximum landing weight	650 kg	1433lb

Baggage Compartment		
Maximum weight	20 kg	44lb
Maximum specific pressure	12,5 kg/dm^2	256 lbs/sq in

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15. CENTER OF GRAVITY RANGE

Datum	Vertical plane tangent to the propeller flange (the aircraft must be levelled in the longitudinal plane)
Levelling	Refer to the seat track supporting beams (see procedure in Section 6)
Forward limit	1.841 m (20% MAC) aft of datum for all weights
Aft limit	1.978 m (30% MAC) aft of datum for all weights

The pilot is responsible for ensuring that the airplane is properly loaded. Refer to Section 6 for appropriate instructions.

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16. APPROVED MANOEUVRES

The aircraft is certified in Normal Category in accordance with EASA CS-VLA regulation applying to aeroplanes intended for non-aerobatic operation only.
Non aerobatic operation includes:

- Any manoeuvre pertaining to "normal" flight
- Stalls (except whip stalls)
- Lazy eights
- Chandelles
- Steep turns in which the angle of bank is not more than 60°

Recommended entry speeds for each approved manoeuvre are as follows:

Manoeuvre	Speed [KIAS]
Lazy eight	*98*
Chandelle	*111*
Steep turn (max 60°)	*98*
Stall	Slow deceleration (*1 kts/s*)

WARNING

Acrobatic manoeuvres, including spins and turns with angle of bank of more than 60°, are not approved for such a category.

WARNING

Limit load factor could be exceeded by moving abruptly flight controls at their end run at a speed above V_A (Manoeuvring Speed: 98 KIAS).

WARNING

Flight in expected and/or known icing conditions, in proximity of storms or in severe turbulence is forbidden.

17. MANOEUVRES LOAD FACTOR LIMITS

Manoeuvre load factors limits are as follows:

Positive	Negative
+ 3.8 g	- 1.9 g

Manoeuvre load factors limits with flaps extended are as follows:

Positive	Negative
+ 1.9 g	0 g

18. DEMONSTRATED CROSS WIND SAFE OPERATIONS

The aircraft controllability during take-offs and landings has been demonstrated with a cross wind components of *15kts*.

19. FLIGHT CREW

Minimum crew:	1 pilot
Maximum number of occupants:	2people (including the pilot)

20. KINDS OF OPERATION EQUIPMENT LIST (KOEL)

This paragraph reports the KOEL table, concerning the equipment list required on board under CS-VLA regulations to allow flight operations in VFR Day and VFR Night.

Flight in VFR Day and Night is permitted only if the prescribed equipment is installed and operational.

WARNING

VFR NIGHT operation is limited to airfields providing centre line illumination.

Additional equipment, or a different equipment list, for the intended operation may be required by national operational requirements and also depends on the airspace classification and route to be flown. The owner is responsible for fulfilling these requirements.

WARNING

Primary flight information (airspeed, altitude, heading and attitude) is provided by analogue instruments. All information provided by G3X is only intended for situational awareness.

Equipment	VFR Day	VFR Night
ANALOGUE ALTIMETER	•	•
ANALOGUE AIRSPEED INDICATOR	•	•
MAGNETIC DIRECTION INDICATOR	•	•
ANALOGUE ATTITUDE INDICATOR		•
ANALOGUE FUEL QUANTITY INDICATORS	•	•
ANALOGUE CHT INDICATOR	•	•
ANALOGUE RPM INDICATOR	•	•
ANALOGUE OIL TEMPERATURE INDICATOR	•	•
ANALOGUE VOLTMETER	•	•
GARMIN G3X SUITE		
TRANSPONDER	•	•
ALTITUDE ENCODER	•	•
SLIP INDICATOR	•	•
LONGITUDINAL TRIM INDICATOR	•	•
FLAP POSITION INDICATOR	•	•
COMM/NAV EQUIPMENT	•	•
AUDIO PANEL/MARKER BEACON	•	•
LANDING/TAXI LIGHT		•
STROBE LIGHTS		•
NAV LIGHTS		•
ANNUNCIATOR PANEL	•	•
BREAKERS PANEL	•	•
STALL WARNING SYSTEM	•	•
FIRST AID KIT	•	•
HAND-HELD FIRE EXTINGUISHER	•	•
ELT	•	•
PITOT HEAT		•
TORCH (WITH SPARE BATTERIES)		•
PANEL LIGHTS		•
EMERGENCY LIGHT		•
DIMMING DEVICES		•
DAY/NIGHT SWITCH		•

21. LIMITATIONS PLACARDS

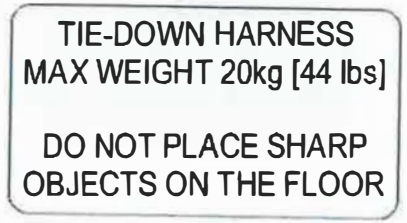
The following limitation placards are placed in plain view on the pilot.

On the left side instrument panel, above on the left, it is placed the following placard reporting the speed limitations:

On the central side of the instrument panel, the following placard is placed reminding the observance of aircraft operating limitations according to installed equipment configuration (see KOEL, Para. 20):

On the right hand side of the instrument panel the following placard is placed reminding the observance for "no smoking":

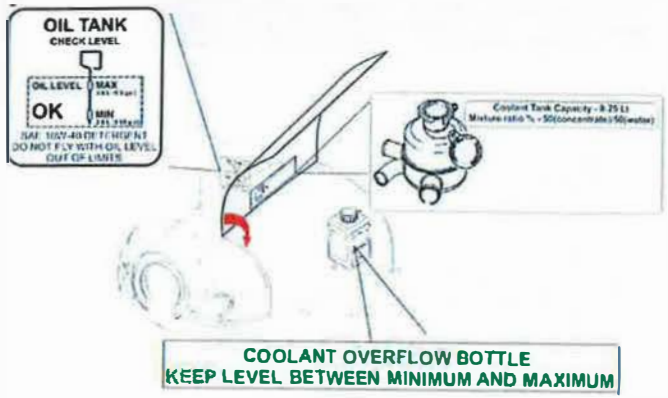
In the baggage compartment following placard is placed:



Below the G3X screens and analogue instruments, the following labels are placed:

22. OTHER PLACARDS

Engine compartment placards



Oil brakes reservoir placard

Usable fuel markings

Allowed fuel placards

Emergency exit placard

Parking brake placard

Throttle marking

Fuel selector valve marking

Choke placard

Alternate static port placard

Cabin heat/defrost placard

Carb heat placard

Ignition key placard

Master/Generator placards

Map-light placard

MAP - LIGHT

Flap indicator placard

Backrest lever placard

BACKREST: PRESS
TO UNLOCK

Safety equipment location placard

FIRST AID KIT
FIRE EXTINGUISHER
are in the luggage
compartment

Elt placard

Battery placard

BATTERY INSIDE
BEHIND
THIS PANEL

Annunciator panel

Upper panel labels

Switches labels

Day/Night switch label

Door lock lever

CLOSED

OPEN

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10.1. SECTION 3 – EMERGENCY PROCEDURES

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1. INTRODUCTION

Section 3 includes checklists and detailed procedures to be used in the event of emergencies. Emergencies caused by a malfunction of the aircraft or engine are extremely rare if appropriate maintenance and pre-flight inspections are carried out.

Before operating the aircraft, the pilot should become thoroughly familiar with the present Manual and, in particular, with the present Section. Further, a continued and appropriate training should and self-study should be done.

In case of emergency the pilot should acts as follows:

1. *Keep control of the aeroplane*
2. *Analyse the situation*
3. *Apply the pertinent procedure*
4. *Inform the Air Traffic Control if time and conditions allow.*

Two types of emergency procedures are hereby given:

a. "Bold faces" which must be known by heart and executed in the correct and complete sequence, as soon as possible as the failure is detected and recognized;

These procedures characters are boxed and highlighted, an example is shown below:

BEFORE ROTATION: ABORT TAKE OFF

1.	**Throttle**	***IDLE***
2.	**Rudder**	***Keep heading control***
3.	--	
4.	--	

b. Other procedures which should be well theoretically know and mastered, but that are not time critical and can be executed entering and following step by step the AFM appropriate checklist.

NOTE

For the safe conduct of later flights, any anomaly and/or failure must be communicated to the National Authorities in charge, in order to put the aircraft in a fully operational and safe condition.

NOTE

In this Chapter, following definitions apply:
***Land as soon as possible**: land without delay at the nearest suitable area at which a safe approach and landing is assured.*
***Land as soon as practical**: land at the nearest approved landing area where suitable repairs can be made.*

2. AIRPLANE ALERTS

The alert lights, located on the annunciator panel, feature the following colours:

GREEN	to indicate that pertinent device is turned ON
AMBER	to indicate no-hazard situations which have to be considered and which require a proper crew action
RED	to indicate emergency conditions

2.1. ELECTRIC POWER SYSTEM MALFUNCTION

Alternator Failure Light ON

NOTE *Alternator light may illuminate for a faulty alternator or when voltage is above 16V; in this case the over-voltage sensor automatically shuts down the alternator.*

If **ALTOUT** caution is **ON**:

1. Verify failure
2. Circuit breaker(s) — *Check*
3. Generator switch: — *OFF 1 sec. then back ON*

If **ALTOUT** *caution persists* **ON**:

4. Generator switch: — *OFF*
5. *Reduce electrical load as much as possible*

6. **Land as soon as practical.**

NOTE *The battery can supply electrical power for at least 30 minutes.*

2.2. PITOT HEATING SYSTEM FAILURE

When the Pitot Heat system is activated, the green **PITOT HEAT ON** safe operating annunciation is **ON**;

If the amber **PITOT HEAT** is turned ON, but the caution remains **ON,** the Pitot Heat system is not functioning properly.

In this case apply following procedure:

1. Pitot Heat switch *OFF*
2. Check Pitot Heat circuit breaker *IN*
3. Pitot Heat switch *ON*
4. Check PITOT HEAT caution light:
   If the amber light stays ON, assume PITOT HEAT malfunction.
   Avoid visible moisture conditions.

2.3. G3X FAILURES

In case of LH or RH display failure, navigation and engine data will be automatically available in the remaining display(split mode).

INSTRUCTION: revert to the remaining display.

3. AIRPLANE EVACUATION

With the engine secured and propeller stopped (if practical):

1.	**Parking brake:**	*ON*
2.	**Seat belts:**	*unstrap completely*
3.	**Headphones:**	*REMOVE*
4.	**Door:**	*OPEN*
5.	***Escape away from flames/ hot engine compartment/ spilling fuel tanks/ Hot brakes.***	

4. ENGINE SECURING

Following procedure is applicable to shut-down the engine in flight:

1.	**Throttle Lever**	*IDLE*
2.	**Ignition key**	*OFF*
3.	**Fuel Selector**	*OFF*
4.	**Electrical fuel pump**	*OFF*
5.	**Generator switch**	*OFF*

5. ENGINE FAILURE

5.1. ENGINE FAILURE DURING TAKE-OFF RUN

1.	**Throttle:**	***IDLE (keep fully out)***
2.	**Rudder:**	***Keep heading control***
3.	**Brakes:**	***apply as needed***

When safely stopped:

4.	Ignition key:	*OFF.*
5.	Fuel selector valve:	*OFF*
6.	Electric fuel pump:	*OFF*
7.	Alternator& Master switches:	*OFF.*

5.2. ENGINE FAILURE IMMEDIATELY AFTER TAKE-OFF

1.	**Speed:**	***keep minimum 61 KIAS***
2.	**Find a suitable place to land safely.**	

WARNING

The immediate landing should be planned straight ahead with only small changes in directions not exceeding 45° to the left or 45° to the right.

3.	**Flaps:**	***as needed***

WARNING

Stall speed increases with bank angle and longitudinal load factor. Acoustic stall warning will in any case provides a correct anticipated cue of incipient stall.

At, or right before, touch down

4.	**Throttle:**	***IDLE (fully out and hold)***
5.	**Ignition key:**	***OFF***
6.	**Fuel selector valve:**	***OFF***
7.	**Electric fuel pump:**	***OFF***
8.	**Alternator& Master switches:**	***OFF***

WARNING

A single engine aircraft take off should always be preceded by a thorough take off emergency pilot self-briefing. Decision to try an engine emergency restart right after take off should be taken only if environmental situation requires it: pilot shall never ignore the priority of attentively follow an immediate emergency landing.

After possible mechanical engine seizure, fire or a major propeller damage, engine restart attempt is not recommended.

5.3. ENGINE FAILURES DURING FLIGHT

5.3.1 Low Fuel Pressure

If the fuel pressure indicator falls below 2.2 psi/**FP LOW** warning is **ON:**

1. Electric fuel pump: *ON*
2. Fuel selector valve: *select opposite fuel tank if NOT empty*
3. Fuel quantity indicators: *Check both*

If fuel pressure does not build up:

4. **Land as soon as possible** applying forced landing procedure (See Para. 8)

5.3.2 Low Oil Pressure

If oil pressure is below12 psi/**OP LOW** warning is **ON**:

1. Throttle Lever *REDUCE* to *Minimum practical*
2. **Land as soon as practical**

If oil pressure does not increase and **OP LOW** warning persists ON:

3. **Land as soon as possible** applying forced landing procedure (See Para. 8)

5.3.3 High Oil Temperature

If high OT occurs, apply following procedure:

If **OP LOW** warning is **ON**, see para. 5.3.2 "Low Oil Pressure".

If oil pressure is within limits (**OP HIGH** and **OP LOW** warning are **OFF**):

1. Throttle Lever *REDUCE Minimum practical*

If oil temperature does not decrease

2. Airspeed *INCREASE if practical*

NOTE

If oil temperature does not come back within limits, the thermostatic valve regulating the oil flow to the heat exchangers, could be damaged or an oil leakage can be present in the oil supply line.

3. **Land as soon as practical**

If engine roughness, vibrations, erratic behaviour, or high CHT/CT occurs:

4. **Land as soon as possible** applying forced landing procedure (See Para. 8)

5.3.4 CHT/CT limit exceedance

If CHT is above 135°C or CT is above 120°C, apply following procedure:

If **OP LOW** warning is **ON**, see Para. 5.3.2 "Low Oil Pressure".

If oil pressure is within limits (**OP HIGH** and **OP LOW** warnings are **OFF**):

1. Throttle Lever *REDUCE* to *Minimum practical*
2. **Land as soon as practical**

NOTE

The thermostatic valve regulating the water flow to the cylinder heads, could be damaged or a coolant leakage can be present in the coolant supply line.

If **CHT/CT** does not decrease and engine shows roughness or power loss:

3. **Land as soon as possible** applying forced landing procedure (See Para. 8)

6. IN-FLIGHT ENGINE RESTART

After a mechanical engine seizure, fire or a major propeller damage engine restart is not recommended.

1.	Carburettor heat	*ON if required*
2.	Electrical fuel pump	*ON*
3.	Fuel quantity indicator	*CHECK*
4.	Fuel Selector	*select opposite tank if not empty*
5.	Ignition key	*BOTH*
6.	Ignition key	*START*
7.	Throttle lever	*SET as required*

NOTE

If the fuel quantity in the selected tank which feeds the engine is low, select the opposite side fuel tank by means of the fuel selector.

In case of unsuccessful engine restart:

1. Engine — *SECURE(see engine securing procedure on Para. 4)*

2. **Land as soon as possible** applying forced landing procedure (See Para. 8)

7. SMOKE AND FIRE

7.1. ENGINE FIRE ON THE GROUND

1.	**Fuel Selector**	***OFF***
2.	**Electrical fuel pump**	***OFF***
3.	**Ignition key**	***OFF***
4.	**Throttle lever**	***FULL POWER***
5.	**Cabin Heat**	***OFF***
6.	**Alternator&Master Switches**	***OFF***
7.	**Parking Brake**	***ENGAGED***
8.	**Aircraft Evacuation**	***carry out immediately***

7.2. ENGINE FIRE DURING TAKEOFF

BEFORE ROTATION: ABORT TAKE OFF

1.	**Throttle Lever**	**IDLE *(fully out and hold)***
2.	**Rudder**	***Keep heading control***
3.	**Brakes**	***As required***

With aircraft under control

1.	**Fuel Selector**	***OFF***
2.	**Electrical fuel pump**	***OFF***
3.	**Ignition key**	***OFF***
4.	**Cabin Heat**	***OFF***
5.	**Alternator&Master Switches**	***OFF***
6.	**Parking Brake**	***ENGAGED***
7.	**Aircraft Evacuation**	***carry out immediately***

7.3. ENGINE FIRE IN-FLIGHT

1.	**Cabin heat:**	***OFF***
2.	**Fuel selector valve:**	***OFF***
3.	**Electric fuel pump:**	***OFF***
4.	**Throttle:**	***FULL FORWARD until the engine stops***
5.	**Ignition key:**	***OFF***
6.	**Cabin vents:**	***OPEN***

Do not attempt engine restart

7. **Land as soon as possible** applying forced landing procedure(See Para. 8).

7.4. CABIN FIRE / ELECTRICAL SMOKE IN CABIN DURING FLIGHT

1.	**Cabin heating:**	***OFF***
2.	**Cabin vents:**	***OPEN***
3.	**Try to choke the fire. Direct the fire extinguisher towards flame base**	

If smoke persists:

1. Alternator& Master switches: *OFF*
2. **Land as soon as possible** and evacuate the aircraft

If the MASTER SWITCH is set to OFF, consider that flaps extension and pitch trim operation is prevented.

7.5. ELECTRICAL SMOKE/FIRE IN CABIN ON THE GROUND

1.	**Generator switch:**	***OFF***
2.	**Throttle Lever:**	***IDLE***
3.	**Ignition key:**	***OFF***
4.	**Fuel Selector Valve:**	***OFF***
5.	**Master Switch:**	***OFF***
6.	**Aircraft Evacuation**	***carry out immediately***

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8. LANDING EMERGENCIES

8.1. FORCED LANDING WITHOUT ENGINE POWER

1. Flaps: UP
2. Airspeed: *71 KIAS*
3. Find a suitable place to land safely, plan to approach it upwind.
4. Fuel selector valve: *OFF*
5. Electric fuel pump: *OFF*
6. Ignition key: *OFF*
7. Safety belts: *Tighten*

When certain to land

8. Flaps: *as necessary*
9. Generator and Master switches: *OFF.*

NOTE *Glide ratio is **12.8**, therefore in zero wind conditions every 1000ft above Ground Level it is possible to cover ca. 2 NM.*

8.2. POWER-ON FORCED LANDING

1. Airspeed: *71 KIAS*
2. Flaps: *UP*
3. Locate the most suitable terrain for emergency landing, plan to approach it upwind.
4. Safety belts: *Tighten*

When certain to land, right before touch down

5. Flaps: *as necessary*
6. Fuel selector valve: *OFF*
7. Electric fuel pump: *OFF*
8. Ignition key: *OFF*
9. Generator and Master switches: *OFF*

8.3. LANDING WITH A FLAT NOSE TIRE

1. Pre-landing checklist: *Complete*
2. Flaps: *Land*
3. Land and maintain aircraft *NOSE HIGH* attitude as long as possible.

As aircraft stops

4. Engine securing: *Perform(see Para. 4)*
5. Airplane evacuation: *Perform(see Para. 3)*

8.4. LANDING WITH A FLAT MAIN TIRE

If it's suspected a main tire defect or it's reported to be defective:

1. Pre-landing checklist: *Complete*
2. Flaps: *Land*
3. Land the aeroplane on the side of runway opposite to the defective tire to compensate the change in direction which is to be expected during final rolling
4. Touchdown with the GOOD TIRE FIRST and hold aircraft with the flat tire off the ground as long as possible by mean of aileron and rudder control.

As aircraft stops

5. Engine securing: *Perform(see Para. 4)*
6. Airplane evacuation: *Perform(see Para3)*

9. RECOVERY FROM UNINTENTIONAL SPIN

If unintentional spin occurs, the following recovery procedure should be used:

1. **Throttle:** ***IDLE (full out position and hold)***
2. **Rudder:** ***full, in the opposite direction of the spin***
3. **Stick:** ***centralize and hold neutral***

As the spin stops:

4. **Rudder:** ***SET NEUTRAL***
5. **Aeroplane attitude:** ***smoothly recover averting speeds in excess of V_{NE}***
6. **Throttle:** ***Readjust to restore engine power.***

WARNING

Keep full rudder against rotation until spin has stopped.

One complete turn and recovery takes around 500 feet.

10. OTHER EMERGENCIES

10.1. UNINTENTIONAL FLIGHT INTO ICING CONDITIONS

WARNING

Carburettor ice is possible when flying at low engine rpm in visible moisture (outside visibiltty less than 5 km, vicinity of fog, mist, clouds, rain, snow or hail). Airbox carburettor heater is designed to help prevent carburettor ice, less effectively functions as a de-icing system.

1. Carburettor heating: *ON*
2. Immediately fly away from icing conditions (changing altitude and direction of flight, out and below of clouds, visible moisture, precipitations)
3. Controls surfaces: *continue to move to keep free from ice build up*
4. Throttle speed: *increase rpm.*
5. Cabin heat: *ON*

WARNING

In case of ice formation on wing leading edge, stall speed could highly increase and stall may become asymmetric. In case of stabilator ice accretion it may lose its efficiency, leading to aircraft pitch up response and loss of control.

10.2. TRIM SYSTEM FAILURE

Trim Jamming

Should trim control be inoperative, act as follows:

1. Breaker: *CHECK IN*
2. LH/RH Trim switch: *CHECK for correct position*

If jamming persists

1. Trim cutout switch: *CHECK ON*
2. Speed: *adjust to control aircraft without excessive stick force*
3. **Land aircraft as soon as possible.**

Trim Runaway

In event of trim runaway, act as follows:

1. Trim cutout switch: *OFF*
2. Speed: *adjust to control aircraft without excessive stick force*
3. **Land aircraft as soon as possible.**

10.3 STATIC PORTS FAILURE

In case of static ports failure, the alternate static port in the cabin (identified by the placard below) must be activated.

In this case apply following procedure:

1. Cabin heat *OFF*
2. ALTERNATE STATIC PORT VALVE *OPEN*
3. Continue the mission

10.4 FLAPS FAILURE

In event of flaps-up landing, account for:

Approach speed: *65 KIAS*

Landing length: *35% increased*

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SECTION 4 – NORMAL PROCEDURES

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1. INTRODUCTION

Section 4 describes checklists and recommended procedures for the conduct of normal operations for ***P2008JC*** aircraft.

NOTE

Garmin G3X provides primary engine and electric system parameters information, supported by caution/warning lights in the annunciator panel and backup CHT indicator.

NOTE

Analogue CHT is a backup for the information provided by G3X. Since the pick-up location for the sensors is different (cylinder 2 and 4 respectively), analogue CHT could indicate a temperature up to 20° less than the G3X.

WARNING

Garmin G3X indeed is NOT intended to be used as primary reference for flight and navigation information but only provides information for increased situational awareness: primary flight information (altitude, airspeed and heading) is provided by analogue instruments.

2. AIRSPEEDS FOR NORMAL OPERATIONS

The following airspeeds are those which are significant for normal operations.

	FLAPS	650kg
Rotation Speed (in takeoff, V_R)	T/O	**50 KIAS**
Best Angle-of-Climb Speed (V_X)	0°	**63 KIAS**
Best Rate-of-Climb speed (V_Y)	0°	**67 KIAS**
Approach speed	T/O	**61 KIAS**
Final Approach Speed	FULL	**55 KIAS**
Manoeuvring speed (V_A)	0°	**98 KIAS**
Never Exceed Speed (V_{NE})	0°	**143 KIAS**

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3. PRE-FLIGHT INSPECTIONS

Before each flight, it is necessary to carry out a complete aircraft check including a cabin inspection followed by an external as below detailed.

3.1. CABIN INSPECTION

A Aircraft documents (ARC, Certificate of Airworthiness, Noise certificate, Radio COM certificate, AFM): *check current and on board*

B Weight and balance: *calculate (ref. this AFM sect. 6) check within limits*

C Safety belts: *connected to hard points, check condition*

D Ignition key: *OFF, key extracted*

E Master switch: *ON*

F Voltmeter: check (10-12 V);

G Lights: *all ON, check for operation*

H Acoustic stall warning: *check operation*

I Master switch: *OFF*

J Baggage: *check first aid kit, ELT, fire extinguisher, luggage stowed and fastened with restraint net.*

3.2. AIRCRAFT WALK-AROUND

To perform the aircraft walk-around, carry out the checklists according to the pattern shown in Figure 4-1.

WARNING

Visual inspection is defined as follows: check for defects, cracks, detachments, excessive play, unsafe or improper installation as well as for general condition. For control surfaces, visual inspection also involves additional check for freedom of movement and security. Red lubber lines on bolts and nuts shall be intact.

WARNING

Fuel level indicated by the fuel quantity indicators must be verified by visual check of actual fuel quantity embarked in the tanks: graduated dipstick must be used.

WARNING

If ignitions key is in L/R/BOTH position, a propeller movement can cause the engine starting with consequent hazard for people nearby.

NOTE

Fuel drainage operation must be carried out with the aircraft parked on a level surface. Set Cockpit Fuel Selector Valve to OFF prior to drain fuel.

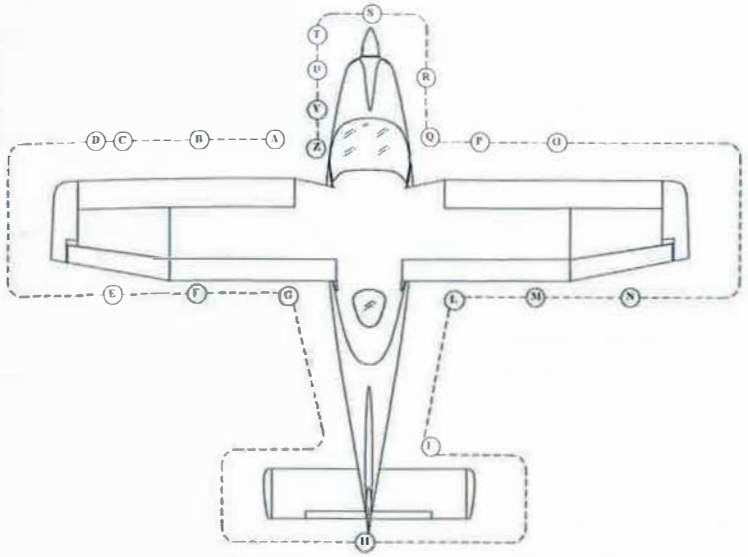

Figure 4.1

A	Left fuel filler cap	*CHECK desired fuel level (use graduated dipstick). Drain the left fuel tank sump by quick drain valve using a cup to collect fuel (drainage operation must be carried with the aircraft parked on a level surface). Check for water or other contaminants. Make sure filler cap is closed.*
B	Pitot tube	*REMOVE pitot plug and check the pitot for obstructions. Do not blow inside pitot tube.*
C	Left side leading edge and wing skin	*Visual inspection, CHECK stall strips*
D	Left strobe light	*Visual inspection, CHECK for integrity and fixing*
E	Left aileron, hinges and Left tank vent	*CHECK for damage, freedom from plays; Left tank vent: CHECK for obstructions.*
F	Left flap and hinges	*Visual inspection*

G	Left main landing gear	*CHECK inflation, tire condition, alignment, fuselage skin condition. Check fuselage skin status, tire status (cuts, bruises, cracks and excessive wear), slippage markers integrity, gear structure and brakes hoses :there should be no sign of hydraulic fluid leakage.*
H	Stabilator and tab	*CHECK stabilator leading edge. Check the actuating mechanism of stabilator and the connection with related tab: CHECK free of play, friction. CHECK fuselage bottom and top skin. CHECK antennas for integrity.*
I	Vertical tail and rudder	*Visual inspection, check free of play, friction.*
L	Right main landing gear	*CHECK inflation, tire condition, alignment, fuselage skin condition. Check fuselage skin status, tire status (cuts, bruises, cracks and excessive wear), slippage markers integrity, gear structure and brakes hoses: there should be no sign of hydraulic fluid leakage.*
M	Right flap and hinges	*Visual inspection*
N	Right aileron, hinges and Right side tank vent	*Visual inspection, check free of play, friction; Right side tank vent: check for obstructions.*
O	Right strobe light, leading edge and wing skin	*Visual inspection, CHECK stall strips, CHECK strobe light for integrity and fixing*
P	Stall indicator micro switch	*CHECK for integrity and free of play,*
Q	Right side fuel filler cap	*CHECK desired fuel level (use graduated dipstick). Drain the right fuel tank sump by quick drain valve using a cup to collect fuel (drainage operation must be carried with the aircraft parked on a level surface). Check for water or other contaminants. Make sure filler cap is closed.*
R	Nose wheel strut and tire/ RH static port	*CHECK inflation, tire condition and condition of shock absorber: there should be no sign of hydraulic fluid leakage. Check the right static port for obstructions.*
S	Propeller and spinner condition	*CHECK for nicks, cracks, dents and other defects, propeller should rotate freely. Check fixing and lack of play between blades and hub.*

T Check the engine cowling surface conditions, then open both engine inspection doors and perform the following checks:

a) Nacelle inlets and exhausts openings must be free of obstructions. Check connection and integrity of air intake system, visually inspect that ram air intake is unobstructed. If inlet and outlet plugs are installed, they must be removed.

b) Check radiators. There should be no indication of leakage of fluid and they have to be free of obstructions.

c) Check for foreign objects

d) Only before the first flight of a day:

(1) Verify coolant level in the expansion tank, replenish as required up to top (level must be at least 2/3 of the expansion tank).

(2) Verify coolant level in the overflow bottle: level must be between min. and max. mark.

WARNING

Before proceeding to the next step be sure that magnetos and Master switch are OFF with the key extracted.

(3) Turn the propeller by hand to and from, feeling the free rotation of 15°or 30° before the crankshaft starts to rotate. If the propeller can be turned between the dogs with practically no friction at all further investigation is necessary. Turn propeller by hand in direction of engine rotation several times and observe engine for odd noises or excessive resistance and normal compression.

(4) Carburettors: check the throttle and choke cables for condition and installation.

(5) Exhaust: inspect for damages, leakage and general condition.

(6) Check engine mount and silent-blocks for condition.

e) Check oil level and replenish as required. Prior to oil check, switch off both ignitions circuits and turn the propeller by hand in direction of engine rotation several times to pump oil from the engine into the oil tank, or let the engine idle for 1 minute. This process is finished when air is returning back to the oil tank and can be noticed by a murmur from the open oil tank. Prior to long flights oil should be added so that the oil level reaches the "max" mark.

f) Drain off Gascolator for water and sediment (drain until no water comes off). Then make sure drain valve is closed.

g) Check drainage hoses free of obstructions

h) Verify all parts are fixed or locked: inspect fuel circuit for leakages.

U	Engine cowling doors	*CLOSE, check for proper alignment of cam-locks*
V	Landing/taxi light and LH static port	*CHECK, Visual inspection for integrity. Right side tank vent: check for obstructions.*

Z	Tow bar and chocks	*REMOVE, stow on board pitot, static ports and stall warning protective plugs.*

NOTE *Avoid blowing inside Pitot tube and inside airspeed indicator system's static ports as this may damage instruments.*

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4. CHECKLISTS

4.1. BEFORE ENGINE STARTING (AFTER PRE-FLIGHT INSPECTION)

1. Seat position and safety belts: *adjust*

WARNING

In-flight seat release can cause the loss of airplane control. Check that occupied seats are positively locked; after seat adjustment, make sure that the adjustment lever is well aligned with the aircraft longitudinal axis(neutral position) and that has a springback return to the neutral position.

2. Flight controls: *operate full stroke checking for movement smoothness, free of play and friction.*
3. Parking brake: *engage*
4. Throttle friction: *adjust*
5. Circuit Breakers: *check all IN*
6. Master switch: *ON, Check generator light ON and Voltage (at least 10.5 V)*
7. Electric fuel pump: *ON (check for audible pump noise)*
8. Electric fuel pump: *OFF*
9. Avionic Master switch: *ON, check instruments, then set in OFF position*
10. Flap control: *cycle fully extended and then set to T/O*
11. Alternate static port: *check closed*
12. Pitch Trim: *cycle fully up and down, from both LH and RH controls, check for trim disconnect switch operation.*
13. Pitch trim: *set neutral*

WARNING

Pitch trim position other than in neutral position would affect take off performance and take off rotation execution at the correct V_R.

14. Nav. light & Strobe light: *ON*
15. Fuel quantity: *compare the fuel quantity indicators information with fuel quantity visually checked into the tanks (see Pre-flight inspection – External inspection)*

NOTE

In absence of RH seat occupant: fasten seat belts around the seat so as to prevent any interference with the aeroplane flight control operation and with rap. egress in an emergency.

16. Doors: *Closed and locked*

CAUTION

Avionic Master switch must be set OFF during the engine's start-up to prevent avionic equipment damage.

4.2. ENGINE STARTING

1. Engine throttle: *idle*
2. Choke: *as needed*
3. Fuel selector valve: *select the tank with less fuel*
4. Electric fuel pump: *ON*
5. Propeller area: *call for CLEAR and visually check*

WARNING

Check to insure no person or object is present in the area close to the propeller. Forward lower sector visibility is not possible from inside the cockpit.

6. Ignition key: *BOTH*
7. Ignition key: *START*
8. Check OP LOW warning turns OFF within 10 sec.
9. Generator switch: *ON*
10. Voltmeter: *check more than 14V*
11. Engine parameters: *all cautions/warnings OF, OT within the limits*
12. Choke: *OFF*
13. Propeller rpm: *1000-1200 rpm*
14. Electric fuel pump: *OFF*
15. FP LOW warning: *check OFF*

4.3. BEFORE TAXIING

1. Radio and Avionics: *ON*
2. Altimeter: *set*
3. Parking brake: *OFF*

4.4. TAXIING

1. Brakes: *check for operation*
2. Flight instruments: *check altimeter and attitude indicator alignment*

4.5. PRIOR TO TAKEOFF

1. Parking brake: ON, *brake pedal press*
2. Engine parameters: *check all cautions/warnings OFF, OT within the limits*
3. ALT OUT caution: *check OFF*
4. Electric Fuel pump: *ON*
5. Fuel selector valve: *select the fullest tank*
6. Fuel pressure: *check FP LOW warning OFF*
7. Throttle speed: *advance throttle to 1640 rpm*
   a. Ignition key test: *select LEFT, check speed drop within 130 propeller rpm;*
   b. Select BOTH: *check propeller speed 1640 rpm;*
   c. Select RIGHT: *check speed drop within 130 propeller rpm,*
   d. *Maximum difference of speed between LEFT and RIGHT 50 rpm,*
   e. Select BOTH: *check propeller speed 1640 rpm .*
8. Carburettor heat test:
   a. *Pull selector fully out*
   b. Throttle speed*: check 100 rpm drop*
   c. *Push selector fully IN*
   d. Throttle speed*: check 1640 rpm*
9. Flaps: *set T/O*
10. Pitch trim: *check neutral*
11. Flight controls: *check free*
12. Seat belts: *checked fastened*
13. Doors: *check closed and locked.*

4.6 TAKEOFF AND CLIMB

WARNING

Primary flight information (airspeed, altitude and heading) is provided by analogue instruments. Flight information provided by G3X is only for situational awareness.

WARNING

On uncontrolled fields, before line up, check runway wind direction and speed and check for traffic on final

1. Parking brake: *OFF*
2. Carburetor heat: *OFF*
3. Full throttle: *set and check approximately 2100 ± 100 propeller rpm*
4. Engine instruments: *check parameters within the limits*
5. Rotation speed V_R: *50 KIAS*
6. Flaps: *retract (above flap retraction speed 61 KIAS)*
7. Establish Climb rate V_Y: *67 KIAS*
8. Electric fuel pump: *OFF*
9. Fuel pressure: *check minimum 2.2 psi*
10. Throttle speed: *reduce at or below 2250 rpm*

4.7 CRUISE

1. Set power at or below maximum continuous: *2250 propeller rpm*
2. Check engine instruments
   - Oil temperature: *50°-130 ° C.*
   - Temperature cylinder heads: *Max. 135 °C*
   - Oil pressure: *12 - 102psi.*
   - Fuel pressure: *minimum 2.2 psi*
3. Carburettor heat: *as needed.*

NOTE

Monitor and manually compensate asymmetrical fuel consumption by switching fuel selector valve. Switch on the electric fuel pump prior to swap the fuel feeding from one tank to another.

4.8 BEFORE LANDING

1. Electric fuel pump: *ON*
2. Fuel valve: *select the fullest tank*
3. Landing Light: *ON*
4. On downwind, leg abeam touch down point:
   Flaps*: set T/O*
   Approach speed*: 61KIAS*
5. On final leg:
   Flaps: set LAND
   Final Approach Speed*: 55 KIAS*
6. Carburettor heat: *OFF (full IN)*
7. Optimal touchdown speed: *55 KIAS*

4.9 BALKED LANDING/MISSED APPROACH

1. Throttle: *FULL*
2. Speed: *keep over 61 KIAS, climb to V_Y or V_X as applicable*
3. Flaps position: *TO*
4. Electric fuel pump: *ON*

4.10 AFTER LANDING

1. Flaps: *UP*
2. Electric Fuel Pump*: OFF*
3. Landing light: *OFF*

4.11. ENGINE SHUT DOWN

1. Parking brake: *engage*
2. Keep engine running at 1200 propeller rpm for about one minute in order to reduce latent heat.
3. Avionic equipment: *OFF*
4. Ignition key: *OFF, keys extracted*
5. Strobe light: *OFF*
6. Master & Generator switches: *OFF*
7. Fuel selector valve: *OFF*

Before disembarkation verify propeller is fully stopped.

Instruct passenger to fully open RH door and depart, avoiding contact with wheels and sharp wing control surfaces edges.

4.12. POST-FLIGHT CHECKS

1. Flight controls: *lock by mean of seat belts*
2. Wheel chocks and wing mooring cables: *Set*
3. Parking brake: *Release*
4. Doors: *Close and lock*
5. Protection plugs: *set over pitot tube, stall warning, static ports*

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SECTION 5 - PERFORMANCE

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1. INTRODUCTION

This section provides all necessary data for an accurate and comprehensive planning of flight activity from take-off to landing.

Data reported in graphs and/or in tables were determined using:

- ✓ "Flight Test Data" under conditions prescribed by EASA CS-VLA regulation
- ✓ aircraft and engine in good condition
- ✓ average piloting techniques

Each graph or table was determined according to ICAO Standard Atmosphere (ISA - s.l.); evaluations of the impact on performancewere carried out by theoretical means for:

- ✓ Airspeed
- ✓ External temperature
- ✓ Altitude
- ✓ Weight
- ✓ Runway type and condition

2. USE OF PERFORMANCE CHARTS

Performance data are presented in tabular or graphical form to illustrate the effect of different variables such as altitude, temperature and weight. Given information is sufficient to plan the mission with required precision and safety.

Additional information is provided for each table or graph.

3. AIRSPEED INDICATOR SYSTEM CALIBRATION

Graph shows calibrated airspeed V_{IAS} as a function of indicated airspeed V_{CAS}.

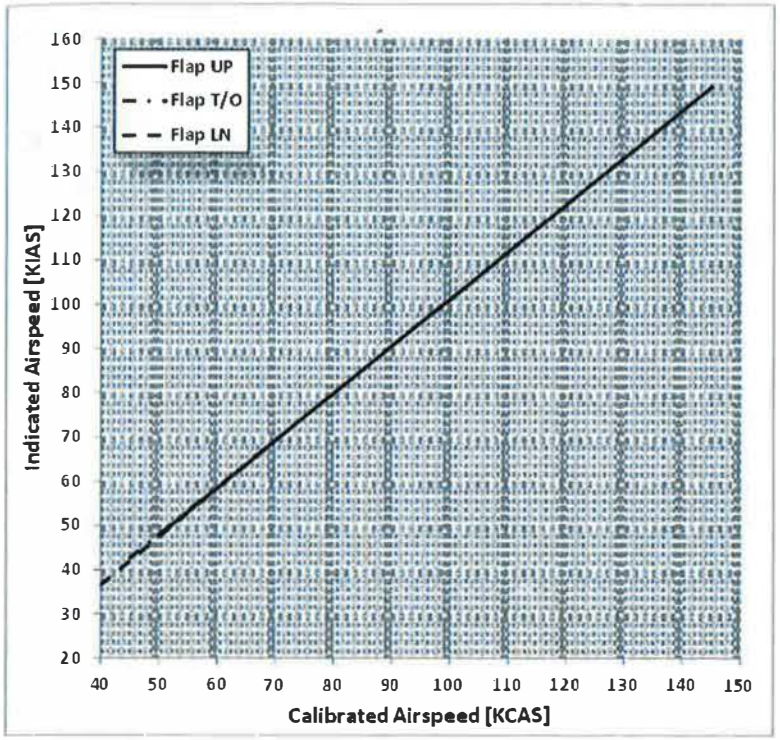

FIG. 5-1. CALIBRATED VS INDICATED AIRSPEED

Example:

Given	***Find***
KIAS *75.0* *Flap: UP*	KCAS *74.5*

NOTE *Indicated airspeed assumes 0 as an instrument error*

4. ICAO STANDARD ATMOSPHERE

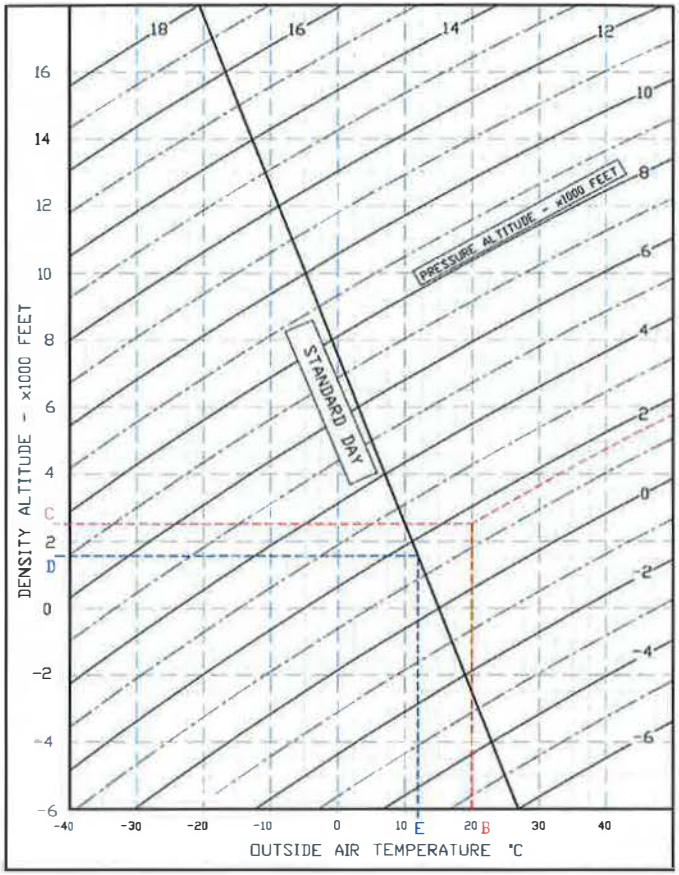

FIG. 5-2. ICAO CHART

Examples:

Scope	*Given*		*Find*
DensityAltitude:	A: Pressure altitude = *1600ft* B: Temperature = *20°C*	→	C: DensityAltitude = *2550ft*
ISA Temperature:	D: Pressure altitude = *1600ft*	→	E: ISA Air Temperature = *12°C*

5. STALL SPEED

Weight: 650 kg
Throttle Levers: *IDLE*
CG: *Most Forward (20%)*
No ground effect

WEIGHT	BANK ANGLE	STALL SPEED					
		FLAPS 0°		FLAPS T/O		FLAPS FULL	
[kg]	[deg]	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
650 (FWD C.G.)	0	49	51	46	48	40	44
	15	50	52	46	49	41	44
	30	53	55	49	51	44	47
	45	59	61	55	57	49	52
	60	71	72	67	67	60	62

NOTE *Altitude loss during conventional stall recovery, as demonstrated during flight tests is approximately 350 ft with banking below 30°.*

6. CROSSWIND

Maximum demonstrated crosswind is 15Kts

⇒Example:

Given

Wind direction (*with respect to aircraft longitudinal axis*)= 30°

Wind speed = 20 Kts

Find

Headwind = 17.5 Kts

Crosswind = 10 Kts

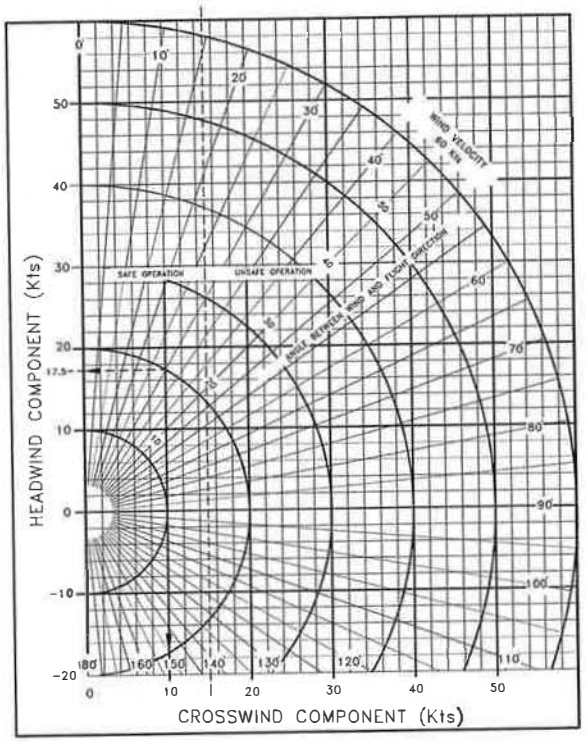

FIG. 5-2, CROSSWIND CHART

7. TAKE-OFF PERFORMANCE

NOTE *To account for likely in service performance variations apply a factored to distances of 1.10*

Weight = *650 kg* Flaps: *T/O* Speed at Lift-Off = *50 KIAS* Speed Over *50ft* Obstacle = *61 KIAS* Throttle Levers: *Full Forward* Runway: *Grass*	**Corrections** Headwind: - *5 m* for each kt (*16 ft/kt*) Tailwind: + *15 m* for each kt (49 *ft/kt*) Paved Runway: - *10%* to Ground Roll Runway slope: + *7%* to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m]				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	Ground Roll	144	182	224	272	**207**
	At 50 ft AGL	304	379	463	557	**428**
1000	Ground Roll	157	198	245	297	**222**
	At 50 ft AGL	330	412	503	605	**458**
2000	Ground Roll	172	216	267	324	**238**
	At 50 ft AGL	359	448	547	658	**490**
3000	Ground Roll	188	236	292	354	**256**
	At 50 ft AGL	391	487	595	717	**525**
4000	Ground Roll	205	258	319	387	**275**
	At 50 ft AGL	425	530	648	780	**562**
5000	Ground Roll	224	283	349	423	**295**
	At 50 ft AGL	463	578	706	850	**603**
6000	Ground Roll	246	309	381	463	**318**
	At 50 ft AGL	505	630	770	927	**646**
7000	Ground Roll	269	339	418	507	**342**
	At 50 ft AGL	551	687	840	1011	**693**
8000	Ground Roll	295	371	458	555	**368**
	At 50 ft AGL	601	750	917	1104	**744**
9000	Ground Roll	323	407	502	609	**397**
	At 50 ft AGL	657	819	1002	1205	**800**
10000	Ground Roll	354	446	551	668	**428**
	At 50 ft AGL	718	895	1095	1318	**859**

Weight = 550 kg Flaps: T/O Speed at Lift-Off = 50 KIAS Speed Over 50ft Obstacle = 61 KIAS Throttle Levers: Full Forward Runway: Grass	Corrections Headwind: - 5 m for each kt (16 ft/kt) Tailwind: + 15 m for each kt (49 ft/kt) Paved Runway: - 10% to Ground Roll Runway slope: + 7% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m]				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	Ground Roll	97	122	150	182	138
	At 50 ft AGL	207	258	316	380	292
1000	Ground Roll	105	133	164	199	148
	At 50 ft AGL	225	280	343	413	312
2000	Ground Roll	115	145	179	217	159
	At 50 ft AGL	245	305	373	449	334
3000	Ground Roll	126	158	195	237	171
	At 50 ft AGL	266	332	406	488	358
4000	Ground Roll	137	173	213	259	184
	At 50 ft AGL	290	361	442	531	383
5000	Ground Roll	150	189	233	283	198
	At 50 ft AGL	316	394	481	579	411
6000	Ground Roll	164	207	255	310	213
	At 50 ft AGL	344	429	525	631	440
7000	Ground Roll	180	227	280	339	229
	At 50 ft AGL	375	468	572	689	472
8000	Ground Roll	197	248	307	372	247
	At 50 ft AGL	410	511	625	752	507
9000	Ground Roll	216	272	336	408	266
	At 50 ft AGL	447	558	682	821	545
10000	Ground Roll	237	299	369	447	286
	At 50 ft AGL	489	610	746	897	585

Weight = 450 kg Flaps: T/O Speed at Lift-Off = 50 KIAS Speed Over 50ft Obstacle = 61 KIAS Throttle Levers: Full Forward Runway: Grass	Corrections Headwind: - 5 m for each kt (16 ft/kt) Tailwind: + 15 m for each kt (49 ft/kt) Paved Runway: - 10% to Ground Roll Runway slope: + 7% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m]				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	Ground Roll	60	75	93	113	85
	At 50 ft AGL	131	163	199	239	184
1000	Ground Roll	65	82	101	123	92
	At 50 ft AGL	142	177	216	260	197
2000	Ground Roll	71	90	110	134	98
	At 50 ft AGL	154	192	235	283	211
3000	Ground Roll	78	98	121	146	106
	At 50 ft AGL	168	209	256	308	226
4000	Ground Roll	85	107	132	160	114
	At 50 ft AGL	183	228	279	335	242
5000	Ground Roll	93	117	144	175	122
	At 50 ft AGL	199	248	304	365	259
6000	Ground Roll	102	128	158	191	131
	At 50 ft AGL	217	271	331	398	278
7000	Ground Roll	111	140	173	210	141
	At 50 ft AGL	237	295	361	434	298
8000	Ground Roll	122	153	189	230	152
	At 50 ft AGL	258	322	394	474	320
9000	Ground Roll	134	168	208	252	164
	At 50 ft AGL	282	352	430	518	344
10000	Ground Roll	147	185	228	276	177
	At 50 ft AGL	308	384	470	566	369

8. TAKE-OFF RATE OF CLIMB

NOTE *To account for likely in service performance variations apply a factored to rate of climb of 0.90*

Throttle Levers: Full Forward
Flaps: Take Off (15°)

Weight	Pressure Altitude	Climb Speed V_Y	Rate of Climb [ft/min]				
			Temperature [°C]				ISA
[kg]	[ft]	[KIAS]	-25	0	25	50	
650	S.L.	70	951	805	675	557	725
	2000	69	840	696	568	453	638
	4000	68	729	588	462	349	551
	6000	67	619	480	357	245	464
	8000	65	509	373	251	142	377
	10000	64	399	266	146	39	290
	12000	63	290	159	42	-64	204
	14000	62	181	53	-63	-166	117
600	S.L.	70	1067	913	776	652	829
	2000	68	950	799	664	542	737
	4000	67	833	685	552	433	646
	6000	66	717	571	441	324	555
	8000	65	602	458	330	215	463
	10000	64	486	345	220	106	372
	12000	63	371	233	110	-2	280
	14000	62	257	121	0	-109	189
550	S.L.	69	1201	1038	892	760	948
	2000	68	1077	916	773	644	851
	4000	67	953	795	654	527	754
	6000	66	830	675	536	411	657
	8000	65	707	555	419	296	560
	10000	64	584	435	301	181	462
	12000	63	462	315	184	66	365
	14000	61	341	196	68	-48	268

9. EN-ROUTE RATE OF CLIMB

NOTE *To account for likely in service performance variations apply a factored to rate of climb of 0.90*

Throttle Levers: Full Forward
Flaps: UP

Weight	Pressure Altitude	Climb Speed V_Y	Rate of Climb [ft/min]				
			Temperature [°C]				ISA
[kg]	[ft]	[KIAS]	-25	0	25	50	
650	S.L.	67	981	835	704	586	755
	2000	67	870	726	597	481	667
	4000	67	759	617	491	377	580
	6000	67	648	509	385	273	493
	8000	67	538	401	279	170	406
	10000	67	428	294	174	66	319
	12000	67	319	187	69	-37	232
	14000	67	210	80	-35	-139	145
600	S.L.	67	1104	948	809	683	863
	2000	67	985	832	695	572	770
	4000	67	867	717	582	461	677
	6000	67	750	602	470	351	585
	8000	67	632	487	357	240	492
	10000	66	515	373	245	131	399
	12000	66	399	259	134	21	307
	14000	66	283	145	23	-88	214
550	S.L.	67	1245	1078	929	794	987
	2000	67	1118	954	807	675	887
	4000	67	992	830	686	556	788
	6000	66	865	707	565	438	688
	8000	66	740	584	445	319	589
	10000	66	614	461	325	202	490
	12000	66	489	339	205	84	390
	14000	66	365	218	86	-33	291

10. CRUISE PERFORMANCE

CAUTION

Propeller speed over 2265 RPM is restricted to 5min.

Weight = 650 kg

CORRECTIONS

	KTAS	Fuel Consumption	Endurance	Range	Specific Range
For each +15°C of OAT	-2%	-2.5%	+2%	+1%	+1%
For each -15°C of OAT	+1%	+3%	-4%	-2%	-1%
For -100kg of weight	+3.3%	-	-	+3%	+4%

CRUISE PERFORMANCE

Pressure Altitude [ft]	OAT ISA [deg C]	Propeller RPM	KTAS	Fuel Consumption [lt/hr]	Endurance [hr:mm]	Range [nm]	Specific Range [nm/lt]
0	15	2388	120	26.2	4:35	552	4.5
		2250	112	23.5	5:06	574	4.7
		2100	103	21.2	5:40	589	4.8
		2000	98	19.9	6:02	592	4.9
		1900	92	18.8	6:22	588	4.8
		1800	86	18	6:39	575	4.7
2000	11	2250	112	23	5:13	586	4.8
		2100	103	20.8	5:46	596	4.9
		2000	97	19.7	6:06	595	4.9
		1900	91	18.8	6:24	586	4.8
		1800	85	18.1	6:37	568	4.7

Weight = 650 kg

CORRECTIONS

	KTAS	Fuel Consumption	Endurance	Range	Specific Range
For each +15°C of OAT	-2%	-2.5%	+2%	+1%	+1%
For each -15°C of OAT	+1%	+3%	-4%	-2%	-1%
For -100kg of weight	+3.3%	-	-	+3%	+4%

CRUISE PERFORMANCE

Pressure Altitude [ft]	OAT ISA [deg C]	Propeller RPM	KTAS	Fuel Consumption [lt/hr]	Endurance [hr:mm]	Range [nm]	Specific Range [nm/lt]
4000	7	2250	111	22.5	5:20	595	4.9
		2100	102	20.6	5:50	599	4.9
		2000	97	19.6	6:08	594	4.9
		1900	91	18.8	6:23	581	4.8
		1800	85	18.1	6:37	564	4.6
6000	3	2250	111	22.1	5:26	602	4.9
		2100	102	20.4	5:53	602	4.9
		2000	96	19.6	6:08	591	4.9
		1900	90	18.9	6:21	574	4.7
		1800	83	18.5	6:30	550	4.5
8000	-1	2250	110	21.8	5:30	607	5.0
		2100	101	20.3	5:55	600	4.9
		2000	95	19.6	6:07	586	4.8
		1900	89	19.1	6:17	564	4.6
10000	-5	2250	109	21.4	5:37	615	5.1
		2100	101	20.4	5:53	594	4.9
		2000	95	19.7	6:05	578	4.7
		1900	89	19.1	6:18	561	4.6

11. LANDING PERFORMANCE

NOTE *To account for likely in service performance variations apply a factored to distances of 1.67*

Weight = 650 kg

Flaps: *LAND*
Short Final Approach Speed = 54 KIAS
Throttle Levers: *Idle*
Runway: *Grass*

Corrections
Headwind: -4m for each kt (*13 ft/kt*)
Tailwind: + 13m for each kt (*43 ft/kt*)
Paved Runway: *-10%* to Ground Roll
Runway slope: -3% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m]				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	Ground Roll	149	164	179	194	**173**
	At 50 ft AGL	358	373	388	403	**382**
1000	Ground Roll	154	170	186	201	**178**
	At 50 ft AGL	363	379	395	410	**387**
2000	Ground Roll	160	176	192	209	**183**
	At 50 ft AGL	369	385	401	418	**392**
3000	Ground Roll	166	183	200	216	**189**
	At 50 ft AGL	375	392	409	425	**398**
4000	Ground Roll	172	190	207	225	**195**
	At 50 ft AGL	381	399	416	434	**404**
5000	Ground Roll	179	197	215	233	**201**
	At 50 ft AGL	388	406	424	442	**410**
6000	Ground Roll	186	205	223	242	**207**
	At 50 ft AGL	395	414	432	451	**416**
7000	Ground Roll	193	212	232	251	**213**
	At 50 ft AGL	402	421	441	460	**422**
8000	Ground Roll	200	221	241	261	**220**
	At 50 ft AGL	410	430	450	470	**429**
9000	Ground Roll	208	229	250	271	**227**
	At 50 ft AGL	417	438	459	480	**436**
10000	Ground Roll	217	238	260	282	**234**
	At 50 ft AGL	426	447	469	491	**443**

12. BALKED LANDING PERFORMANCE

NOTE *To account for likely in service performance variations apply a factored to rate of climb and to angle of climb of 0.90*

Throttle Levers: Full Forward
Flaps: LAND
Speed: 54 KIAS

Weight	Pressure Altitude	Angle of Climb [deg]				
		Temperature [°C]				ISA
[kg]	[ft]	-25	0	25	50	
650	S.L.	8.4	7.0	5.8	4.7	**6.3**
	2000	7.4	6.0	4.8	3.7	**5.5**
	4000	6.3	5.0	3.8	2.7	**4.6**
	6000	5.3	3.9	2.8	1.7	**3.8**
	8000	4.2	2.9	1.8	0.7	**3.0**
	10000	3.2	1.9	0.8	-0.3	**2.1**
	12000	2.1	0.9	-0.2	-1.2	**1.3**
	14000	1.1	-0.1	-1.2	-2.2	**0.5**

13. NOISE DATA

Noise level, determined in accordance with ICAO/Annex 16 6th Ed., July 2011, Vol. I°, Chapter 10, is **68.06**dB(A).

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SECTION6–WEIGHT AND BALANCE

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1. INTRODUCTION

This section describes the procedure for establishing the basic empty weight and the moment of the aircraft. Loading procedure information is also provided.

NOTE

Aircraft must be operated in accordance with the limits concerning the maximum takeoff weight and CG excursion as reported in Flight Manual Section 2.

Pilot is responsible for checking the weight and CG excursion are compliant with the related limits. CG excursion and weight limits are reported in Section 2 – Limitations.

2. WEIGHING PROCEDURES

2.1. PREPARATION

- Carry out weighing procedure inside closed hangar
- Remove from cabin any objects unintentionally left
- Insure Flight Manual and mandatory documents are on board
- Align nose wheel
- Drain fuel via the specific drain valve
- Oil, hydraulic fluid and coolant to operating levels
- Move sliding seats to most forward position
- Raise flaps to fully retracted position (0°)
- Place control surfaces in neutral position
- Place scales under each wheel

2.2. LEVELLING

- Level the aircraft (the reference for longitudinal levelling is made putting a spirit-level on the cabin floor as shown in the Aircraft Maintenance Manual).
- If needed, adjust longitudinal attitude deflating nose tire

2.3. WEIGHING

- Record weight shown on each scale
- Repeat weighing procedure three times
- Calculate empty weight

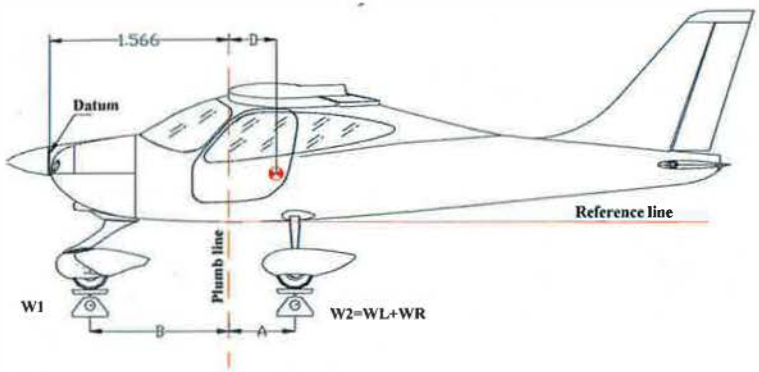
2.4. DETERMINATION OF C.G. LOCATION

- Drop a plumb bob tangent to the wing leading edge and trace a reference mark on the floor(see Figure on Para. 2.5 or 2.6)
- Repeat the operation for other wing
- Stretch a taught line between the two marks
- Measure the distance between the reference line and both main and nose wheel axis(A and B distances respectively)
- Using recorded data it is possible to determine the aircraft C.G. location and the aircraft moment (see following table)

2.5. WEIGHING RECORD

Model **P2008 JC** *S/N:* 1070 *Weighing no.* 1 *Date:* 27/02/2017

Datum: Propeller Flange



	Kg or ~~Lbs~~		Meters or ~~feet~~
Nose wheel weight	W_1 = 84.3	Plumb bob distance LH wheel	A_L = 0,660
LH wheel weight	W_L = 168,0	Plumb bob distance RH wheel	A_R = 0,660
RH wheel weight	W_R = 169,0	Average distance $(A_L + A_R)/2$	A = 0,660
$W_2 = W_L + W_R$ = 337,0		Plumb bob distance from nose wheel	B = 1,150

Empty weight $We = W_1 + W_2$ = 421,0 [kg] or ~~[lbs]~~

$D = \frac{W_2 \cdot A - W_1 \cdot B}{We}$ = 0,299 [m] or ~~[Ft]~~

$D\% = \frac{D}{1{,}373\ m\ (or\ 4.5\ ft)} \cdot 100$ = 21,8

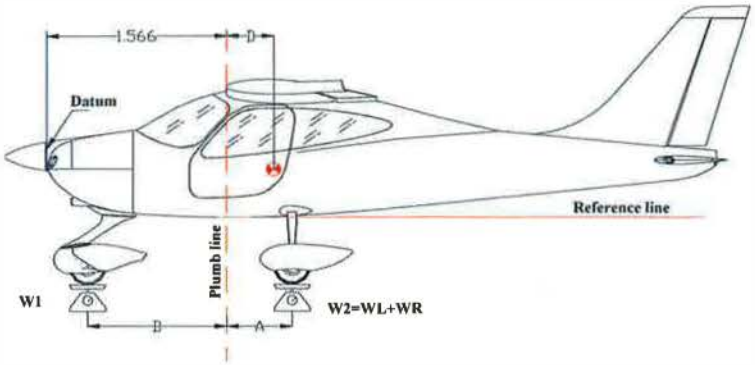
Empty weight moment: M = [(D+1.566) We] = [$m \cdot kg$] or ~~[lb·ft]~~ 785,5

Maximum takeoff weight	W_T = 650 kg	(1433 lbs)	Signature
Empty weight	We = 421,0	[kg] or ~~[lbs]~~	
Max. useful load W_T - We	Wu = 229,0	[kg] or ~~[lbs]~~	

2.6. WEIGHING RECORD (II)

Model **P2008 JC** *S/N:*_____ *Weighing no.* ____ *Date:*_____

Datum: Propeller Flange



	Kg or Lbs
Nose wheel weight	W_1 =
LH wheel weight	W_L =
RH wheel weight	W_R =
$W_2 = W_L + W_R$ =	

	Meters or feet
Plumb bob distance LH wheel	A_L =
Plumb bob distance RH wheel	A_R =
Average distance $(A_L + A_R)/2$	A =
Plumb bob distance from nose wheel	B =

Empty weight We = $W_1 + W_2$ = [kg] or [lbs]

$D = \frac{W_2 \cdot A - W_1 \cdot B}{We}$ = [m] or [ft]

$D\% = \frac{D}{1.373\ m\ (or\ 4.5\ ft)} \cdot 100$ =

Empty weight moment: M = [(D+1.566) We] = [*m · kg*] or [ft lbs]

Maximum takeoff weight	W_T = 650 kg	(1433 lbs)
Empty weight	We =	[kg] or [lbs]
Max. useful load W_T - We	Wu =	[kg] or [lbs]

Signature

_____

_____

3. WEIGHTS AND C.G.

In order to compute the weight and balance of this aircraft, the following loading charts are provided. To compute weight and balance use the formula:

Weight * Arm = Moment.

Pilot&Passenger	
Weight(kg)	**Moment (kgm)**
10	18
20	36
30	54
40	72
50	90
60	108
70	126
80	144
90	162
100	180
110	198
120	216
130	234
140	252
150	270
160	288
170	306
180	324
190	342
200	360
210	378
220	396
230	414

Fuel		
Liter	**Weight (kg)**	**Moment (kgm)**
10	7.2	15.91
20	14.4	31.82
30	21.6	47.74
40	28.8	63.65
50	36	79.56
60	43.2	95.47
70	50.4	111.38
80	57.6	127.30
90	64.8	143.21
100	72	159.12
110	79.2	174.95
120	86.4	190.86
124	89.3	197.26

Baggage	
Weight(kg)	**Moment (kgm)**
5	12.05
10	24.10
15	36.15
20	48.20

	Meter	Inches
Pilot and PAX	1.800	70.90
FUEL	2.209	86.97
BAGGAGE	2.417	95.16

To compute weight and balance:

1. Get moments from loading charts
2. Obtain the empty weight and moment from the most recent weight and balance
3. Insert the weights and the moments for fuel, occupants and baggage from the previous chart
4. Sum the weight and the moment columns
5. Divide the total moment by the total weight to get the arm
6. Check that the total weight does not exceed maximum gross weight of 630 Kg (1388 lb)
7. Check that the arm falls within the C.G. range

650

CoG Position Computation Chart			
	Weight (kg)	**Arm (m)***	**Moment (kg*m)**
EmptyWeight	421	1,88	785,5
Fuel		2.209	
Pilot&Passenger		1.800	
Baggage		2.417	
Total **MOMENT**			
Total **WEIGHT**			
Distance "D"=**MOMENT/WEIGHT**			

HB KML

*ADD to the distance "D" the value 1.566m (62in)

Signature

Max FWD 1,841 m Max AFT 1,978 m

C.G.Range	Max FWD	Max AFT
Meters	1.841	1.978
Max Weight	**Pounds**	**Kilograms**
	1433.00	650.00

Example	Weight (lbs)	Weight (kg)	Arm (inches)	Arm (m)	Moment (lbs x in)	Moment (lbs x in)
Empty Weight	813.5	366.075	74.41	1.89	60531.97	691.88
Fuel	150	67.5	87.01	2.21	13051.16	149.18
Pilot & Passenger	300	135	70.90	1.80	21270.00	243.00
Baggage	0	0	94.88	2.41	0.00	0.00
Total	1263.5	568.575	75.07	1.84	94853.12	1084.06

In this example, the gross weight is under the max gross weight of 630 kg (1388 lbs) and the Arm or C.G. is within the C.G. range listed above.

4. BAGGAGE LOADING

The baggage loading in the dedicated compartment, behind the pilots' seats, must be carried out in accordance with C.G. excursion and weight limitations reported in Section 2.

Baggage must be uniformly distributed on compartment floor.

Pilot is provided with a red tie-down net and snap fasteners allowing for securing the loads on the compartment floor.

CAUTION

Loading the baggage, make sure that you correctly stretched the net which must be secured to the four vertices of the compartment.

5. EQUIPMENT LIST

The following is a comprehensive list of all TECNAM supplied equipment for the P2008 JC. The list consists of the following groups:

A *Engine and accessories*
B *Landing gear*
C *Electrical system*
D *Instruments*
E *Avionics*

the following information describes each listing:

- Part-number to uniquely identify the item type.
- Item description
- Weight in kilograms
- Distance in meters from Datum

NOTE *Items marked with an asterisk (*) are part of basic installation. Equipment marked with X in the* Inst. *column are those actually installed on board relative to aircraft S/N.*

P2008 JC EQUIPMENT LIST		DATE: 27/02/2017			
RIF.	DESCRIPTION &P/N	INST	WEIGHT [kg]	DATUM [mm]	Q.TY [N°]
	ENGINE & ACCESSORIES				
A1	*Hoffmann Propellers – p/n* HO17GHM A 174 177C	*	6.0	-144	1
A2	*Heat exchanger - p/n 28-10-8000-000*	*	2.00	754	1
A3	*Oil Reservoir (full) - p/n 956508*	*	4.00	760	1
A4	*Oil radiator - p/n 886029*	*	0.50	25	1
A5	*Liquid coolant radiator. - p/n 995.697*	*	1.50	129	1
A6	*Air filter K&N- p/n 33-2544*	*	0.40	315	1
A7	*Electric Fuel pump p/n 21-11-342-000*	*	1.20	764	1
A8	*Thermostatic water valve 26-9-9100-000*	*	0.35	316	1
A9	*Thermostatic oil valve 26-9-9000-000*	*	0.35	316	1
	LANDING GEAR AND ACCESSORIES				
B1	*Main gear wheel rims. – Cleveland 40-78B*	*	2.05	2229	2
B2	*Main gear tires.-Air Trac 5.00-5*	*	2.58	2229	2
B3	*Disk brakes - Cleveland 164-17*	*	0.80	2229	2
B4	*Nose gear wheel rim - Cleveland 0101120*	*	1.30	418	1
B5	*Nose gear tire – Air Trac 5.00-5*	*	1.20	418	1
B6	*Nose gear fairing p/n 210-4-3001-401A / -401P*	*	1.50	418	1
B7	*Main gear fairing p/n 27-8-410-1/-2*	*	1.50	2229	2
B8	*Nose gear shock p/n28-8-500-000*	*	1.45	770	1
	ELECTRICAL SYSTEM				
C1	*Battery FIAMM 6H4P 12V 18Ah*	N	4.70	1900	1
C2	*Battery GILL-Teledyne G-25 12V 18Ah*	X	9.53	1900	1
C3	*Buffer Battery Sonnenschein A512/2 S*	*	1.0	1900	2
C3	*Battery relay - p/n 111-226-5*	*	0.30	1900	1
C4	*Flaps actuator control – 22-5-176-1*	*	2.20	2206	1
C5	*Trim actuator control BRISTOL SG B6-11C*	*	0.40	5818	1
C6	*Overvoltage sensor Electrodelta OS75-14*	N	0.30	772	1
	Overvoltage sensor LAMAR B-00289-2	X	0.30	772	1
C7	*Aveo NAV/POS/Strobe p/nAVE-WPST R/G-54G*	*	0.20	2130	2
C8	*Landing Led light p/n PLEDIL*	*	0.40	130	1

	INSTRUMENTS				
D1	Altimeter MIKROTECHNA p/n LUN 1128.12B6 –TSO C10b	*	1.00	1084	1
D2	Airspeed indicator – MIKROTECHINA LUN 1116F2B2 - TSO C2b	*	1.00	1084	1
D3	Compass - AirpathC2400 I.4P – TSO C7c	*	0.29	1000	1
D4	Clock – DAVTRON mod. M 800	*	0.15	1084	1
D5	Slip Indicator SI-2Q	*	0.56	1084	1
D6	Attitude Indicator - RC Allen Instr. RCA26EK-12	X	1.30	1084	1
D7	Trim Position Ind. UMA p/nN091IS0U2DR000	*	0.20	1084	1
D8	Fuel Quantity Ind. Road GmbH X1D4000800	*	0.45	1090	2
D9	RPM indicator (Sorlini) SOR 52	X	0.30	1084	1
D10	Oil temperature indicator (Sorlini) SOR 54S	X	0.30	1084	1
D11	CHT temperature indicator (Sorlini) SOR 53	N	0.30	1084	1
D12	VoltmeterIndicator (Sorlini) SOR 51S	*	0.30	1084	1
D13	G3X Display (LH + RH) – P/n 28-9-5090-000	*	1.60	1084	2
D14	G3X AHRS - P/n 28-9-5110-000	*	1.60	1900	1
D15	G3X Magnetometer - GMU 44	*	0.23	4697	1
D16	OAT probe - GTP 59	*	0.10	2060	1
D17	CT temperature indicator (Sorlini) SOR 59	X	0.30	1084	1
	AVIONICS AND OTHER				
E1	Nav/Comm - Garmin SL30 Pack and connectors	N	1.50	1084	1
E2	ELT Artex ME 406	N	1.10	1900	1
E3	Transponder-Garmin GTX328	*	1.00	1084	1
E4	Audio panel –Garmin GMA 340	*	0.50	1084	1
E5	Transponder Antenna Garmin 010-10160-00	*	0.17	985	1
E6	GPS Antenna.GarminGA-35	*	0.27	807	1
E7	Comm Antenna Comant Industries C1-121	*	0.34	4253	1
E8	ELT Antenna Kit Model ME 406	N	0.21	1900	1
E9	First Aid Kit	*	0.30	1800	1
E10	Fire Extinguisher H3Rs Halon RTA600	*	0.60	1800	1
E11	Garmin GNC 255A COM/NAV	*	1.80	1084	1
E12	Marker beacon Antenna Comant Industries C1 102	*	0.30	2917	1
E13	Nav Antenna Comant Industries C1-158C	*	0.30	5782	1
E14	Altitude Encoder ACK technologies ACK A30	*	0.35	975	1
E15	ELT Kannad 406 AF Compact	*	1.10	1900	1
E16	ELT Antenna ANT200	*	0.21	0.11	1

SECTION 7 – AIRFRAME AND SYSTEMS DESCRIPTION

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1. INTRODUCTION

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

2. AIRFRAME

P2008 JC's airframe can be divided in the following main groups, as highlighted below on:

1) Wings
2) Fuselage
3) Empennage
4) Landing gear

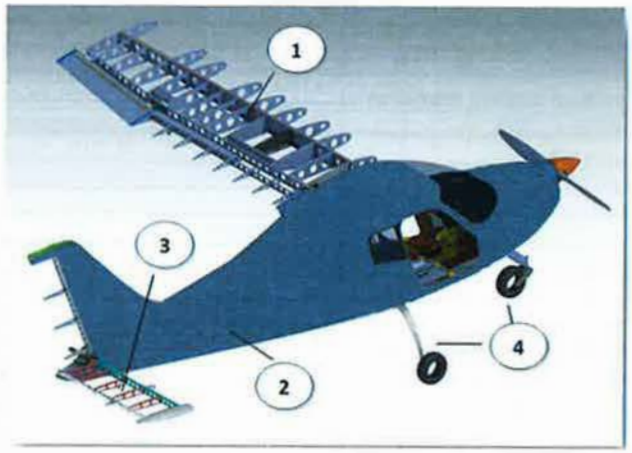


Fig. 7-1.P2008JC AIRFRAME

2.1. WING

Each wing is connected to the fuselage by means of two bolt attachments and a single strut brace per side. The wings are made up of a central light alloy torsion box; a light alloy leading edge is attached to the front spar whereas the flap (slotted) and the aileron ("frise") are attached to a rear spar through two hinges each. The torsion box consists of a front and rear spar that represent its front and rear vertical walls; a series of ribs and wrap-around panels complete the structure. Front and rear spars are integrated with wing-fuselage attachment fittings.
The ailerons and flaps are made by an aluminium spar attached to a formed sheet metal leading edge and metal ribs; an aluminium skin surrounds the aileron structure.

2.2. FUSELAGE

The P2008 JC fuselage is mainly made by carbon fibres composite materials.
The fuselage is made by two main shells that are later assembled bonding the two main bodies and the floor (composite) and adding aluminium stiffeners that allow the connection of the main landing gear, seats, wing and instrument panel.
In this context the fuselage and vertical fin are a unique body.

2.3. EMPENNAGES

The horizontal tail is an all-moving type; the stabilizer and elevator form a single uniform plane called stabilator that rotates to the desired pitch setting.
The stabilator structure is made-up by an aluminium spar (1) and ribs (2).
Aluminium skin panels are riveted to the above elements (3).

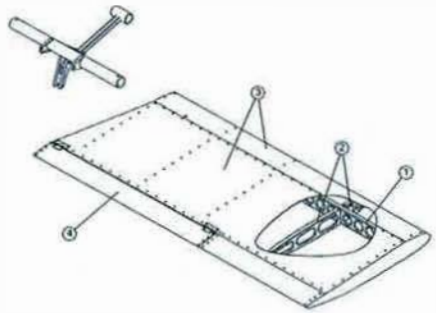


Fig. 7-2.STABILATOR STRUCTURE

A trim tab (4) provides stick force adjustment and longitudinal compensation.
The rudder structure is made-up by a single aluminium spar and ribs. Aluminium skin panels are riveted to the above elements. At the lower hinge a bellcrank is connected for the movement transmission.

2.4. LANDING GEAR

The main landing gear (see Figure 7-3) consists of two special steel leaf-springs positioned crossways to the fuselage.

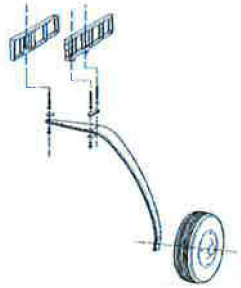


Fig. 7-3.MAIN LANDING GEAR STRUCTURE

The steel leaf-springs are attached to the fuselage structure via two couples of machined aluminium beams.
Wheels are cantilevered on gear struts and feature hydraulically actuated disc brakes controlled by toe.

A Pivoting nose gear is attached to the firewall reinforcement plate. The Hydraulic shock absorber is fitted on the upper machined component and directly on the nose landing gear structure.

In the following figure is shown:

1) *Hydraulic shock absorber*
2) *Firewall*
3) *Nose wheel*

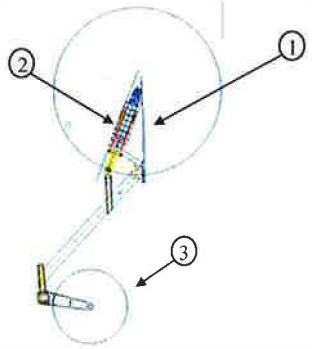


Fig. 7-4.NOSE LANDING GEAR STRUCTURE

3. FLIGHT CONTROLS

Aircraft flight controls are operated through conventional stick and rudder pedals. Longitudinal control acts through a system of push-rods and is equipped with a trim tab. a cable control circuit is confined within the cabin and it is connected to a pair of push-pull rod systems positioned in each main wing which control ailerons differentially. Aileron trimming is carried out on ground through a small tab positioned on left aileron.

Flaps are extended via an electric servo actuator controlled by a switch on the instrument panel. Flaps act in continuous mode; the indicator displays three markings related to 0°, takeoff (T/O) and landing (FULL) positions. A breaker positioned on the right side of the instrument panel protects the electric circuit.

Longitudinal trim is performed by the trim tab located on the stabilator through an electric actuator controlled by the pilot or co-pilot by a switch located on the control stick, another switch on the instrument panel, gives full authority to pilot or co-pilot control switch. An analogue trim indicator provides information about the surface position. In case of a trim control runaway a trim disconnect switch is available on the instrument panel

4. INSTRUMENT PANEL

The instrument panel is divided in four areas:

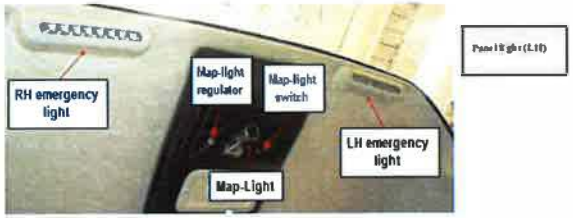
- The left area holds primary (analogue) and pilot's situational awareness (G3X LH display) flight instruments, a chronometer, a pitch trim indicator and a holds Day/night switch (selecting between two brightness levels for warning lights in the annunciator panel);
- The right area holds thus a voltmeter, the breaker panel and primary analogue engine instruments:
  - Oil Temperature indicator
  - RPM indicator
  - CHT indicator
- The central area holds the stabilator trim cut out switch and LH/RH selector switch, the dimming devices (for G3X, for flexible support mounted panel lights and for instruments), Nav/Com instrument (Garmin GNC 255A) , the GTX 328 transponder and the annunciator panel,,
  - Electric fuel pump ON (GREEN)
  - Low Oil Pressure (RED)
  - Low Fuel Pressure (RED)
  - Alternator Fail (AMBER)
  - Pitot heat operation lights (GREEN/AMBER)
  - High Oil Pressure warning light (RED)
- The lower-LH portion of the instrument panel holds:
  - Ignition key;
  - Master and Generator switches;
  - Emergency fuel pump;
  - Avionic Master switch;
  - Pitot heat switch;
  - Emergency light switch;
  - Carburetor heat knob;
- The lower-Central portion of the instrument panel holds:
  - Throttle;
  - Two analogue fuel quantity indicators;
  - Fuel selector valve;
- The lower-RH portion of the instrument panel holds:
  - Flap indicator and toggle switch;
  - Cabin heating knob;
  - NAV, land and strobe switches.

Fig. 7-5. INSTRUMENT PANEL

4.1. INTERNAL LIGHTS SYSTEM

An internal lights system is provided; it's based on the following elements:

- 2 dimmable panel lights (with flexible and adjustable supports) located in both sides of the dashboard and 2 LED lights above the annunciator panel (Panel DIM device);
- 2 emergency lights located in side area of the cabin ceiling and 1 LED light above the annunciator panel (all controlled by red Emergency Switch);
- 1 adjustable map-light located in the center area of the cabin ceiling.



4.2. CARBURETTOR HEAT

Carburettor heat control knob is located lower-LH portion of the instrument panel; when the knob is pulled fully outward from the instrument panel, carburettors receive maximum hot air. During normal operation, the knob is set in OFF position.

7. POWERPLANT

7.1. ENGINE

Manufacturer: *Bombardier-Rotax GmbH*

Model: *ROTAX 912 S2*

Type: *4 stroke, horizontally-opposed 4 cylinder, mixed air and water cooled, twin electronic ignition, forced lubrication.*

Maximum rating: *98.6hp (73.5kW) @ 5800 rpm/min (2388 rpm/min. prop). Gear reduction ratio - 2.4286:1*

Max oil consumption: *Max: 0.1 litres/hour*

7.2. PROPELLER

Manufacturer: *Hoffman Propellers*

Model: *HO17GHMA 174 177C*

N° of blades: *2*

Diameter: *1740 mm*

Type: *fixed pitch*

5. SEATS AND SAFETY HARNESS

Aircraft features four fitting point for safety belts equipped with waist and shoulder harnesses adjustable via sliding metal buckle.

Seats are built with light alloy tube structure and synthetic material cushioning. A lever located on the right lower side of each seat allows for seat adjustment according to pilot size..

6. DOORS

Two doors are provided for P2008 JC, on Pilot and co-pilot side. A sketch of the door is shown below (RH and LH doors are specular):

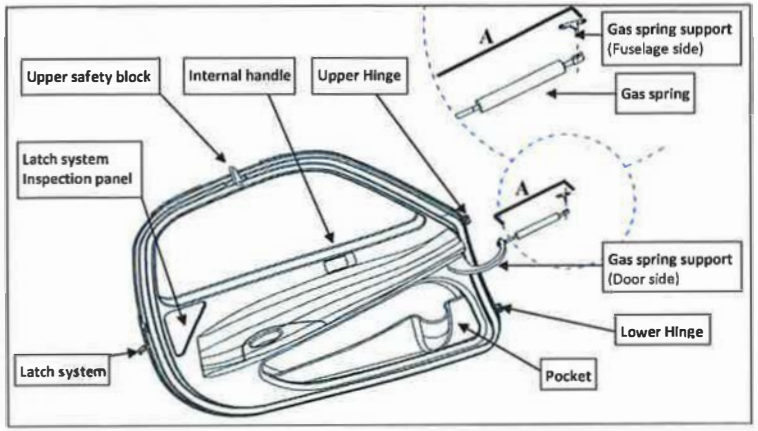


Fig. 7-6.DOOR

The door is equipped with a gas spring fixed to the fuselage that facilitates door opening.

1. INTRODUCTION

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

2. AIRFRAME

P2008 JC's airframe can be divided in the following main groups, as highlighted below on:

1) Wings
2) Fuselage
3) Empennage
4) Landing gear

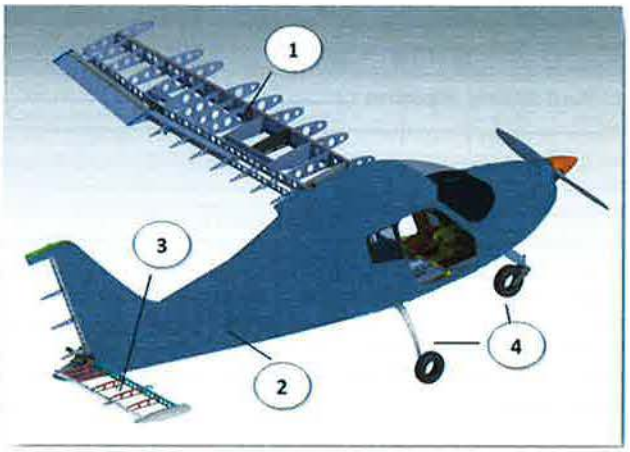


Fig. 7-1.P2008JC AIRFRAME

2.1. WING

Each wing is connected to the fuselage by means of two bolt attachments and a single strut brace per side. The wings are made up of a central light alloy torsion box; a light alloy leading edge is attached to the front spar whereas the flap (slotted) and the aileron ("frise") are attached to a rear spar through two hinges each. The torsion box consists of a front and rear spar that represent its front and rear vertical walls; a series of ribs and wrap-around panels complete the structure. Front and rear spars are integrated with wing-fuselage attachment fittings.
The ailerons and flaps are made by an aluminium spar attached to a formed sheet metal leading edge and metal ribs; an aluminium skin surrounds the aileron structure.

2.2. FUSELAGE

The P2008 JC fuselage is mainly made by carbon fibres composite materials.
The fuselage is made by two main shells that are later assembled bonding the two main bodies and the floor (composite) and adding aluminium stiffeners that allow the connection of the main landing gear, seats, wing and instrument panel.
In this context the fuselage and vertical fin are a unique body.

2.3. EMPENNAGES

The horizontal tail is an all-moving type; the stabilizer and elevator form a single uniform plane called stabilator that rotates to the desired pitch setting.
The stabilator structure is made-up by an aluminium spar (1) and ribs (2).
Aluminium skin panels are riveted to the above elements (3).

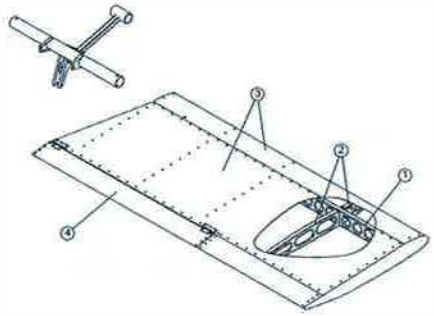


Fig. 7-2.STABILATOR STRUCTURE

A trim tab (4) provides stick force adjustment and longitudinal compensation.

The rudder structure is made-up by a single aluminium spar and ribs. Aluminium skin panels are riveted to the above elements. At the lower hinge a bellcrank is connected for the movement transmission.

2.4. LANDING GEAR

The main landing gear (see Figure 7-3) consists of two special steel leaf-springs positioned crossways to the fuselage.

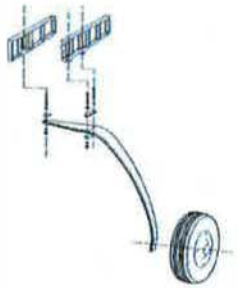


Fig. 7-3. MAIN LANDING GEAR STRUCTURE

The steel leaf-springs are attached to the fuselage structure via two couples of machined aluminium beams.
Wheels are cantilevered on gear struts and feature hydraulically actuated disc brakes controlled by toe.

A Pivoting nose gear is attached to the firewall reinforcement plate. The Hydraulic shock absorber is fitted on the upper machined component and directly on the nose landing gear structure.

In the following figure is shown:

1) *Hydraulic shock absorber*
2) *Firewall*
3) *Nose wheel*

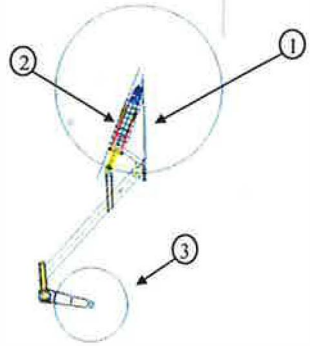


Fig. 7-4. NOSE LANDING GEAR STRUCTURE

3. FLIGHT CONTROLS

Aircraft flight controls are operated through conventional stick and rudder pedals. Longitudinal control acts through a system of push-rods and is equipped with a trim tab. a cable control circuit is confined within the cabin and it is connected to a pair of push-pull rod systems positioned in each main wing which control ailerons differentially. Aileron trimming is carried out on ground through a small tab positioned on left aileron.

Flaps are extended via an electric servo actuator controlled by a switch on the instrument panel. Flaps act in continuous mode; the indicator displays three markings related to 0°, takeoff (T/O) and landing (FULL) positions. A breaker positioned on the right side of the instrument panel protects the electric circuit.

Longitudinal trim is performed by the trim tab located on the stabilator through an electric actuator controlled by the pilot or co-pilot by a switch located on the control stick, another switch on the instrument panel, gives full authority to pilot or co-pilot control switch. An analogue trim indicator provides information about the surface position. In case of a trim control runaway a trim disconnect switch is available on the instrument panel

4. INSTRUMENT PANEL

The instrument panel is divided in four areas:

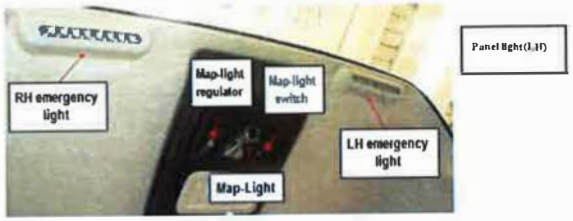
- The left area holds primary (analogue) and pilot's situational awareness (G3X LH display) flight instruments, a chronometer, a pitch trim indicator and a holds Day/night switch (selecting between two brightness levels for warning lights in the annunciator panel);
- The right area holds thus a voltmeter, the breaker panel and primary analogue engine instruments:
  - Oil Temperature indicator
  - RPM indicator
  - CHT indicator
- The central area holds the stabilator trim cut out switch and LH/RH selector switch, the dimming devices (for G3X, for flexible support mounted panel lights and for instruments), Nav/Com instrument (Garmin GNC 255A) , the GTX 328 transponder and the annunciator panel,,
  - Electric fuel pump ON (GREEN)
  - Low Oil Pressure (RED)
  - Low Fuel Pressure (RED)
  - Alternator Fail (AMBER)
  - Pitot heat operation lights (GREEN/AMBER)
  - High Oil Pressure warning light (RED)
- The lower-LH portion of the instrument panel holds:
  - Ignition key;
  - Master and Generator switches;
  - Emergency fuel pump;
  - Avionic Master switch;
  - Pitot heat switch;
  - Emergency light switch;
  - Carburetor heat knob;
- The lower-Central portion of the instrument panel holds:
  - Throttle;
  - Two analogue fuel quantity indicators;
  - Fuel selector valve;
- The lower-RH portion of the instrument panel holds:
  - Flap indicator and toggle switch;
  - Cabin heating knob;
  - NAV, land and strobe switches.

Fig. 7-5. INSTRUMENT PANEL

4.1. INTERNAL LIGHTS SYSTEM

An internal lights system is provided; it's based on the following elements:

- 2 dimmable panel lights (with flexible and adjustable supports) located in both sides of the dashboard and 2 LED lights above the annunciator panel (Panel DIM device);
- 2 emergency lights located in side area of the cabin ceiling and 1 LED light above the annunciator panel (all controlled by red Emergency Switch);
- 1 adjustable map-light located in the center area of the cabin ceiling.



4.2. CARBURETTOR HEAT

Carburettor heat control knob is located lower-LH portion of the instrument panel; when the knob is pulled fully outward from the instrument panel, carburettors receive maximum hot air. During normal operation, the knob is set in OFF position.

7. POWERPLANT

7.1. ENGINE

Manufacturer: *Bombardier-Rotax GmbH*

Model: *ROTAX 912 S2*

Type: *4 stroke, horizontally-opposed 4 cylinder, mixed air and water cooled, twin electronic ignition, forced lubrication.*

Maximum rating: *98.6hp (73.5kW) @ 5800 rpm/min (2388 rpm/min. prop). Gear reduction ratio - 2.4286:1*

Max oil consumption: *Max: 0.1 litres/hour*

7.2. PROPELLER

Manufacturer: *Hoffman Propellers*

Model: *HO17GHMA 174 177C*

N° of blades: *2*

Diameter: *1740 mm*

Type: *fixed pitch*

5. SEATS AND SAFETY HARNESS

Aircraft features four fitting point for safety belts equipped with waist and shoulder harnesses adjustable via sliding metal buckle.

Seats are built with light alloy tube structure and synthetic material cushioning. A lever located on the right lower side of each seat allows for seat adjustment according to pilot size..

6. DOORS

Two doors are provided for P2008 JC, on Pilot and co-pilot side. A sketch of the door is shown below (RH and LH doors are specular):

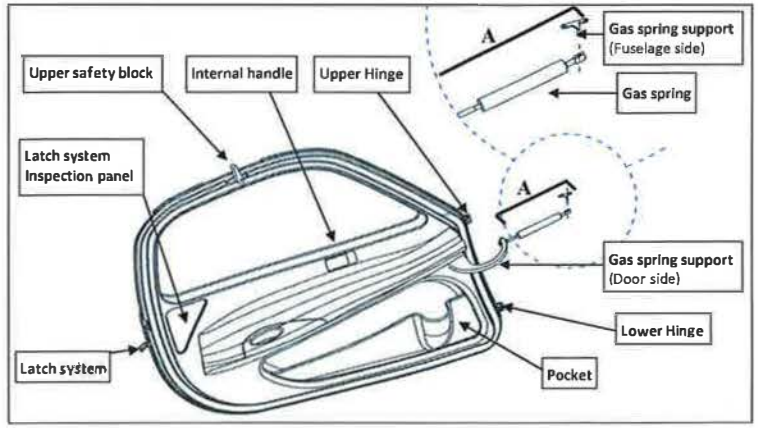


Fig. 7-6.DOOR

The door is equipped with a gas spring fixed to the fuselage that facilitates door opening.

7. POWERPLANT

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Maximum rating: *98.6hp (73.5kW) @ 5800 rpm/min (2388 rpm/min. prop). Gear reduction ratio - 2.4286:1*

Max oil consumption: *Max: 0.1 litres/hour*

7.2. PROPELLER

Manufacturer: *GT Propellers*

Model: *GT-2/173/VRR-FW101 SRTC*

N° of blades: *2*

Diameter: *1730 mm (no reduction permitted)*

Type: *wood, fixed pitch*

8. FUEL SYSTEM

The fuel system is designed to supply the reciprocating engine (Bombardier-Rotax 912 S2) with the suitable flow rate and pressure according to engine limitations required by Rotax manuals.
Following figure shows the fuel system schematic of P2008JC airplane.

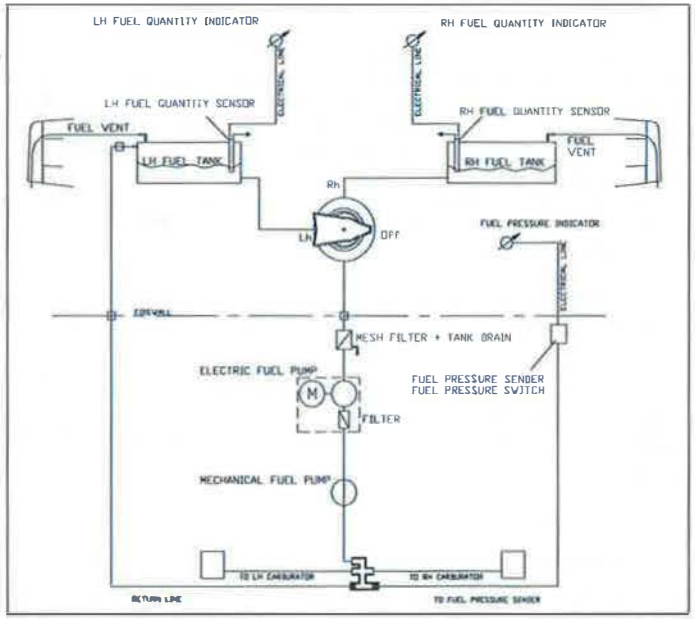

Fig.7-7. FUEL SYSTEM SCHEMATIC

Each fuel tank is integrated within the wing ribs box. The capacity of each tank is 62 liters for a total of 124 liters.
The internal side of fuel tank is accessible for inspection through two dedicated doors.
The fuel tank filler cap is located on the top of the wing, in the area outside of the tank and it is easily accessible from the leading edge of the aircraft. At the lowest point of the tank it is positioned a drain sump.
The engine is equipped with an engine gear pump, mechanical (primary). An additional auxiliary electrical fuel pump is provided (auxiliary).
The fuel selector is operated by a fuel selector control knob located in the cabin on the central panel. The fuel selector control and the fuel valve are connected via a rigid control rod.

9. ELECTRICAL SYSTEM

Primary DC power is provided by an external alternator with a 14 VDC output, rated to 40 Amps @ 5800 rpm. During normal operations, it r charges the battery.
Secondary DC power is provided by a battery (Main) which provides the energy necessary for feeding the essential electrical loads in the event of a alternator failure.
A second battery, activated only during engine start-up is installed; this is intended to act as a buffer battery during engine start-up, but it can provide additional electrical power in the event of an alternator failure or of a total loss of electrical system. This battery is enabled by the master switch and is only connected to the G3X units. It is installed beside the main battery and is housed in a dedicated box.
The switch between the energy sources(alternator and main battery) is automatic and no action is required in order to activate the alternate energy source.
For ground maintenance and/or starting, an external power socket is provided.
The alternator and battery are connected to the battery bus in order to provide energy for the electric equipment.

Each electrically fed instrument is connected to a dedicated circuit breaker which protects the cable from the battery bus to the associated electric equipment.

If the Ignition is in the position L, R, or BOTH, an accidental movement of the propeller may start the engine with possible danger for bystanders.

9.1. STALL WARNING SYSTEM

The aircraft is equipped with a stall warning system consisting of a sensor located on the right wing leading edge connected to a warning horn located near the instrument panel.

9.2. AVIONICS

The avionic system installed P2008 JC is based on five analogue indicators, an airspeed indicator, an attitude indicator, an altimeter, a magnetic compass and a slip indicator, which provide primary flight information on the left side of the instrument panel.

On the right side of the instrument panel three analogue indicators provides primary information of engine parameters, an RPM indicator, oil temperature indicator and a CHT indicator.

A dedicated analogue voltmeter is installed, located below engine instruments, which provides primary information of the electrical power supplied.

The fuel quantity information is provided by two dedicated analogue indicators located in the bottom central instruments panel.

Garmin G3X integrated avionic suite in a dual screen configuration is installed. It provides flight and engine information intended for the pilot's situational awareness only.
G3X also embodies a GPS WAAS receiver whose information, intended for situational awareness only, are presented on RH display moving map.
Two dedicated indicators provide the pilot with information about the flaps and pitch trim position.
Stand-alone external COM/NAV and transponder sources (Garmin GNC 255A and GTX 328) are installed. Garmin GNC 255A navigation information is presented on the display (course and direction) along with the information related to active/standby frequency. This information is supplemented by an HSI indicator on G3X LH display.
GTX 328 transponder provides SSR (Secondary Surveillance Radar) responses; this unit is capable of both mode "S" and mode "C". An external altitude encoder (ACK A-30) allows altitude reporting, this information is also presented on GTX 328 display.
An automatic reversion mode is integrated within the system in order to continue providing the pilot with the flight and engine information in the event of a LH or RH display failure.

Seven warning lights located on the top centre area of the instrument panel are available:

- Electric fuel pump ON (GREEN)
- Low Oil Pressure (RED)
- Low Fuel Pressure (RED)
- Alternator Fail (AMBER)
- High Oil Pressure (RED)
- Pitot heat ON (GREEN)
- Pitot heat fail (AMBER)

9.3. EXTERNAL POWER SUPPLY

On the right side of the tail cone, an external power is present. Using this device it is possible to feed the electric system directly on the bus bar, by an external power source. It should be used at the engine start-up in cold weather condition. For engine start below -17°C OAT it is advisable to use the external power source.

Follow this procedure to start the engine using the external power source.

1. Magnetos, Master switch, Generator switch: OFF
2. Open the receptacle door and insert the external power source's plug into the socket
3. Engine start-up procedure (see Sect. 4 in this manual)
4. Disconnect the external power source's plug and close firmly the receptacle door.

10. PITOT-STATIC PRESSURE SYSTEMS

The P2008 JC air speed/altitude indicating systems are connected with a Pitot-Static system based on a total pressure/Pitot probe (Heated Pitot tube) mounted under left wing and two static pressure ports connected in parallel and located in correspondence of engine firewall on left and right side of fuselage. Flexible plumbing connects total pressure and static ports to primary analogue instruments, anemometer and altimeter. An alternate static source is located in the cabin, operated by a dedicated control.

Garmin G3X ADAHRS (GSU73) unit, installed on the rear side of the fuselage near the battery, acts as an air data computer for Garmin G3X suite, it is connected to both static and total pressure lines providing on that suiteboth air speed and altitude information.

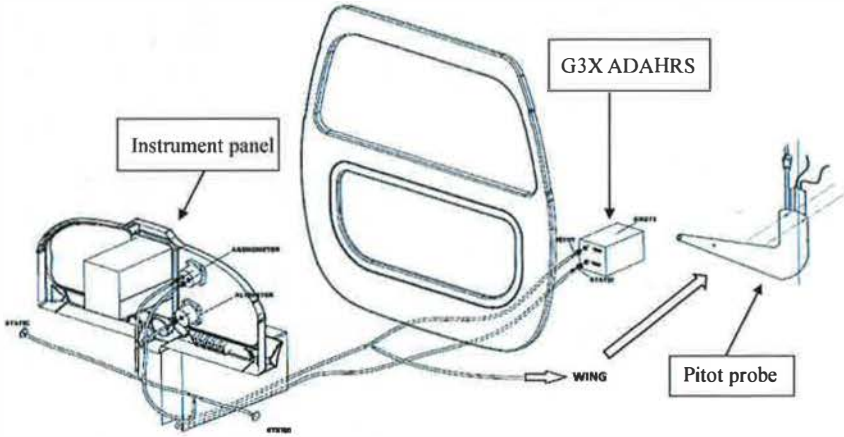

FIG.7-8. PITOT-STATIC SYSTEM

11. BRAKES

The P2008 JC is provided with an independent hydraulically actuated brake system for each main wheel. A master cylinder is attached to each pilot's rudder pedal Hydraulic pressure, applied via the master cylinders, enters the brake via lines connected to the caliper.

A parking brake valve, mounted in correspondence of the cabin floor and operated by a knob on the cockpit central pedestal, intercepts the hydraulic lines, once pressurized by toe brakes, to hold the brake assemblies linings tightened round the main wheels brake discs. Brakes can be operated from either pilot's and co-pilot's pedals: a single vented oil reservoir feeds the pilot side master cylinders which are connected, via hoses, with the co-pilot's side ones.

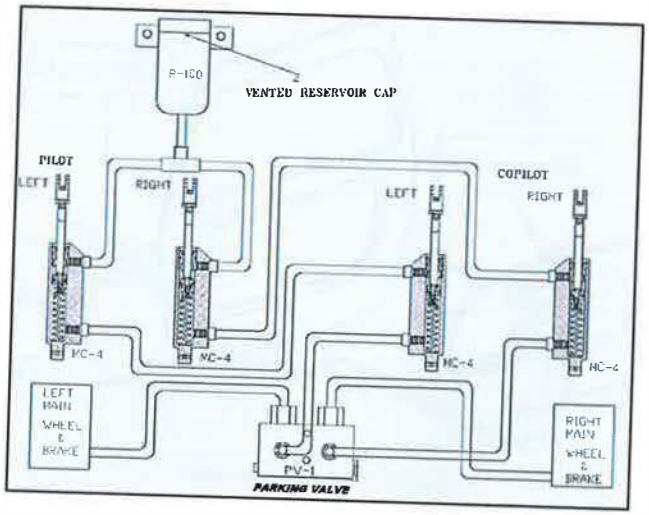

FIG. 7-9. BRAKE SYSTEM SCHEMATIC

SECTION 8 – GROUND HANDLING & SERVICE

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1. INTRODUCTION

This section contains factory-recommended procedures for proper ground handling and routine care and servicing. It also identifies certain inspection and maintenance requirements.

It is recommended to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered locally.

2. AIRCRAFT INSPECTION INTERVALS

Scheduled inspections must be performed in accordance with the instructions addressed on the Aircraft Maintenance Manual. Independently from the aircraft flight hours, an annual inspection has to be performed.

All required inspections are reported in the Aircraft Maintenance Manual.

As far as the scheduled/unscheduled engine maintenance is concerned, refer to the engine manufacturer Maintenance Manual.

Unscheduled inspections/maintenance tasks are necessary when one or more of following conditions occur:

1. *Emergency landing*
2. *Breaking / damage of propeller (or in case of simple impact)*
3. *Engine fire*
4. *Lighting damage*
5. *Any type of damage or failure*

3. AIRCRAFT CHANGES OR REPAIRS

Aircraft changes or repairs must be performed in accordance with Aircraft Maintenance Manual and Job cards provided by TECNAM.

4. MAINTENANCE

4.1. REFUELLING

- *Do not perform aircraft refuelling near flames, sparks or similar.*
- *Avoid fuel contact with the skin: a skin corrosion could occur.*
- *Make sure that a fire extinguisher is available nearby during refuelling operations.*
- *Make sure that overall aircraft instrumentation is turned OFF before performing the refuelling.*
- *Do not operate switches and/or pushbuttons inside the aircraft during refuelling operation; make sure that crew left the aircraft before performing refuelling.*
- *Make sure that the aircraft is electrically connected to the ground.*

4.2. OIL LEVEL CONTROL

1. Open the engine cowling (RH)
2. Prior to oil check, switch off ignition circuit and turn the propeller by hand in direction of engine rotation several times to pump oil from the engine into the oil tank, or let the engine idle for 1 minute. This process is finished when air is returning back to the oil tank and can be noticed by a murmur from the open oil tank.
3. Clean the dipstick and soak it in the reservoir
4. Remove dipstick and read oil level
5. If required, replenish oil: oil level should be between max. and min. Marks shown on thedipstick
6. Close the engine cowling

4.3. LANDING GEAR TIRES PRESSURE CONTROL

For each wheel proceed as follows:

1. Remove wheel fairing
2. Unscrew the tire cap
3. Connect a gauge
4. Read the pressure value
5. If required, rectify the pressure (nose tire 2.2 Bar / 32 Psi, main landing gear tires 2.8 Bar / 40 Psi)
6. Fit the tire cap
7. Install wheel fairing

5. ENGINE COWLING CHECK

5.1. UPPER COWLING

I. Parking brake: *ON*

II. Fuel selector valve: *OFF*

III. Magnetos: *OFF*

IV. Generator & Master switches: *OFF*

V. Unlatch all four butterfly Cam-locks mounted on the cowling by rotating them 90° counter clockwise while slightly pushing inwards.

VI. Remove engine cowling paying attention to propeller shaft passing through nose.

VII. To assemble: rest cowling horizontal insuring proper fitting of nose base reference pins.

VIII. Secure latches by applying light pressure, check for proper assembly and fasten Cam-locks.

WARNING

Butterfly Cam-locks are locked when tabs are horizontal and open when tabs are vertical. Verify tab is below latch upon closing.

5.2. LOWER COWLING

I. After disassembling upper cowling, move the propeller to a horizontal position.

II. Using a standard screwdriver, press and rotate 90° the two Cam-locks positioned on lower cowling by the firewall.

III. Disconnect the ram-air duct from the NACA intake. Pull out the first hinge pin positioned on the side of the firewall, then, while holding cowling, pull out second hinge pin; remove cowling with downward motion.

IV. For installation follow reverse procedure.

6. GROUND HANDLING

6.1. TOWING

The aircraft is most easily and safely maneuvered by hand by pushing on wing struts near attachments or by pulling it by its propeller near the axle. A tow bar can be fixed onto nose gear fork. Aircraft may be steered by turning rudder or, for steep turns, by pushing lightly on tail cone to lift nose wheel.

6.2. PARKING AND TIE-DOWN

General

Under normal weather conditions, the airplane may be parked and headed in a direction that will facilitate servicing without regard to prevailing winds. Ensure that it is sufficiently protected against adverse weather conditions and present no danger to other aircraft.

Procedure

1. Position airplane on levelled surface, headed into the prevailing wind, if practical.
2. Engage parking brake
3. Secure pilot control stick by wrapping the seat belt around it

NOTE:

Do not engage the parking brakes at low ambient temperature, when an accumulation of moisture may cause the brakes to freeze, or when they become hot from severe use. In this case use wheel chocks.

In case of long time parking or overnight parking, it is recommended to moor the a/c as shown on Para.6.3.

CAUTION

Mooring is strongly recommended when the wind is more than 15 knots and the a/c is completely refuelled.

6.3. MOORING

The aircraft is moored to insure its immovability, protection, and security under various weather conditions.

CAUTION

Mooring is strongly recommended when the wind is more than 15 knots and the a/c is completely refuelled.

Procedure

1. Position airplane on levelled surface and headed into the prevailing wind, if practical
2. Centre nose wheel and engage parking brake and/or use the wheel chocks

NOTE:

Do not engage the parking brakes at low ambient temperature, when an accumulation of moisture may cause the brakes to freeze, or when they become hot from severe use. In these cases use wheel chocks.

3. Secure pilot control stick by wrapping the seat belt around it
4. Assure that flaps are retracted
5. Electrically ground airplane, by connecting ground cable to the engine muffle
6. Install control locks
7. Install protective plugs
8. Close and lock cabin doors.
9. Secure tie-down cables to the nose gear leg (and to the wings (in correspondence of wing struts) and tail cone tie-down rings at approximately 45 degree with respect to the ground.

NOTE: *Additional preparation for high winds includes tie-down ropes from the main landing gear employment.*

6.4. JACKING

The aircraft can be lifted up by hydraulic jacks in correspondence of the points shown by external placards.

For the correct procedure please refer to the Maintenance Manual.

6.5. ROAD TRANSPORT

It is recommended to secure tightly all aircraft components onto the cart to avoid damage during transport. Minimum cart size is 7x2.5 meters. It is suggested to place wings under the aircraft's bottom, secured by specific clamps. Secondary components like the stabilator shall be protected from accidental hits using plastic or other material. For correct rigging and de-rigging procedure, refer to the Maintenance Manual.

7. CLEANING AND CARE

CAUTION

Aircraft surface must be kept clean to ensure expected flight performance. Excessively dirty surfaces can affect normal flight conditions.

7.1. WINDOWS

For windows cleaning, it is allowed the use of acrylic products employed for glass and Plexiglas surfaces cleaning.

7.2. EXTERNAL SURFACES

Aircraft surface is cleaned with soapy water; they are not allowed solvents or alcohol based products. Died insects must be removed using hot water.
It is advisable to avoid outside aircraft parking for long periods; it is always convenient to keep the aircraft in the hangar.

7.3. PROPELLER

To preserve its functionality avoiding wear and corrosion, the propeller manufacturer uses, for external surface painting, an acrylic paint which is resistant to all solvents. In any case it is advisable to clean the propeller using exclusively soapy water.

7.4. ENGINE

Engine cleaning is part of the scheduled maintenance. Refer to the engine manufacturer Maintenance Manual for operating and for planning its cleaning.

7.5. INTERNAL SURFACES

Interiors must be cleaned with a rate of 3 to 6 months. Any object present in the cabin (like pens, lost property, maps etc) must be removed.
The instrumentation as a whole must be cleaned with a humid cloth; plastic surfaces can be cleaned with suitable products.
For parts not easily accessible, perform cleaning with a small brush; seats must be cleaned with a humid cloth.

8. ICE REMOVAL

Anti icing products are not allowed. To remove ice, tow the aircraft in the hangar and operate with a soft brush or a humid cloth.

SECTION 9 – AFM SUPPLEMENTS

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1. Introduction 2
2. Supplements list 3

1. INTRODUCTION

This Section concerns the supplemental manuals of additional (or optional) instrumentation equipping the *P2008JC* and/or information and limitations related to installed equipment configuration or needed to fit local national rules.

2. SUPPLEMENTS LIST

Aircraft S/N: 1070 Registration marks: HB-KML Date: 27/02/2017

SUPPLEMENTS LIST FOR P2008 JC

Sup. No.	Title	Rev. no.	Date	APPLICABLE: YES	APPLICABLE: NO
S1	VFR Night equipment configuration	Ed1rev2	20/01/2016	☒	☐
S2	AveoMaxx Hercules Landing/Taxi lights	Ed1rev2	20/01/2016	☒	☐
S3	Hoffman propeller	Ed2rev2	20/01/2016	☐	☒
S4	MTOW increment at 650Kg	Ed1rev1	20/01/2016	☐	☒
S5	Argentine AFMS	Ed1rev0	15/10/2015	☐	☒
S6	Reserved				
S7	MTOW increment at 650Kg for airplane equipped with Hoffmann propeller	Ed1rev0	20/01/2016	☒	☐

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