Aircraft Flight Manual

Doc. No. 2008/100
Ed.1 – Rev. 0
2013, July 30th

TECNAM P2008 JC

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

SERIAL NUMBER: …….....

REGISTRATION MARKINGS: ……..

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 airplane has to be operated in compliance with procedures and limitations contained herein.

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SECTION 0

INDEX

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

Rev	Revised page	Description of Revision	Tecnam Approval			EASA Approval or Under DOA Privileges
			DO	OoA	HDO	

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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 orone variant of these pages when the pages of some Supplementsare embodied.

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

Edition 1, Rev 0 ..... 30th July, 2013

Section	Pages	Revision
Section 0	Pages 1 thru 12	Rev 0
Section 1	Pages 1 thru 14	Rev 0
Section 2	Pages 1 thru 30	Rev 0
Section 3	Pages 1 thru 22	Rev 0
Section 4	Pages 1 thru 18	Rev 0
Section 5	Pages 1 thru 16	Rev 0
Section 6	Pages 1 thru 12	Rev 0
Section 7	Pages 1 thru 16	Rev 0
Section 8	Pages 1 thru 10	Rev 0
Section 9	Pages 1 thru 4	Rev 0

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3. FOREWORD

Tecnam ***P2008 JC*** is a single-enginetwo-seat aircraft with a strut braced high wingand-fixedlanding 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
Limitations (**)	Section 2
Emergency Procedures (**)	Section 3
Normal Procedures (**)	Section 4
Performance (***)	Section 5
Weight and balance (*)	Section 6
Airframe and Systems description (*)	Section 7
Ground Handling and Service (*)	Section 8
AFM Supplements (***)	Section 9

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

SECTION 1 - GENERAL

INDEX

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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.

WARNING

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

CAUTION

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.

NOTE

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

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4. THREE-VIEW AND DIMENSIONS

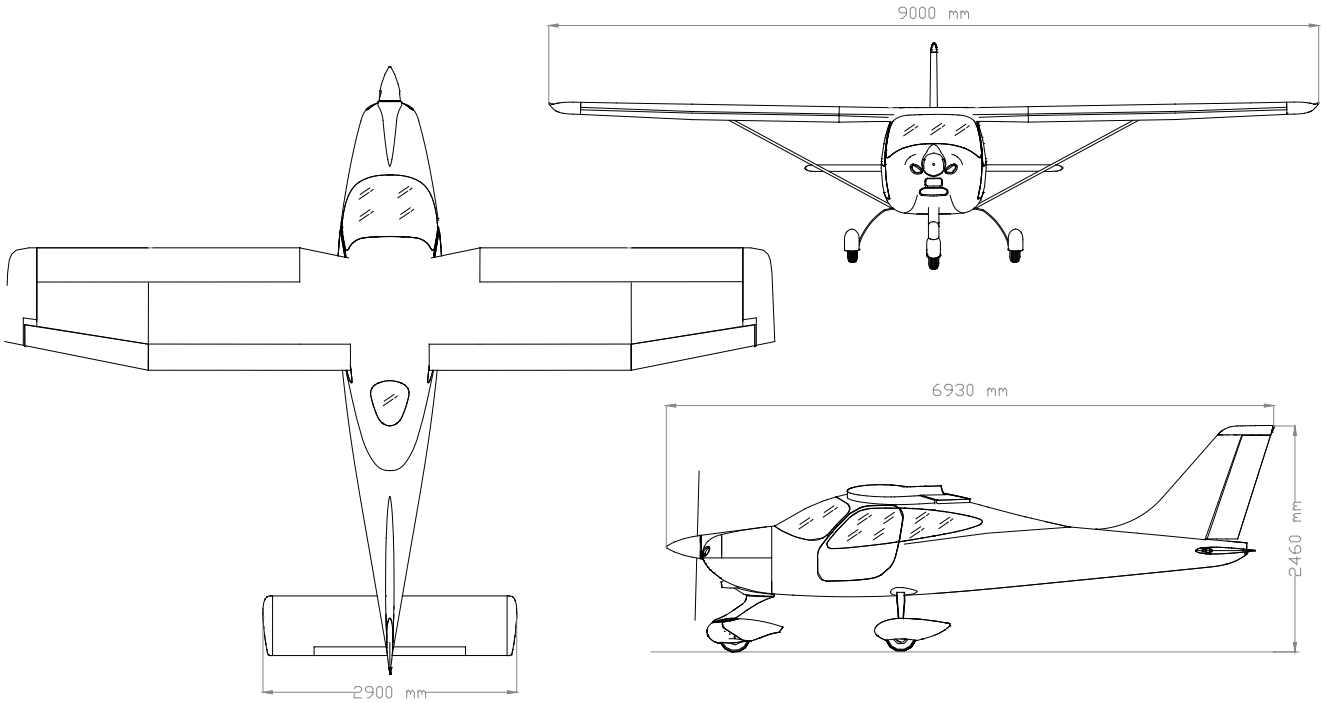

Figure 1 – General views

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	GT Propeller
Model	GT-2/173/VRR-FW101 SRTC
Blades	One-piece 2-blade fixed pitch, constructed of wood materials, protective layer of laminate.
Diameter	1730 mm (no reduction allowed)
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 630 kg (1388lb)
Wing Loading	51 kg/m^2 (10.6 lb/sqft)
Power Loading	6.29 kg/hp (14.09 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

SECTION2–LIMITATIONS

INDEX

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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 theiroperational significance:

AIRSPEED		KIAS	KCAS	REMARKS
V_{NE}	Never exceed speed	**145**	**141**	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising speed	**113**	**111**	Do not exceed this speed except in smooth air, and only with caution.
V_A	Design Manoeuvring speed	**99**	**98**	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	**71**	**72**	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 – 71**	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	**48 – 113**	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	**113 – 145**	Manoeuvres must be conducted with caution and only in smooth air.
Red line	**145**	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
Min/Max Oil	50° C / 130° C

Oil Pressure:

Minimum	12psi	(below 1440 propeller 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 alternative recommended commercial brands and types

7. COOLANT LIQUID

100% Propylene Glycol.

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:	GT Propeller
MODEL:	GT-2/173/VRR-FW101 SRTC
BLADES:	One-piece 2-blade, constructed of wood materials, protective layer of laminate.
TYPE:	Fixed pitch
DIAMETER:	1730 mm (no reduction is permitted)

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
Oil pressure	psi	OP LOW WARNING 12 psi	----	-----	102
Fuel press.	psi	FP LOW WARNING 2.2 psi	2.2-7.26	----	7.26

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	630 kg	1388lb
Maximum landing weight	630 kg	1388lb

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

WARNING

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	*99*
Chandelle	*113*
Steep turn (max 60°)	*99*
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: 99 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**
+ 4 g	**- 2 g**

Manoeuvre load factors limits with flaps extended are as follows:

Positive	**Negative**
+ 2 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:	2 people (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.

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

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.

NOTE

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

WARNING

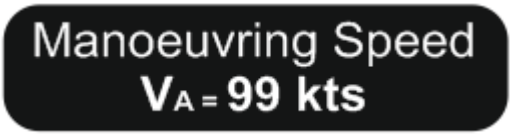
Garmin G3X indeed is NOT intended to be used as primary reference for flight and navigation information but only provides information for increased situational awareness: primary flight information (altitude, airspeed and heading) is provided by analogue instruments.

Equipment	VFR Day
Analogue Altimeter	●
Analogue Airspeed Indicator	●
Magnetic Direction Indicator	●
Analogue Fuel Quantity Indicators	●
Analogue CHT indicator	●
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)	
Cabin Light	

21. LIMITATIONS PLACARDS

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

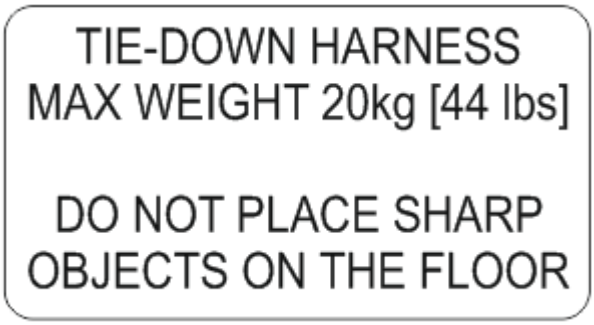
On the left side instrument panel, above on the left, it is placed the following placard reporting the speed limitations:



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”:

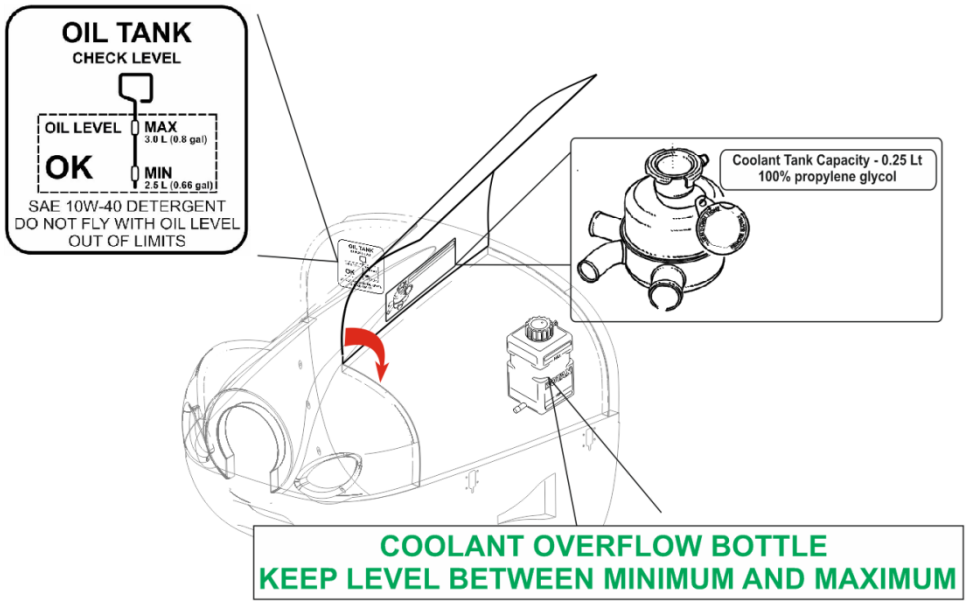
In the baggage compartment following placard is placed:



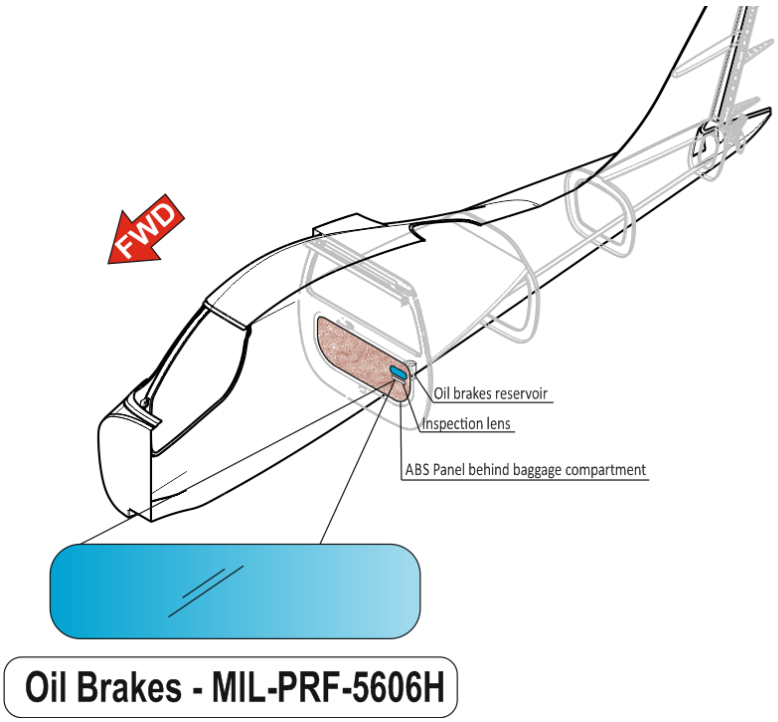
Below LH and RH Garmin G3X display and analogue instruments following placards are placed :

22. OTHER PLACARDS

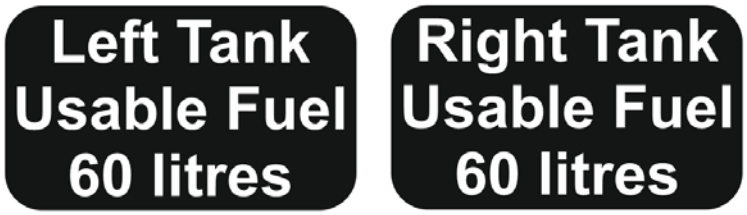
Engine compartment placards



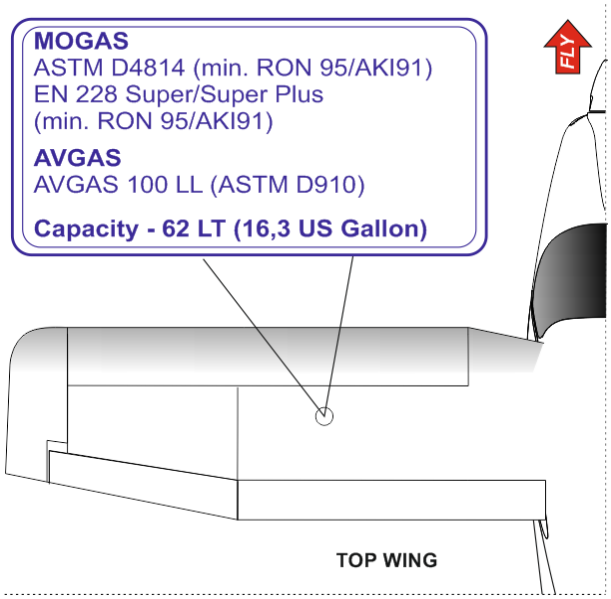
Oil brakes reservoir placard



Usable fuel markings



Allowed fuel placard



Emergency exit placard

Parking brake placard

Throttle marking

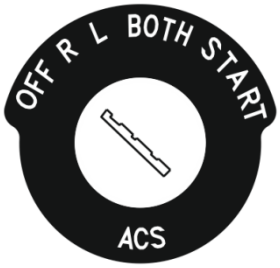
Fuel selector valve marking

Choke placard

Cabin heat/defrost placard

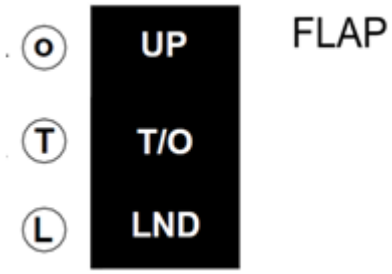
Carb heat placard

Ignition key placard



Master/Generator placards

Flap indicator placard



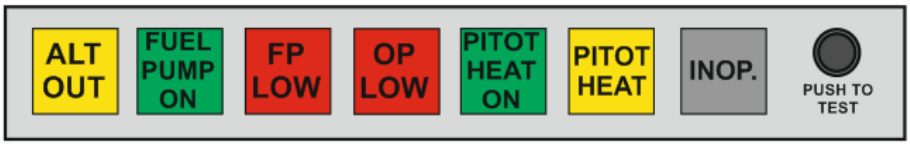
Backrest lever placard

Safety equipment location placard

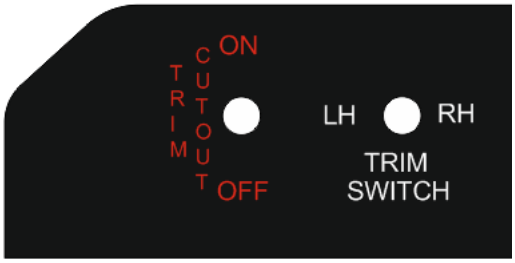
Elt placard

Battery placard

Annunciator panel



Upper panel labels



Switches labels

Door lock lever

CLOSED

OPEN

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SECTION3–EMERGENCY PROCEDURES

INDEX

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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 instrument panel can have 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. Generator switch: *OFF*
2. Master switch: *OFF*
3. Generator switch: *ON*
4. Master switch: *ON*

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

5. Generator switch: *OFF*
6. Pitot heat and audio panel: *OFF*

7. **Land as soon as practical.**

NOTE *The battery can supply electrical power for at least 25 minutes.*

2.2. G3X FAILURES

2.2.1. LH OR RH DISPLAY FAILURE

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.

2.2.2. LOSS OF ENGINE PARAMETERS ON G3X

INSTRUCTION: refer to engine parameters warning lights (OP LOW and FP LOW) and CHT backup indicator.

2.3. PITOT HEATING SYSTEM FAILURE

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

If the amber **PITOT HEAT** caution turns **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, avoid visible moisture conditions.

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 58 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 doesn't 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 m*inimum practical*
2. **Land as soon as practical**

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

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

5.3.3 High Oil Temperature

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

If oil pressure is within limits:

1. Throttle Lever *REDUCE* to *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 is detected:

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

5.3.4 CHT limit exceedance

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

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

If oil pressure is within limits:

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

NOTE

If CHT does not come back within limits, 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 continues to rise 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

WARNING

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*

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***

WARNING

Do not attempt engine restart

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

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:

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

CAUTION

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:** ***ALL OFF***
4. **Fuel Selector Valve:** ***OFF***
5. **Master Switch:** ***OFF***
6. **Aircraft Evacuation** ***carry out immediately***

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. Alternator and Master switches: *OFF*.

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

8.2. POWER-ON FORCED LANDING

1. Airspeed: *71KIAS*
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. Alternator 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 Para. 3)*

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 about 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 visibility less than 5 km, vicinity of fog, mist, clouds, rain, snow or hail) and OAT less than 10°C.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: CHECKON
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. FLAPS FAILURE

In event of flaps-up landing, account for:

Approach speed*:*	*64 KIAS*
Landing length:	*35% increased*

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SECTION 4 – NORMAL PROCEDURES

INDEX

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1. INTRODUCTION

Section 4 describes checklists and recommended procedures for the conduct of normal operations for ***P2008 JC*** 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	**630kg**
Rotation Speed (in takeoff, V_R)	T/O	**48 KIAS**
Best Angle-of-Climb Speed (V_X)	0°	**65 KIAS**
Best Rate-of-Climb speed (V_Y)	0°	**71 KIAS**
Approach speed	T/O	**58 KIAS**
Final Approach Speed	FULL	**54 KIAS**
Manoeuvring speed (V_A)	0°	**99 KIAS**
Never Exceed Speed (V_{NE})	0°	**145 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 inspection, 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. to Section 6)and 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 within the limits*

G Lights: *all ON, check for operation*

H Acoustic stall warning: *check for operation*

I Master switch: *OFF*

J Baggage: *check first aid kit, ELT, fire extinguisher, luggage secured 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 ON prior to drain fuel.

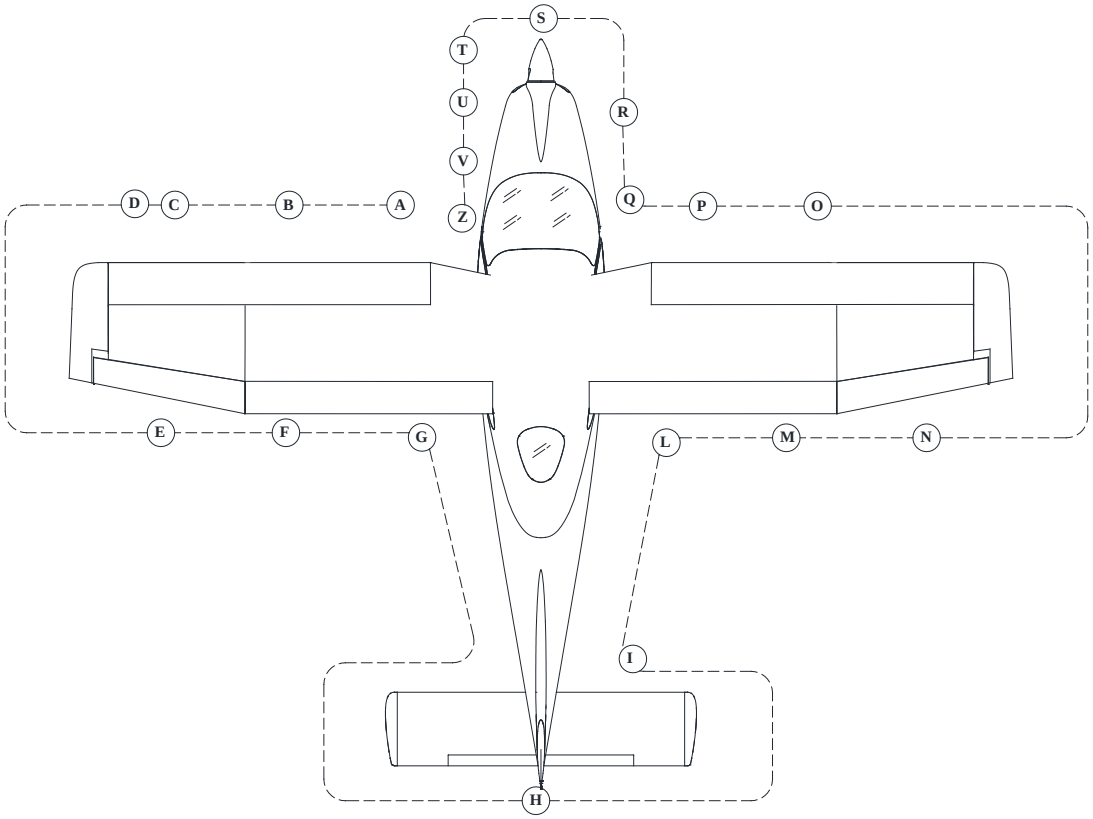

Figure 4.1

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 LH tank vent line	*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 RH tank vent line	*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 switch	*CHECK for integrity and free of play,*
Q	Right 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 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) <u>Only before the first flight of a day</u>:

(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 ALT OUT caution ON and check Voltmeter*
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. Pitch Trim: *cycle fully up and down, from both LH and RH controls, check for trim disconnect switch operation.*
12. 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.

13. Nav. light & Strobe light: *ON*
14. 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 rapid egress in an emergency.

15. 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 oil pressure rises within 10 sec.
9. Generator switch: *ON*
10. Voltmeter: *check more 14V or more*
11. Engine instruments: *Check within the limits*
12. Choke: *OFF*
13. Propeller rpm: *1000-1200 rpm*
14. Electric fuel pump: *OFF*
15. Check fuel pressure*(min 2.2 psi)*

4.3. BEFORE TAXIING

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

4.4. TAXIING

1. Brakes*: check*
2. Flight instruments*: check altimeter.*

4.5. PRIOR TO TAKEOFF

1. Parking brake: *brake pedal press, ON*
2. Engine instruments: *Check:*
   - Oil temperature: *50-130 °C*
   - Cylinder heads temperature: *Max. 135 °C*
   - Oil pressure: *12 – 102 psi*
   - Fuel pressure: *minimum 2.2 psi*
3. ALT OUT caution: *OFF (check)*
4. Electric Fuel pump: *ON*
5. Fuel selector valve: *select the fullest tank*
6. Fuel pressure: *check*
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 (15°)*
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: 48 KIAS
6. Flaps: *retract (above flap retraction speed 58 KIAS)*
7. Establish Climb rate V_Y: 71 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*: 58 KIAS*
5. On final leg:
   Flaps: set LAND
   Final Approach Speed*: 54 KIAS*
6. Carburettor heat: OFF (full IN)
7. Optimal touchdown speed: *54 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*

WARNING

Before disembarkation verify propeller is fully stopped.

CAUTION

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 lines: *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

INDEX

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 performance were 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}.

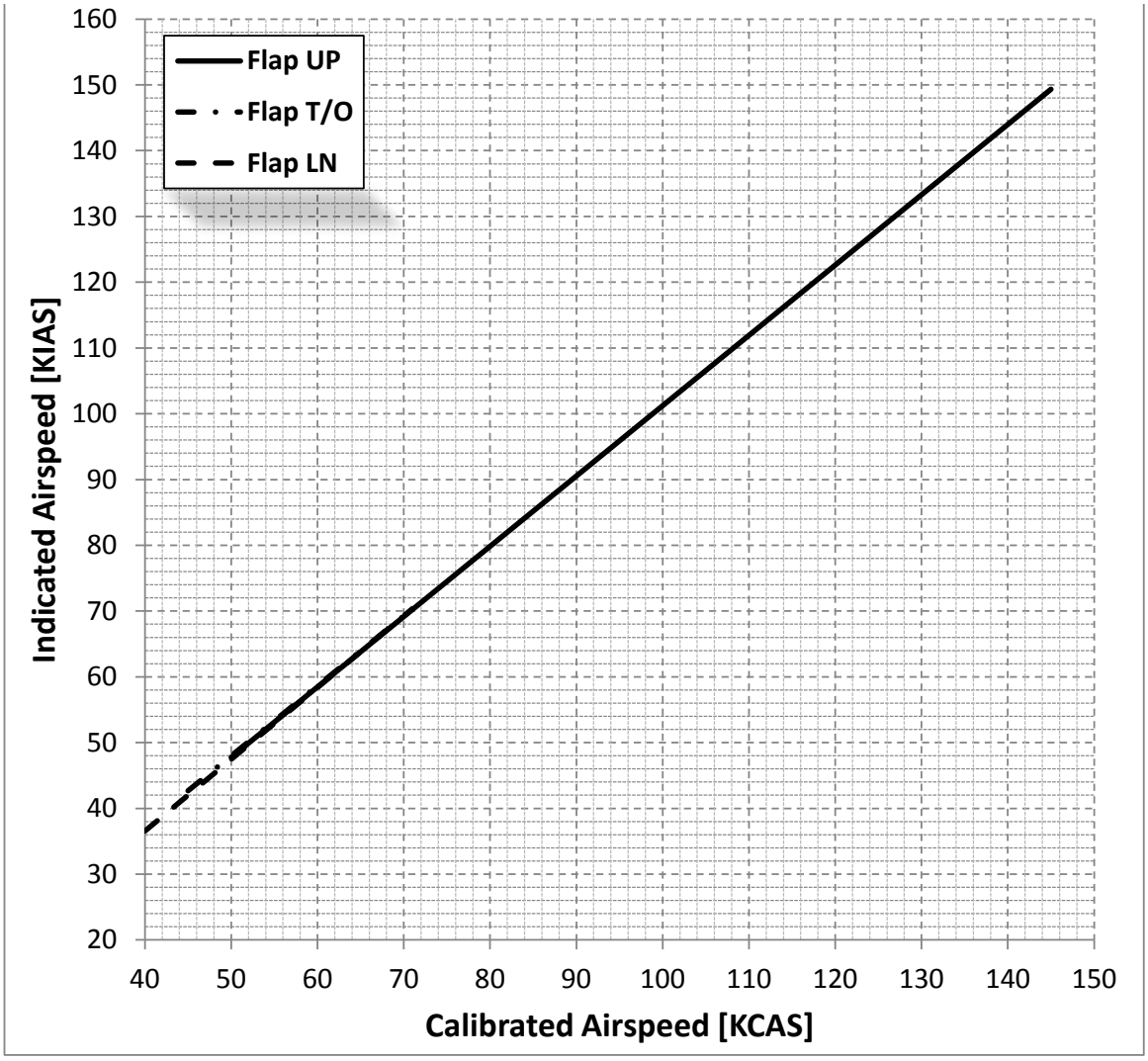

FIG. 5-1. CALIBRATED VS INDICATED AIRSPEED

Example:

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

NOTE *Indicated airspeed assumes 0 as an instrument error*

4. ICAO STANDARD ATMOSPHERE

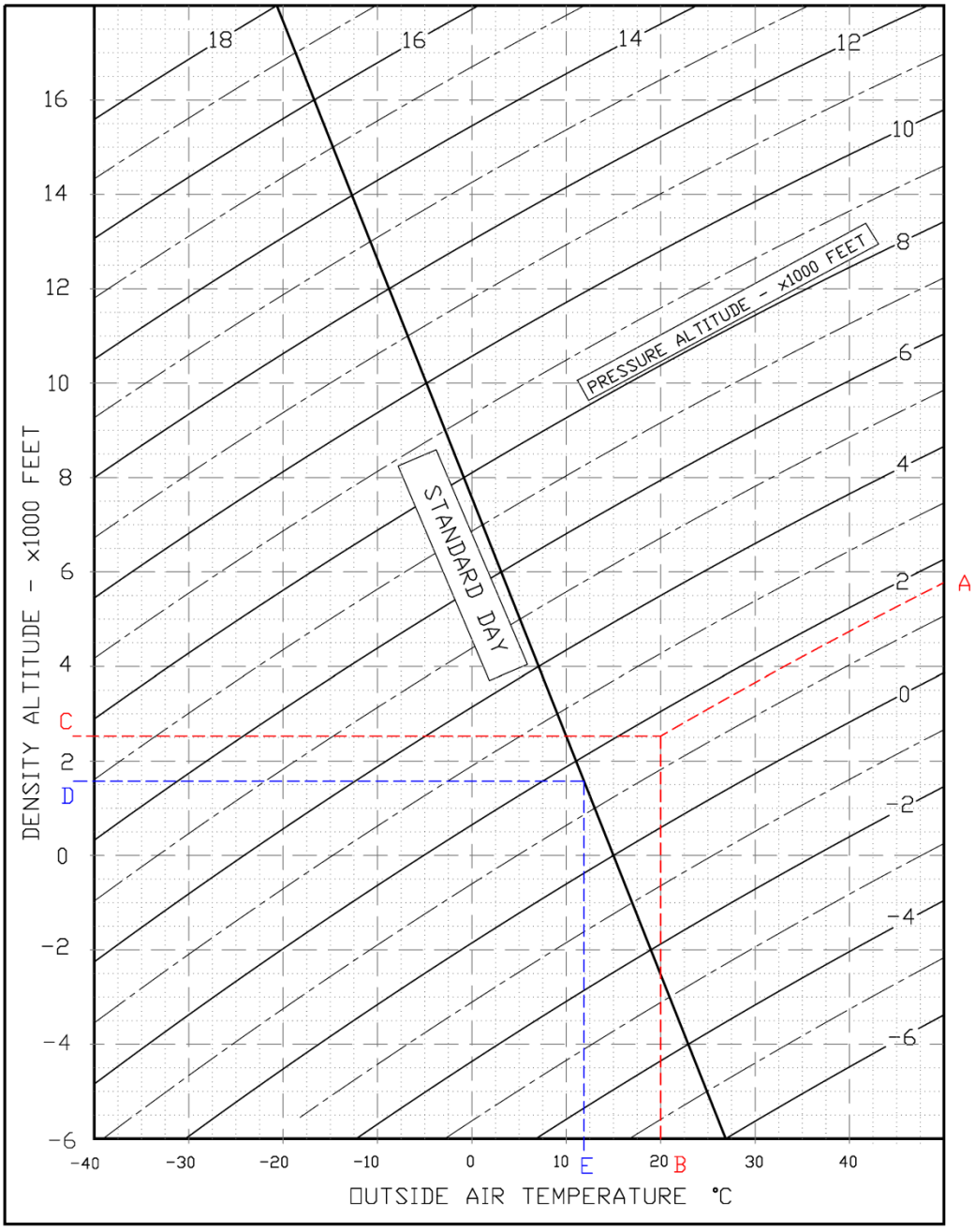

FIG. 5-2. ICAO CHART

Examples:

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

5. STALL SPEED

Weight: *630 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
630 *(FWD C.G.)*	**0**	48	50	43	46	40	43
	15	49	51	44	46	41	44
	30	52	54	47	49	44	46
	45	58	60	52	54	49	51
	60	70	71	63	64	60	61

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 15 Kts

⇒ *Example:*

Given	***Find***
Wind direction (*with respect to aircraft longitudinal axis*) = 30°	Headwind = 17.5 Kts
Wind speed = 20 Kts	Crosswind = 10 Kts

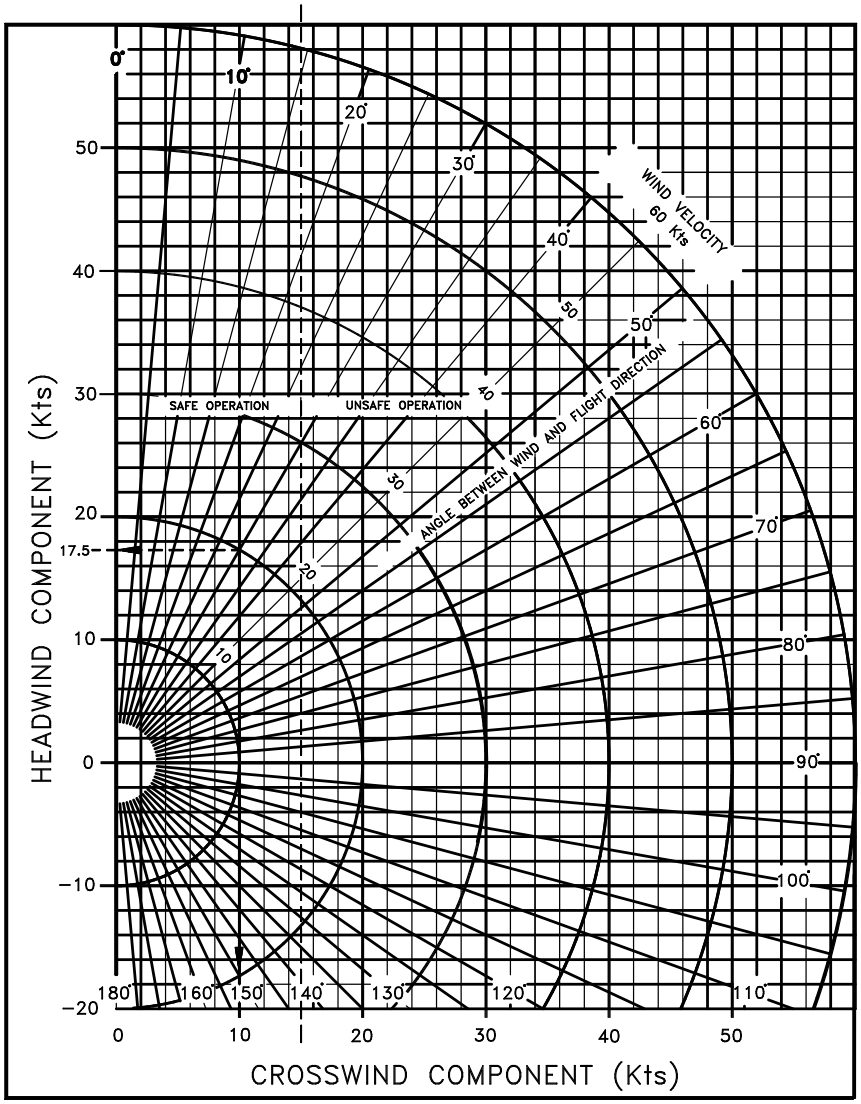

FIG. 5-2. CROSSWIND CHART

7. TAKEOFF PERFORMANCE

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

Weight = *630 kg*

Flaps: *T/O*
Speed at Lift-Off = *48 KIAS*
Speed Over *50ft* Obstacle = *60 KIAS*
Throttle Levers: *Full Forward*
Runway: *Grass*

Corrections

Headwind: - 5m for each kt (*16 ft/kt*)
Tailwind: + 15m 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	157	198	244	296	**225**
	At 50 ft AGL	265	331	406	490	**375**
1000	Ground Roll	172	216	267	323	**242**
	At 50 ft AGL	289	361	442	533	**402**
2000	Ground Roll	187	236	291	353	**259**
	At 50 ft AGL	314	392	481	580	**430**
3000	Ground Roll	205	258	318	386	**279**
	At 50 ft AGL	342	427	524	631	**461**
4000	Ground Roll	224	281	347	421	**299**
	At 50 ft AGL	373	466	571	688	**494**
5000	Ground Roll	244	308	380	461	**322**
	At 50 ft AGL	406	508	622	750	**530**
6000	Ground Roll	268	337	416	504	**346**
	At 50 ft AGL	443	554	679	819	**569**
7000	Ground Roll	293	369	455	552	**373**
	At 50 ft AGL	484	605	741	894	**611**
8000	Ground Roll	321	404	499	605	**401**
	At 50 ft AGL	529	661	810	977	**656**
9000	Ground Roll	352	443	547	663	**432**
	At 50 ft AGL	578	722	885	1068	**705**
10000	Ground Roll	386	486	600	728	**466**
	At 50 ft AGL	632	790	969	1168	**758**

Weight = *580 kg*

Flaps: *T/O*
Speed at Lift-Off = *48 KIAS*
Speed Over *50ft* Obstacle = 60 *KIAS*
Throttle Levers: *Full Forward*
Runway: *Grass*

Corrections

Headwind: - 5m for each kt (*16 ft/kt*)
Tailwind: + 15m 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	129	162	200	243	**185**
	At 50 ft AGL	219	274	335	404	**310**
1000	Ground Roll	141	177	219	265	**198**
	At 50 ft AGL	238	298	365	440	**332**
2000	Ground Roll	154	193	239	289	**213**
	At 50 ft AGL	259	324	397	478	**355**
3000	Ground Roll	168	211	261	316	**228**
	At 50 ft AGL	282	353	432	521	**380**
4000	Ground Roll	183	231	285	346	**245**
	At 50 ft AGL	308	384	471	568	**408**
5000	Ground Roll	200	252	311	378	**264**
	At 50 ft AGL	335	419	514	619	**437**
6000	Ground Roll	219	276	341	413	**284**
	At 50 ft AGL	366	457	560	676	**469**
7000	Ground Roll	240	302	373	453	**305**
	At 50 ft AGL	400	499	612	738	**504**
8000	Ground Roll	263	331	409	496	**329**
	At 50 ft AGL	436	545	668	806	**541**
9000	Ground Roll	289	363	448	544	**354**
	At 50 ft AGL	477	596	731	881	**582**
10000	Ground Roll	317	399	492	597	**382**
	At 50 ft AGL	522	652	799	964	**626**

Weight = *530 kg*

Flaps: *T/O*
Speed at Lift-Off = *48 KIAS*
Speed Over *50ft* Obstacle = 60 *KIAS*
Throttle Levers: *Full Forward*
Runway: *Grass*

Corrections

Headwind: - 5m for each kt (*16 ft/kt*)
Tailwind: + 15m 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	104	131	161	196	**149**
	At 50 ft AGL	178	222	272	328	**251**
1000	Ground Roll	113	143	176	214	**160**
	At 50 ft AGL	193	241	296	357	**269**
2000	Ground Roll	124	156	192	233	**171**
	At 50 ft AGL	210	263	322	388	**288**
3000	Ground Roll	135	170	210	255	**184**
	At 50 ft AGL	229	286	351	423	**309**
4000	Ground Roll	148	186	229	278	**198**
	At 50 ft AGL	250	312	382	461	**331**
5000	Ground Roll	161	203	251	304	**213**
	At 50 ft AGL	272	340	417	502	**355**
6000	Ground Roll	177	222	275	333	**229**
	At 50 ft AGL	297	371	455	548	**381**
7000	Ground Roll	194	244	301	365	**246**
	At 50 ft AGL	324	405	496	598	**409**
8000	Ground Roll	212	267	329	400	**265**
	At 50 ft AGL	354	442	542	654	**439**
9000	Ground Roll	232	293	361	438	**285**
	At 50 ft AGL	387	484	593	715	**472**
10000	Ground Roll	255	321	396	481	**308**
	At 50 ft AGL	423	529	648	782	**508**

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	
630	S.L.	67	1055	870	706	558	770
	2000	66	915	733	572	426	660
	4000	66	775	597	438	295	550
	6000	65	636	461	305	164	441
	8000	64	497	325	172	34	331
	10000	64	359	190	40	-96	221
	12000	63	221	56	-92	-226	112
	14000	63	84	-79	-224	-355	2
580	S.L.	67	1182	987	814	657	881
	2000	66	1034	843	672	518	765
	4000	65	887	698	530	379	649
	6000	65	739	555	390	241	533
	8000	64	593	411	249	103	417
	10000	63	447	269	109	-34	302
	12000	63	301	126	-30	-171	186
	14000	62	156	-16	-169	-307	70
530	S.L.	66	1331	1123	937	770	1009
	2000	66	1173	968	786	622	886
	4000	65	1015	815	635	474	762
	6000	64	858	661	485	326	638
	8000	64	702	508	335	179	515
	10000	63	546	356	186	33	391
	12000	63	391	204	37	-113	268
	14000	62	236	53	-111	-259	144

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	
630	S.L.	71	1045	894	759	637	811
	2000	70	930	782	649	529	721
	4000	68	816	670	539	422	631
	6000	67	702	558	430	314	541
	8000	65	588	447	321	207	451
	10000	64	474	336	212	101	362
	12000	62	361	225	104	-5	272
	14000	61	249	115	-4	-111	182
580	S.L.	71	1171	1011	869	740	924
	2000	69	1050	893	753	626	829
	4000	68	929	774	637	513	734
	6000	66	808	657	521	399	639
	8000	65	688	539	406	286	544
	10000	64	568	422	291	174	449
	12000	62	449	305	177	62	354
	14000	61	330	189	63	-50	259
530	S.L.	71	1317	1147	995	858	1054
	2000	69	1188	1021	871	737	953
	4000	68	1059	895	748	616	852
	6000	66	931	769	625	495	751
	8000	65	803	644	502	375	649
	10000	63	675	519	380	255	548
	12000	62	548	395	259	135	447
	14000	60	421	271	137	16	346

10. CRUISE PERFORMANCE

CAUTION

Propeller speed over 2265 RPM is restricted to 5min.

Weight = *630 kg*

CORRECTIONS					
	KTAS	**Fuel Consumption**	**Endurance**	**Range**	**Specific Range**
For each *+15*℃ of OAT	*-2%*	*-2.5%*	*+2%*	*+1%*	*+1%*
For each *-15*℃ 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	25.8	4:40	562	4.64
		2250	110	21.3	5:40	624	5.16
		2100	99	17.4	7:00	689	5.70
		2000	92	15.3	7:50	725	5.99
		1900	85	13.7	8:45	748	6.18
		1800	78	12.5	9:40	751	6.21
2000	**11**	2388	118	24.1	5:00	593	4.90
		2250	108	20.0	6:00	653	5.40
		2100	98	16.6	7:20	712	5.89
		2000	90	14.8	8:10	740	6.12
		1900	83	13.4	9:00	752	6.22
		1800	76	12.4	9:45	743	6.15

Weight = *630 kg*

CORRECTIONS

	KTAS	Fuel Consumption	Endurance	Range	Specific Range
For each *+15*℃ of OAT	*-2%*	*-2.5%*	*+2%*	*+1%*	*+1%*
For each *-15*℃ 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**	2388	117	22.6	5:25	624	5.16
		2250	107	18.9	6:25	681	5.63
		2100	96	15.9	7:35	731	6.04
		2000	89	14.3	8:25	750	6.20
		1900	82	13.2	9:10	750	6.21
		1800	75	12.4	9:45	728	6.02
6000	**3**	2250	105	18.0	6:40	706	5.84
		2100	94	15.3	7:50	744	6.16
		2000	87	14.0	8:35	753	6.22
		1900	80	13.1	9:25	741	6.13
		1800	73	12.5	9:40	705	5.83
8000	**-1**	2250	103	17.2	7:00	726	6.01
		2100	93	14.9	8:05	752	6.22
		2000	85	13.8	8:45	748	6.19
		1900	78	13.1	9:10	723	5.98
10000	**-5**	2100	91	14.6	8:20	752	6.22
		2000	84	13.7	8:45	735	6.08
		1900	76	13.3	9:05	698	5.77

11. LANDING PERFORMANCE

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

Weight = *630 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: Take-Off (15°)
Speed: 60 KIAS

Weight	Pressure Altitude	Rate of Climb [ft/min] (angle of climb [deg])									
		Temperature [°C]								ISA	
[kg]	[ft]	-25		0		25		50			
630	S.L.	881	(9°)	750	(7°)	633	(6°)	528	(5°)	678	(6°)
	2000	781	(8°)	653	(6°)	538	(5°)	434	(4°)	600	(5°)
	4000	682	(6°)	556	(5°)	443	(4°)	341	(3°)	523	(5°)
	6000	583	(5°)	459	(4°)	348	(3°)	248	(2°)	445	(4°)
	8000	485	(4°)	363	(3°)	254	(2°)	156	(1°)	367	(3°)
	10000	387	(3°)	267	(2°)	160	(1°)	64	(0°)	289	(2°)
	12000	289	(2°)	171	(1°)	66	(0°)	-28	(0°)	211	(2°)
	14000	191	(1°)	76	(1°)	-27	(0°)	-120	(-1°)	133	(1°)

13. NOISE DATA

Noise level, determined in accordance with ICAO/Annex 16 6th Ed., July 2011, Vol. I°, Chapter 10, is **69.83** dB(A).

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SECTION6–WEIGHT AND BALANCE

INDEX

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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

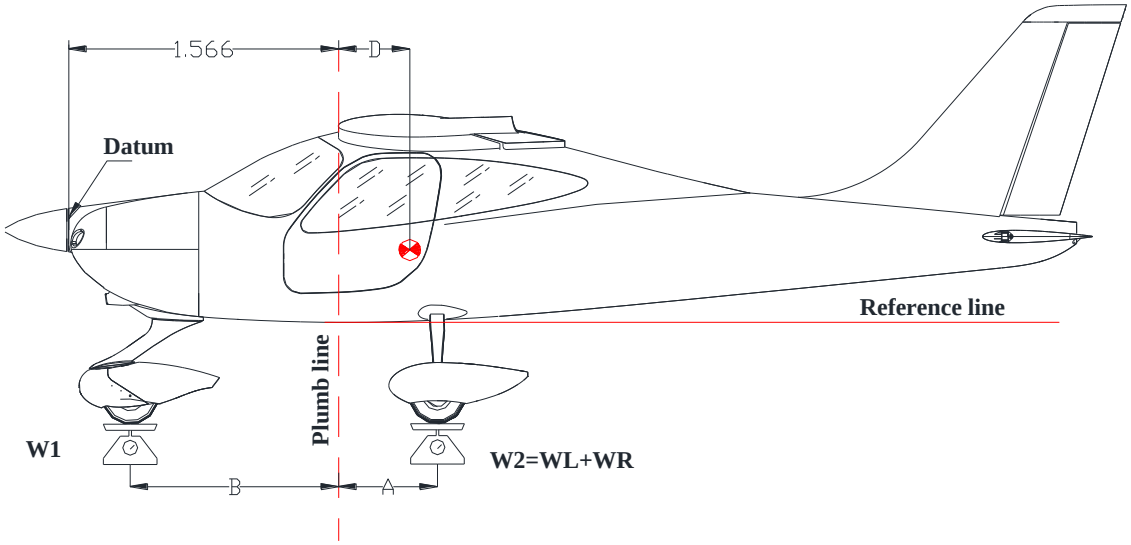
2.4. DETERMINATION OF C.G. LOCATION

- 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*:_____ *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] = [$m \cdot kg$] or [ft · lbs]

Maximum takeoff weight	W_T = 630 Kg	(1388 lbs)
Empty weight	We =	[kg] or [lbs]
Max. useful load W_T - We	Wu =	[kg] or [lbs]

Signature

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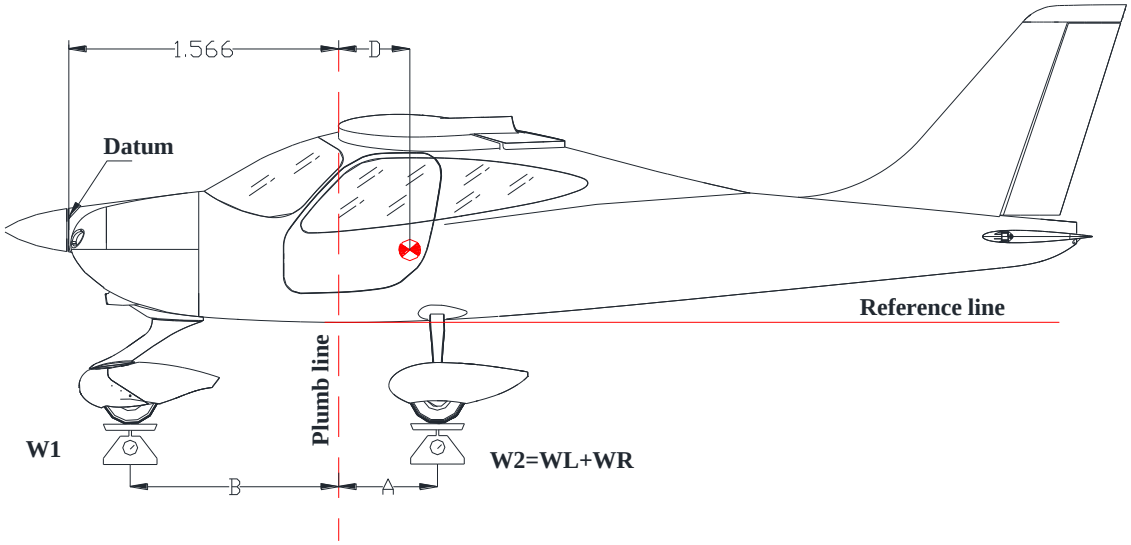
2.6. WEIGHING RECORD (II)

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 = 630 Kg	(1388 lbs)
Empty weight	We =	[kg] or [lbs]
Max. useful load W_T - We	Wu =	[kg] or [lbs]

Signature

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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		
Li-ter	**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

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

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

Signature

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C.G.Range	Max FWD	Max AFT
Meters	1.841	1.978
Max Weight	**Pounds**	**Kilograms**
	1320.00	630.00

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:			
RIF.	DESCRIPTION &P/N	INST	WEIGHT [*kg*]	DATUM [*mm*]	Q.TY [N°]
	ENGINE & ACCESSORIES				
A1	*Prop. GT Propellers – p/n*GT-2/173/VRR-FW101 SRTC	*	*6.0*	*-144*	*1*
A2	*Heat exchanger - p/n28-10-8000-000*	*	*2.00*	*754*	*1*
A3	*Oil Reservoir (full) - p/n956137*	*	*4.00*	*760*	*1*
A4	*Oil radiator - p/n886032*	*	*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/n478360*	*	*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. - Cleveland199-10200*	*	*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 - p/n4077C*	*	*1.30*	*418*	*1*
B5	*Nose gear tire –Air Trac 5.00-5*	*	*1.20*	*418*	*1*
B6	*Nose gear fairing p/n28-8-1110-1 / 28-8-1112-1*	*	*1.50*	*418*	*1*
B7	*Main gear fairing p/n 92-8-410-1/2*	*	*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*	*	*4.70*	*1900*	*1*
C2	*Battery GILL-Teledyne G-25 12V 18Ah*		*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 OS75-14 + LAMAR*	*	*0.30*	*772*	*1*
C10	*Aveo NAV/POS/Strobe p/nAVE-WPST R/G-54G*	*	*0.20*	*2130*	*2*
C11	*Landing Led light p/n PLED1L*	*	*0.40*	*130*	*1*

P2008 JC EQUIPMENT LIST		DATE:			
RIF.	DESCRIPTION &P/N	INST	WEIGHT [*kg*]	DATUM [*mm*]	Q.TY [N°]
	INSTRUMENTS				
D1	*AltimeterMIKROTECHNAp/nLUN 1128.12B6 –TSO C10b*	*	*1.00*	*1084*	*1*
D2	*Airspeed indicator – MIKROTECHINA p/nLUN 1116F0B2 - TSO C2b*	*	*1.00*	*1084*	*1*
D3	*Compass - AirpathC2400 L4P – TSO C7c*	*	*0.29*	*1000*	*1*
D4	*Clock – DAVTRON mod. M 800*	*	*0.15*	*1084*	*1*
D5	*Slip Indicator*	*	*0.56*	*1084*	*1*
D6	*AttitudeIndicator - RCA ALLEN INSTR.* RCA26EK		*1.30*	*1084*	*1*
D7	*Trim Position Indicator UMA p/nN0911S0U2DR000*	*	*0.20*	*1084*	*1*
D8	*Fuel Quantity Ind. Road GmbH XID4000800*	*	*0.45*	*1090*	*2*
D9	*RPM indicator (Sorlini) SOR 52*		*0.30*	*1084*	*1*
D10	*Oil temperature indicator (Sorlini) SOR 54*		*0.30*	*1084*	*1*
D11	*CHT temperature indicator (Sorlini) SOR 53*	*	*0.30*	*1084*	*1*
D12	*VoltmeterIndicator (Sorlini) SOR 51*	*	*0.30*	*1084*	*1*
D13	*G3X Display (LH + RH) - GDU 370*	*	*1.60*	*1084*	*2*
D14	*G3X AHRS - GSU 73*	*	*1.60*	*1900*	*1*
D15	*G3X Magnetometer - GMU 44*	*	*0.23*	*4697*	*1*
D16	*OAT probe - GTP 59*	*	*0.10*	*2060*	*1*
	AVIONICS AND OTHER				
E1	*Nav/Comm - Garmin SL30 Pack and connectors*		*1.50*	*1084*	*1*
E2	*ELT Artex ME 406*	*	*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 CI-121*	*	*0.34*	*4253*	*1*
E8	*ELT Antenna Kit Model ME 406*	*	*0.21*	*1900*	*1*
E9	*First Aid Kit*	*	*0.30*	*1800*	*1*
E10	*Fire Extinguisher H3Rs Halon13-07655*	*	*0.60*	*1800*	*1*
E11	*Garmin GNC 255A COM/NAVPack and connectors*		*1.80*	*1084*	*1*
E12	*Marker beaconAntennaGarmin010-10175-00*	*	*0.30*	*2917*	*1*
E13	*Nav Antenna Comant Industries CI-158C*	*	*0.30*	*5782*	*1*
E14	*Altitude Encoder ACK technologies*	*	*0.35*	*975*	*1*

SECTION7–AIRFRAME AND SYSTEMS DESCRIPTION

INDEX

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

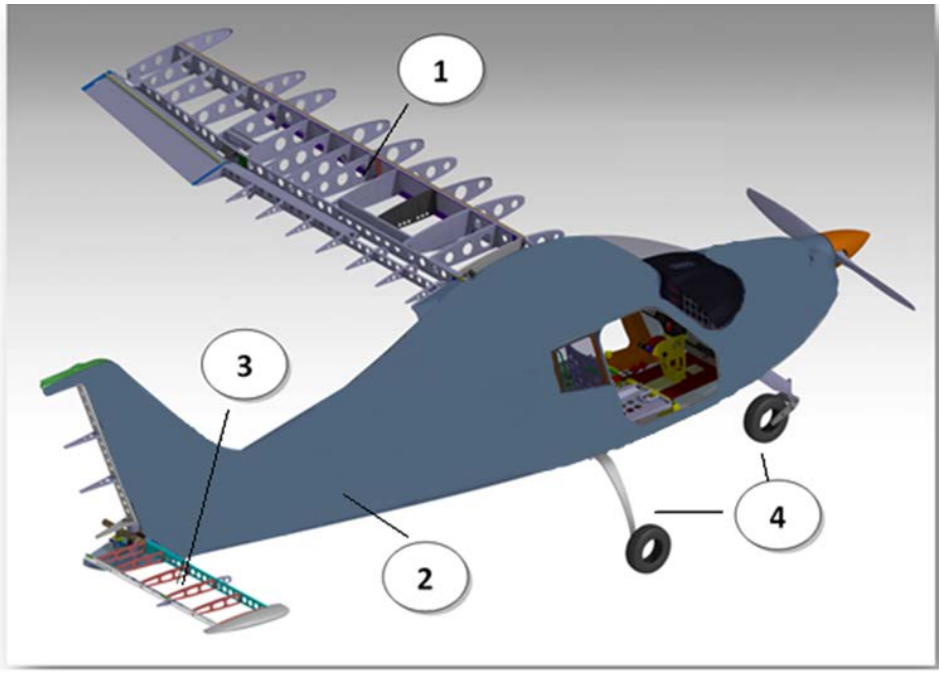

Fig. 7-1.P2008JC AIRFRAME

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).

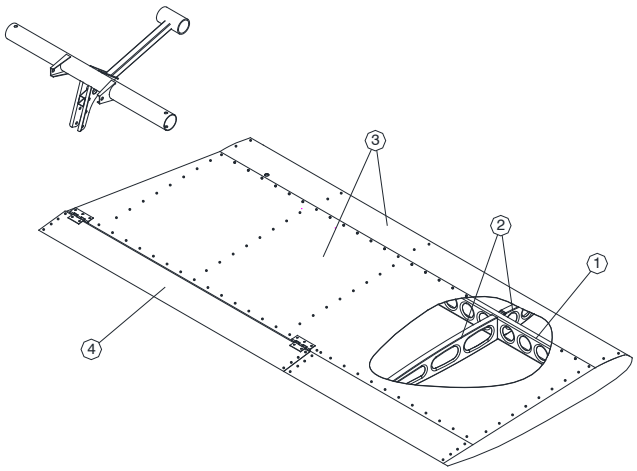

Fig. 7-2.STABILATOR STRUCTURE

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.

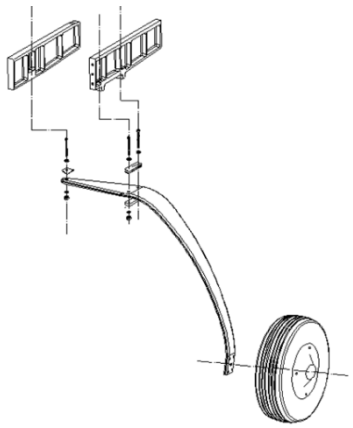

Fig. 7-3.MAIN LANDING GEAR STRUCTURE

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*

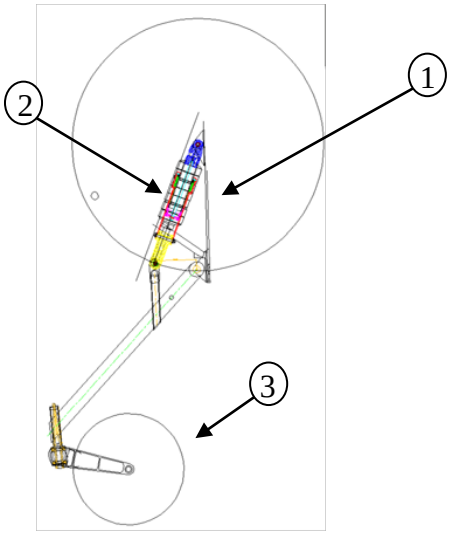

Fig. 7-4.NOSE LANDING GEAR STRUCTURE

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 and the pitch trim indicator;
- The right area holds engine and moving map indicator (G3X RH display), an analogue backup CHT indicator and breaker panel;

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.

- The central area holds Nav/Com instrument, the transponder, warning lights, trim cut out switch and Trim LH/RH selector switch and the annunciator panel with following lights:
  - Electric fuel pump ON (GREEN)
  - Low Oil Pressure (RED)
  - Low Fuel Pressure (RED)
  - Alternator Fail (AMBER)
  - Pitot heat operation lights (GREEN/AMBER) - optional
- The lower-LH portion of the instrument panel holds:
  - Ignition key;
  - Master and Generator switches;
  - Emergency fuel pump;
  - Avionic Master switch;

- Pitot heat switch (optionally provided);
- 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 control;
  - Cabin heating knob;
  - NAV, land and strobe switches.

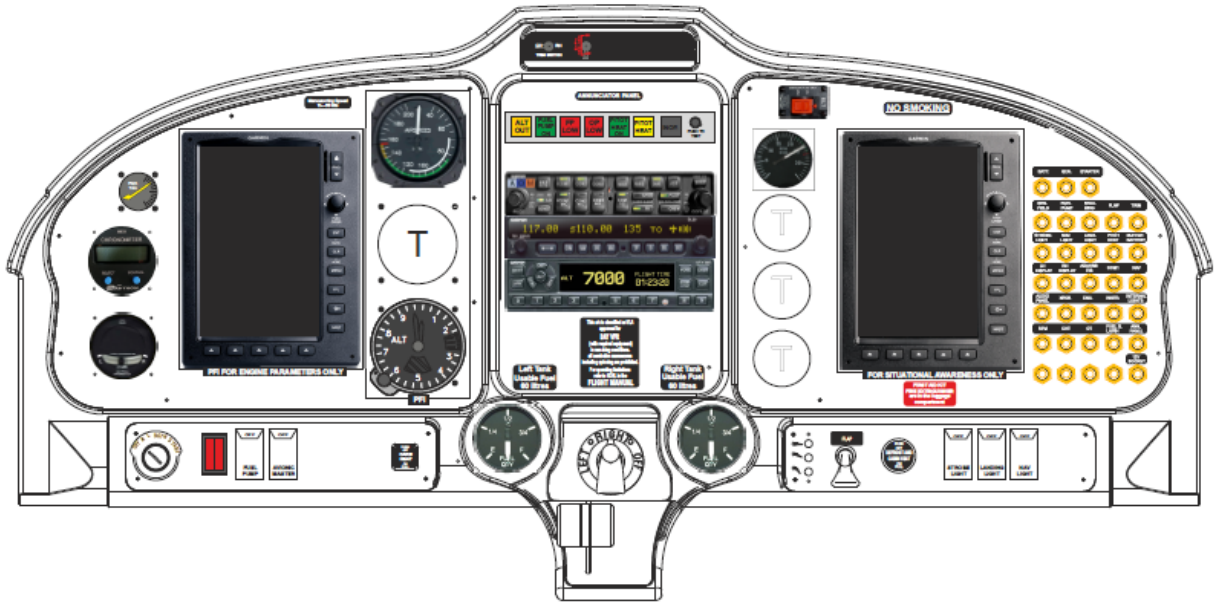

Fig. 7-5. INSTRUMENT PANEL

4.1. 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.

4.2. CABIN HEAT

The cabin heat control knob is positioned on the lower right side of the instrument panel; when knob is pulled fully outward, cabin receives maximum hot air. If the outlets are kept closed, hot air only performs windshield defrost. Vents are located by the rudder pedals. If necessary, outside fresh air can be circulated inside cabin by opening the vents on the doors' windows.

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):

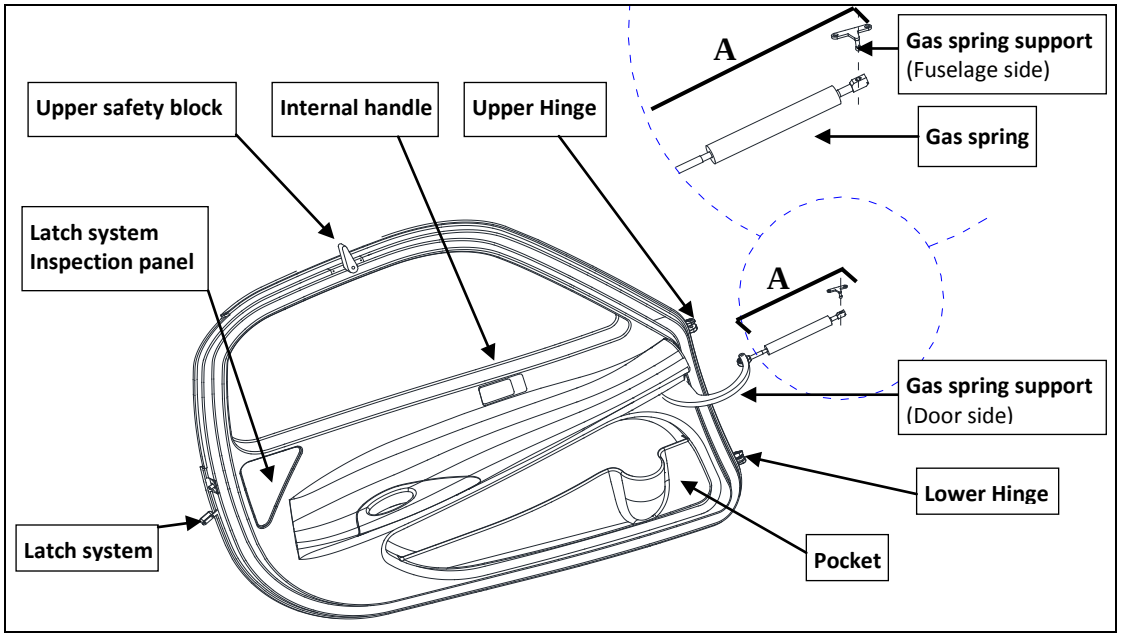

Fig. 7-6.DOOR

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

7. POWERPLANT

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: *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.

Following figure shows the fuel system assy of P2008JC airplane.

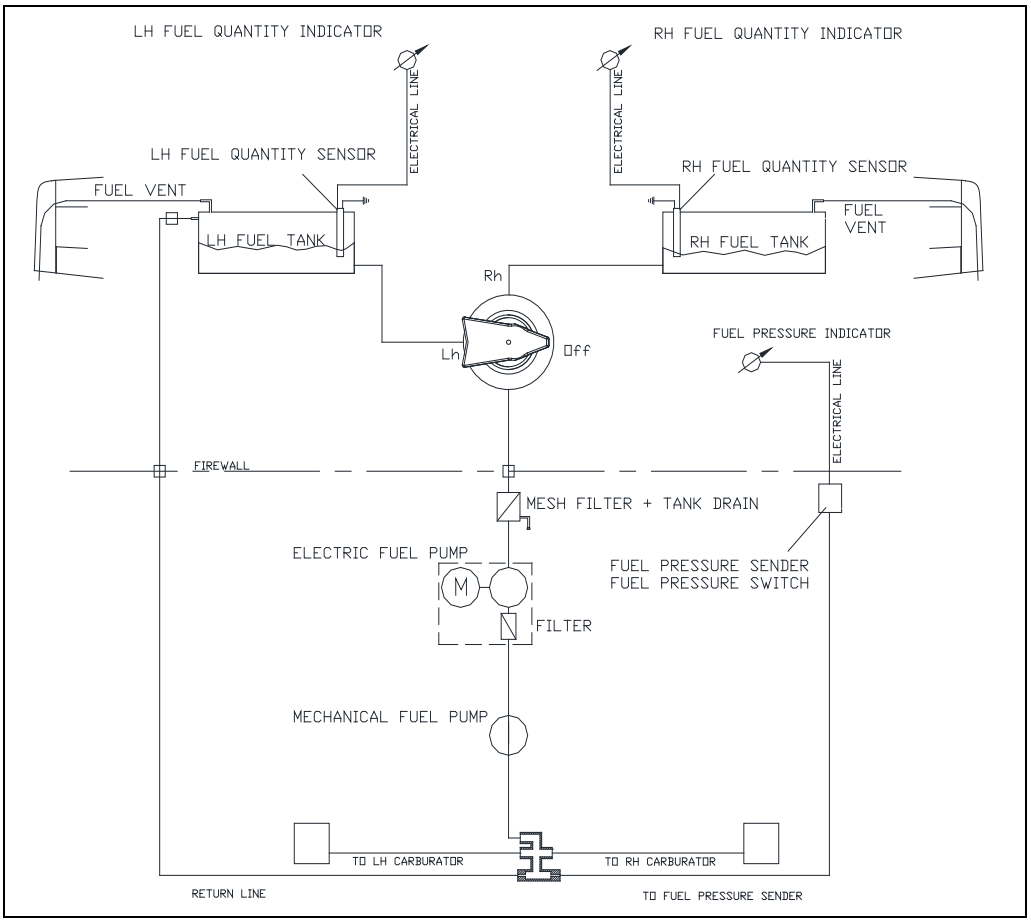

Fig.7-7. FUEL SYSTEM SCHEMATIC

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 recharges 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.

WARNING

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 features four analogue indicators, an airspeed indicator, an altimeter, a magnetic compass and a slip indicator, which provide primary flight information.
Garmin G3X integrated avionic suite in a dual screen configuration is installed. It provides flight information intended for the pilot's situational awareness only. The suite provides primary engine information, except fuel quantity information which is provided by two dedicated analogue indicators located in the bottom central instruments panel, supplemented by an annunciator panel and analogue CHT indicator. 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 SL 30 and GTX 328) are installed. Garmin SL 30 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.

Four 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)

Two additional annunciator lights are installed when pitot heat system is optionally provided:

- 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 (simple Pitot tube) mounted on left wing strut 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.

Garmin G3X ADAHRS (GSU73) unit, installed on the rear 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.

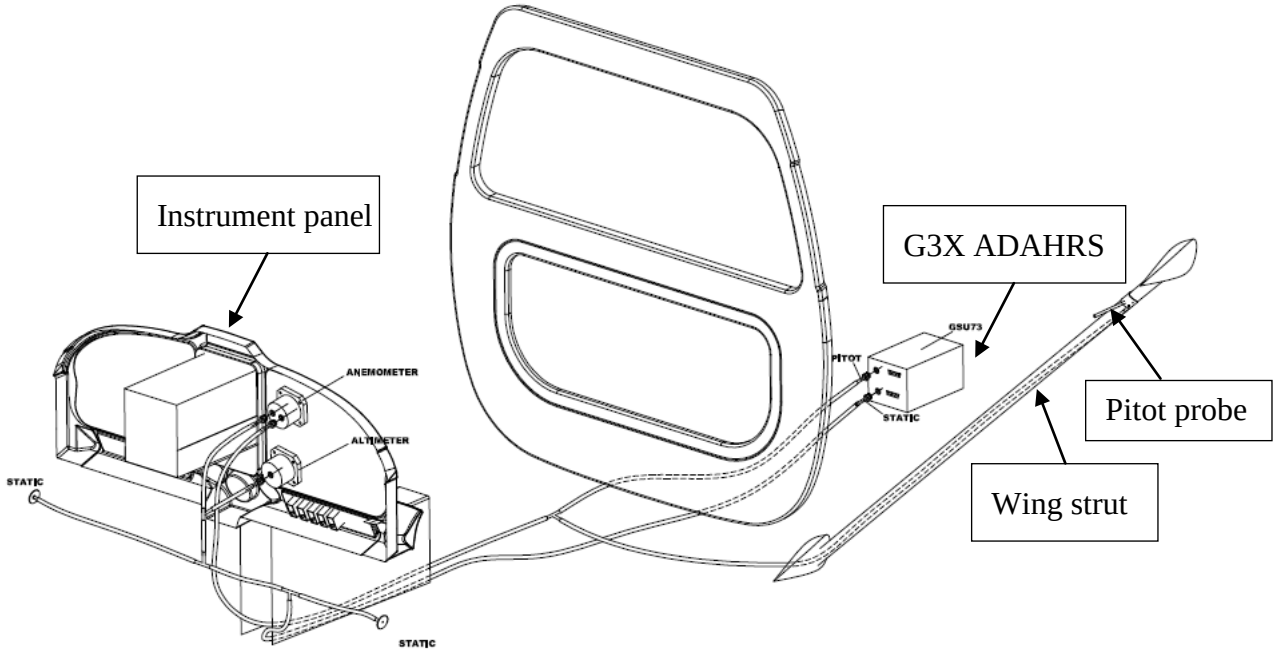

FIG.7-8. PITOT-STATIC SYSTEM

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.

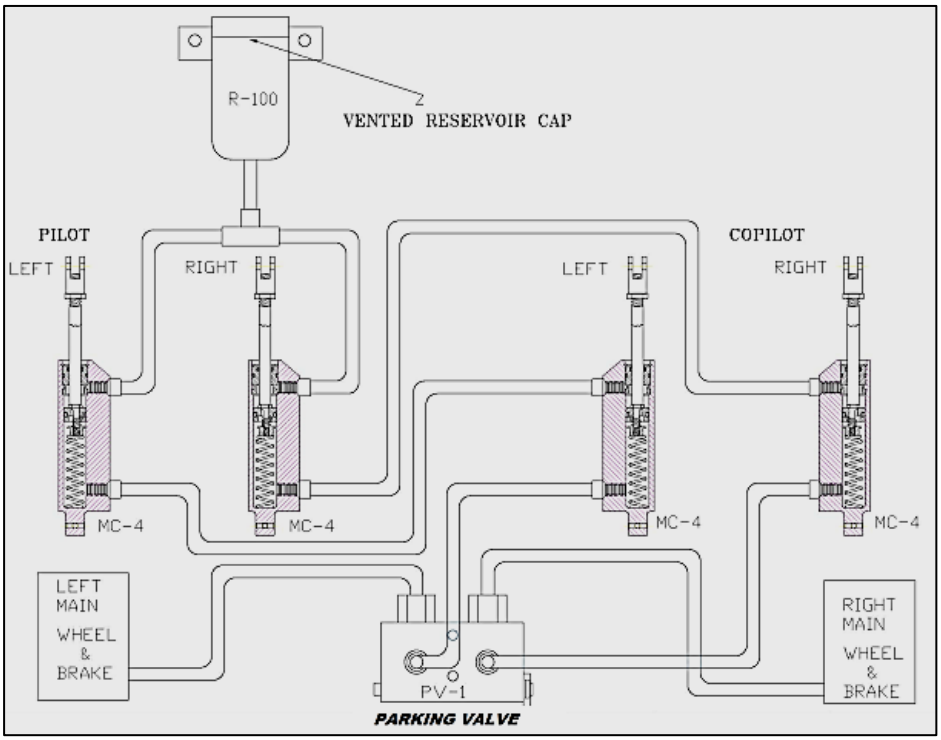

FIG. 7-9. BRAKE SYSTEM SCHEMATIC

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SECTION 8 – GROUND HANDLING & SERVICE

INDEX

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.

CAUTION

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

WARNING

- *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

INDEX

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:	Registration marks:	Date:			
SUPPLEMENTS LIST FOR AIRPLANES WITH ANALOGUE INSTRUMENTS					
Sup. No.	**Title**	**Rev. no.**	**Date**	**APPLICABLE:**	
				YES	**NO**
S1	VFR Night equipment configuration			☐	☐

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SUPPLEMENT NO.S1
VFR NIGHT EQUIPMENT CONFIGURATION

Record of Revisions

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

List of Effective Pages

	Page	Revision
Cover Pages	S1-1 thru 20	*Rev 0*
Section 2	N2-1 thru 30	*Rev 0*
Section 3	N3-1 thru 24	*Rev 0*
Section 4	N4-1 thru 18	*Rev 0*
Section 7	N7-1 thru 18	*Rev 0*

INDEX

INTRODUCTION

The information contained herein supplements or supersedes the basic Aircraft Flight Manual: detailed instructions are provided to allow the owner for replacing the basic AFM pages containing information amended as per the VFR Night Equipment Configuration in subject.

It is the owner's responsibility to replace the mentioned pages in accordance with the instructions herein addressed section by section.

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Supplement S1: pages replacement instructions

SECTION 1 –GENERAL

Refer to Basic AFM Section 1.

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Supplement S1: pages replacement instructions

SECTION 2 – LIMITATIONS

Supplement S1 – **Limitations** pages replace basic AFM Section 2 as a whole.

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SECTION 2 – LIMITATIONS

INDEX

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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	**145**	**141**	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	**113**	**111**	Do not exceed this speed except in smooth air, and only with caution.
V_A	Design Manoeuvring speed	**99**	**98**	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	**71**	**72**	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 – 71**	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	**48 – 113**	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	**113 – 145**	Manoeuvres must be conducted with caution and only in smooth air.
Red line	**145**	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
Min/Max Oil	50° C / 130° C

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

100% Propylene Glycol.

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:	GT Propeller
MODEL:	GT-2/173/VRR-FW101 SRTC
BLADES:	One-piece 2-blade, constructed of wood materials, protective layer of laminate.
TYPE:	Fixed pitch
DIAMETER:	1730 mm (no reduction is permitted)

10. MAXIMUM OPERATING ALTITUDE

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

CAUTION

At altitudes above 10000 ft (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
Engine	rpm	----	577 - 2265	2265 - 2388	2388
Oil temp.	°C	50	50-130	----	130
CHT	°C	----	0-135	----	135
Oil pressure	-	OP LOW Warning 12 psi	----	-----	OP HIGH Warning (102 psi)
Fuel pressure	-	FP LOW Warning 2.2 psi	----	----	---

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	630 kg	1388 lb
Maximum landing weight	630 kg	1388 lb

Baggage Compartment		
Maximum weight	20 kg	44 lb
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

WARNING

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-VLAregulation 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	*99*
Chandelle	*113*
Steep turn (max 60°)	*99*
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: 99 KIAS).

WARNING

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

17. MANOEUVRES LOAD FACTOR LIMITS

Manoeuvre load factors limits are as follows:

Positive	Negative
+ 4 g	**- 2 g**

Manoeuvre load factors limits with flaps extended are as follows:

Positive	Negative
+ 2 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.

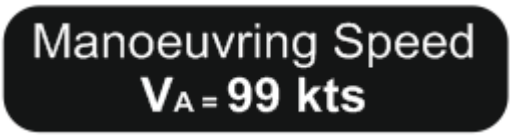
WARNING

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

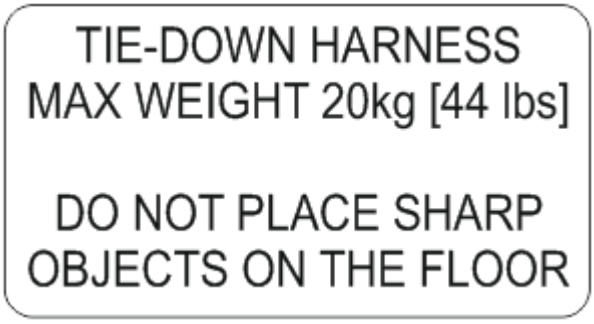
The following limitation placards are placed in plain view on the pilot.
On the left side instrument panel, above on the left, it is placed the following placard reporting following speed limitation:



On the central side of the instrument panel, the following placard is placed reminding the observance of aircraft operating limitations according to the 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”:

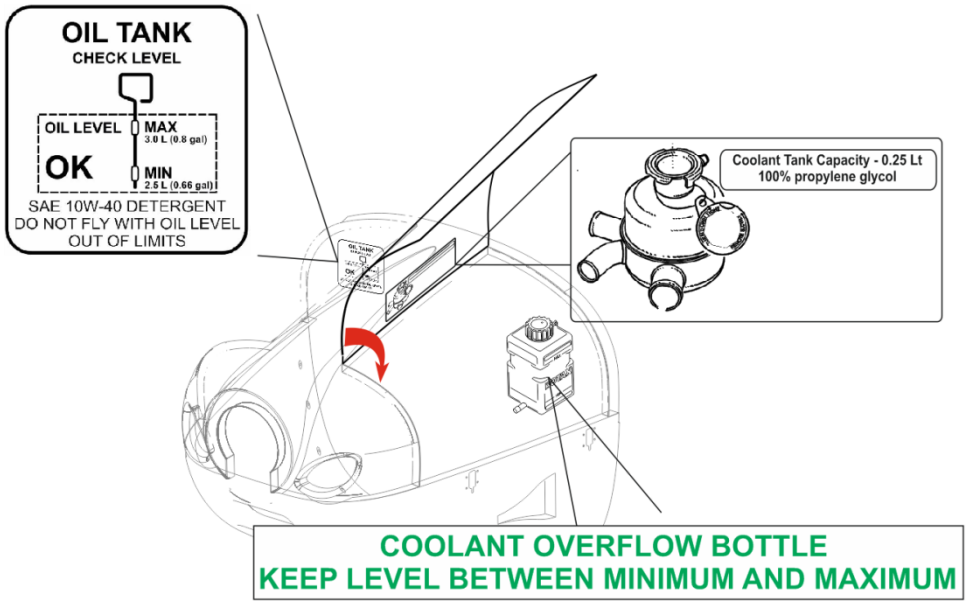
In the baggage compartment following placard is placed:



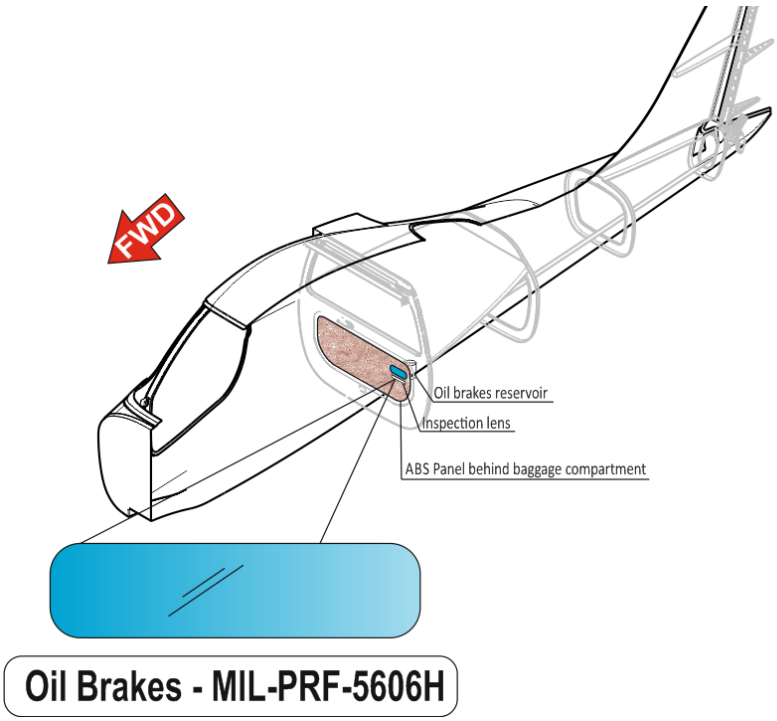
Below the G3X screens and analogue instruments, the following labels are placed:

22. OTHER PLACARDS

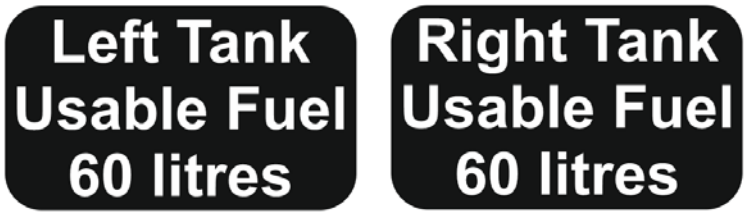
Engine compartment placards



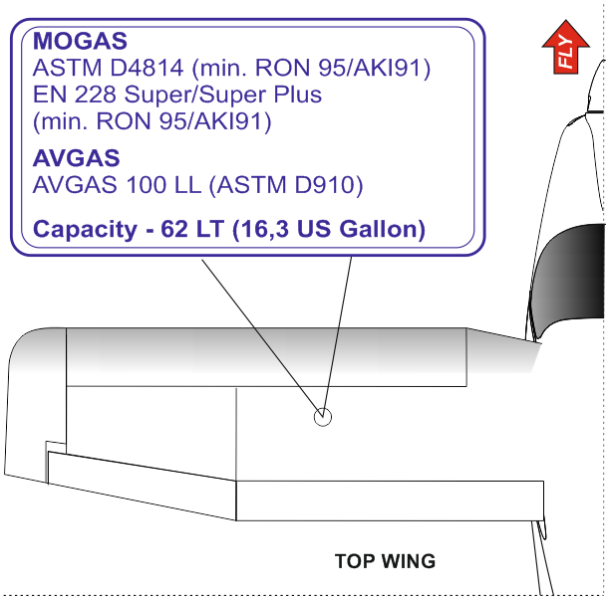
Oil brakes reservoir placard



Usable fuel markings



Allowed fuel placards



Emergency exit placard

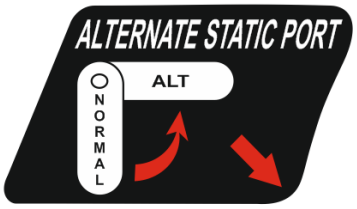
Parking brake placard

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

Flap indicator placard

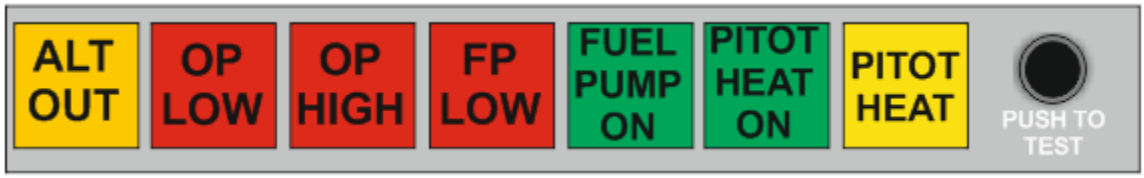
Backrest lever placard

Safety equipment location placard

Elt placard

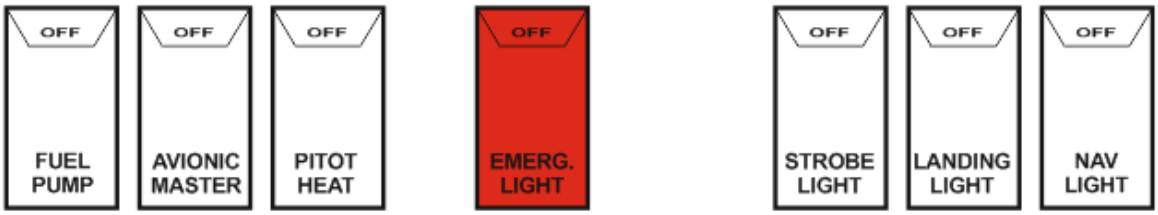
Battery placard

Annunciator panel



Upper panel labels

Switches labels



Day/Night switch label

Door lock lever

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Supplement S1: pages replacement instructions

SECTION 3 – EMERGENCY PROCEDURES

Supplement S1 – **Emergency Procedures** pages replace basic AFM Section 3 as a whole.

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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.*

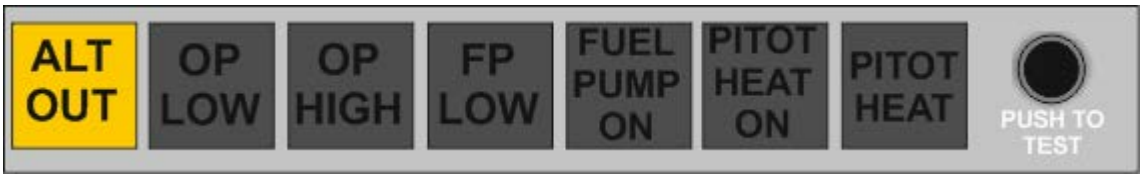
2. AIRPLANE ALERTS

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. Generator switch: *OFF*
2. Master switch: *OFF*
3. Generator switch: *ON*
4. Master switch: *ON*

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

5. Generator switch: *OFF*
6. Audio Panel: *OFF*

7. **Land as soon as practical.**

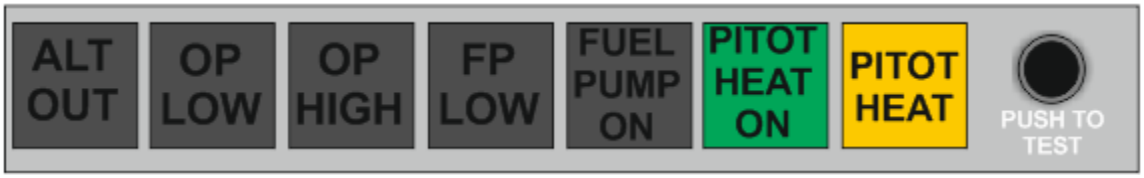
NOTE

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

2.2. PITOT HEATING SYSTEM FAILURE

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

If the amber **PITOT HEAT** caution turns **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, 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 58KIAS***
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***

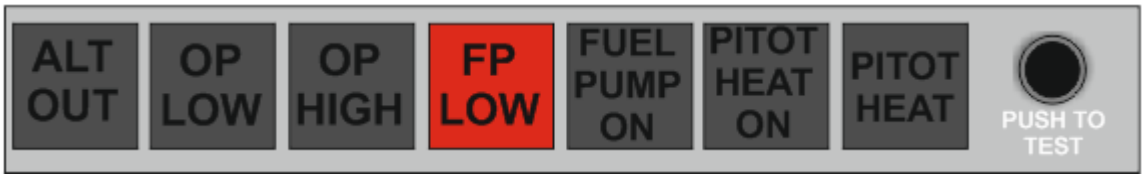
WARNING

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 **FP LOW** warning is **ON:**

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

If **FP LOW** warning persists **ON**:

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

5.3.2 Low Oil Pressure

If **OP LOW** warning is **ON**:

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

If **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 CHToccurs:

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

5.3.4 CHT limit exceedance

If CHT is above 135°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**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

WARNING

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***

WARNING

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

CAUTION

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 visibility 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**.

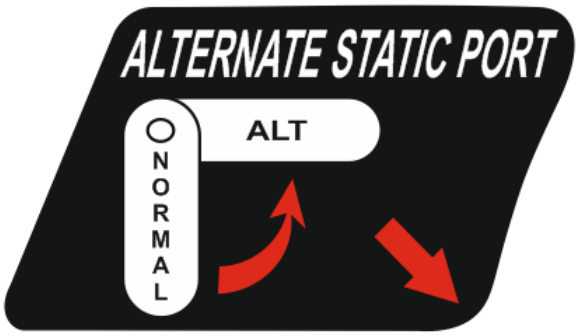
Trim Runaway

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*:*	*64 KIAS*
Landing length:	*35% increased*

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Supplement S1: pages replacement instructions

SECTION 4 – NORMALPROCEDURES

Supplement S1 – **Normal Procedures** pages replace basic AFM Section 4 as a whole.

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SECTION 4 – NORMAL PROCEDURES

INDEX

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1. INTRODUCTION

Section 4 describes checklists and recommended procedures for the conduct of normal operations for P2008 JC aircraft.

WARNING

Garmin G3X is NOT intended to be used as primary reference for flight information but only provides information for situational awareness.
Primary flight information is provided by analogue instruments and, for engine parameters, pilot will rely upon caution/warning lights in the annunciator panel.

2. AIRSPEEDS FOR NORMAL OPERATIONS

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

	FLAPS	**630kg**
Rotation Speed (in takeoff, V_R)	T/O	**48 KIAS**
Best Angle-of-Climb Speed (V_X)	0°	**65 KIAS**
Best Rate-of-Climb speed (V_Y)	0°	**71 KIAS**
Approach speed	T/O	**58 KIAS**
Final Approach Speed	FULL	**54 KIAS**
Manoeuvring speed (V_A)	0°	**99 KIAS**
Never Exceed Speed (V_{NE})	0°	**145 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.

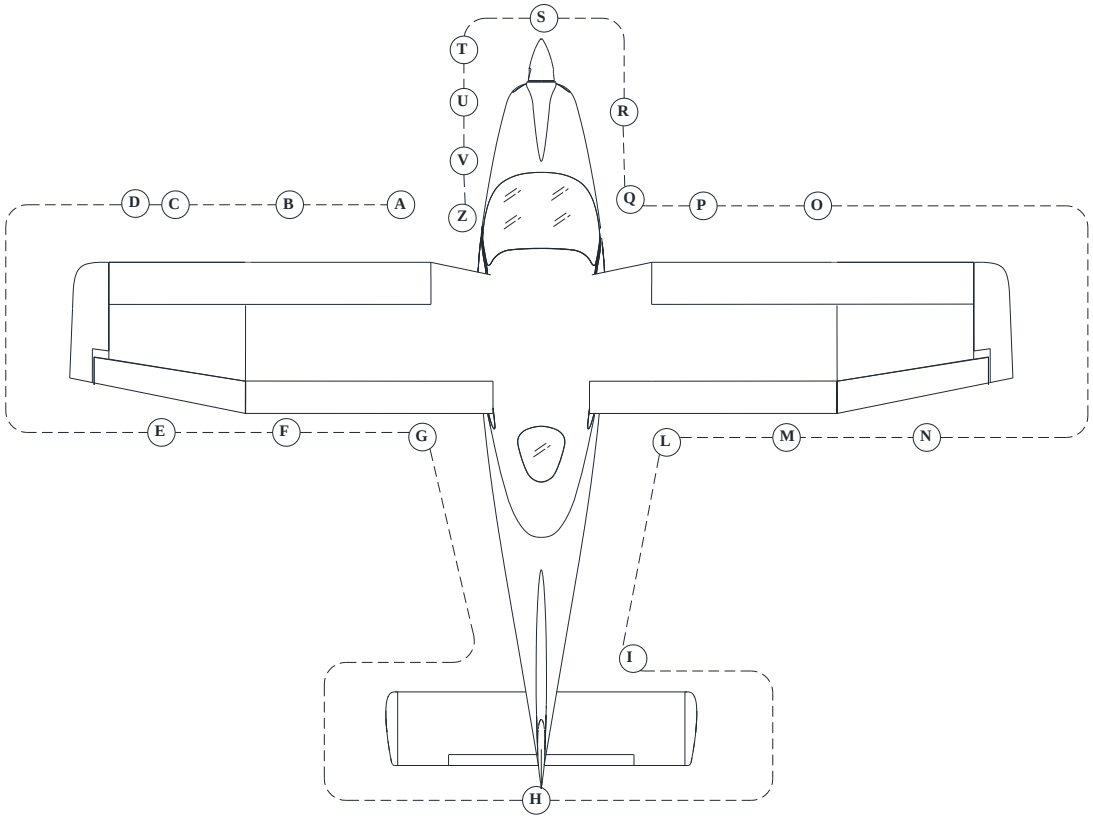

Figure 4.1

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) <u>Only before the first flight of a day</u>:

(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 rapi 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, heading and attitude) 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 parameters: *check all cautions/warnings OFF*
5. Rotation speed V_R: 48 KIAS
6. Flaps: *retract (above flap retraction speed 58 KIAS)*
7. Establish Climb rate V_Y: 71 KIAS
8. Electric fuel pump: *OFF*
9. Fuel pressure: *check FP LOW warning OFF*
10. Propeller speed: *reduce at or below 2250 rpm*

4.7. CRUISE

1. Set power at or below maximum continuous: *2250 propeller rpm*
2. Check engine parameters: *check all cautions/warnings OFF*
3. Carburettor heat: *as needed.*

NOTE

Monitor and manually compensate asymmetrical fuel consumption by switching fuel selector valve.

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*: 58 KIAS*
5. On final leg:
   Flaps: set LAND
   Final Approach Speed*: 54 KIAS*
6. Carburettor heat: *OFF (full IN)*
7. Optimal touchdown speed: *54 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*

WARNING

Before disembarkation verify propeller is fully stopped.

CAUTION

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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Supplement S1: pages replacement instructions

SECTION 5 - PERFORMANCE

Refer to Basic AFM Section 5.

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Supplement S1: pages replacement instructions

SECTION 6 – WEIGHT AND BALANCE

Refer to Basic AFM Section 6.

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Supplement S1: pages replacement instructions

SECTION 7 – AIRFRAME AND SYSTEM DESCRIPTION

Supplement S1 – **Airframe and System Description** pages replace basic AFM Section 7 as a whole.

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SECTION 7 – AIRFRAME AND SYSTEMS DESCRIPTION

INDEX

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

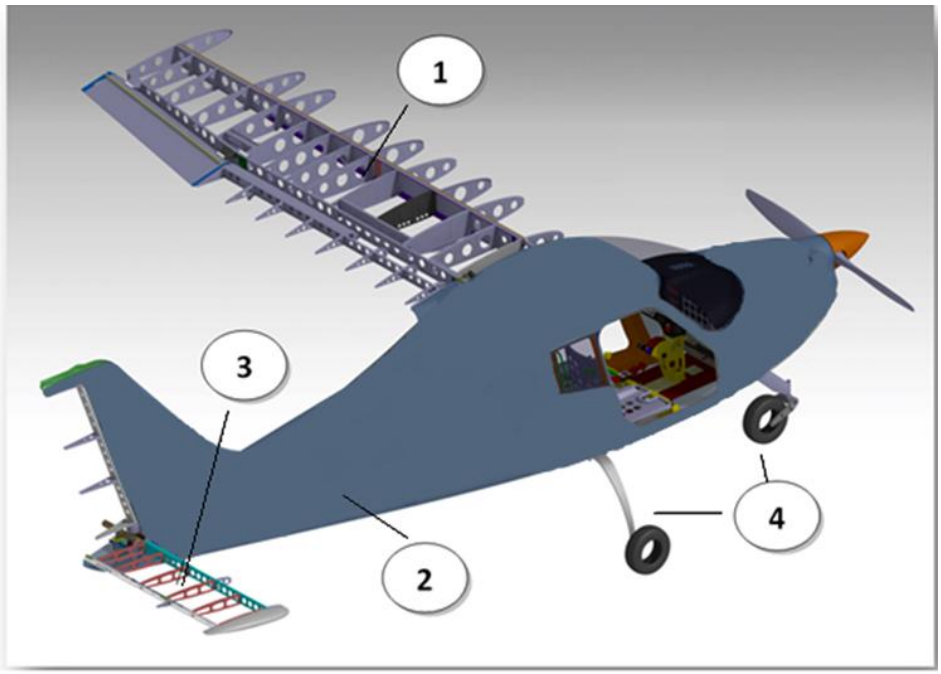


Fig. 7-1.P2008JC AIRFRAME

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).

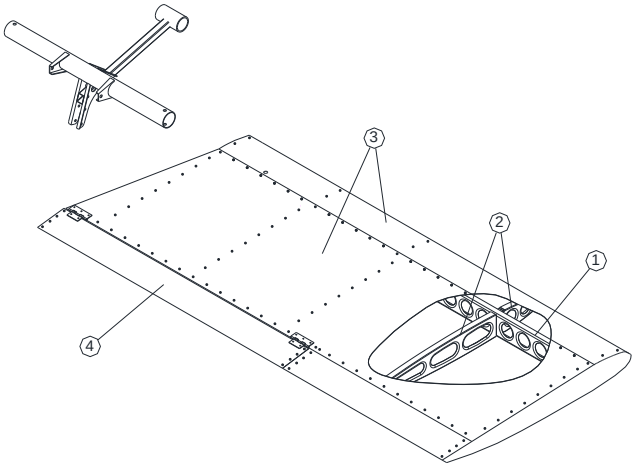


Fig. 7-2.STABILATOR STRUCTURE

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.

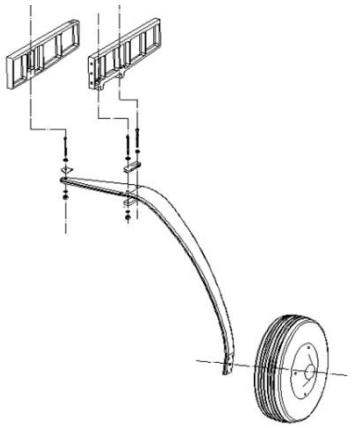


Fig. 7-3.MAIN LANDING GEAR STRUCTURE

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*

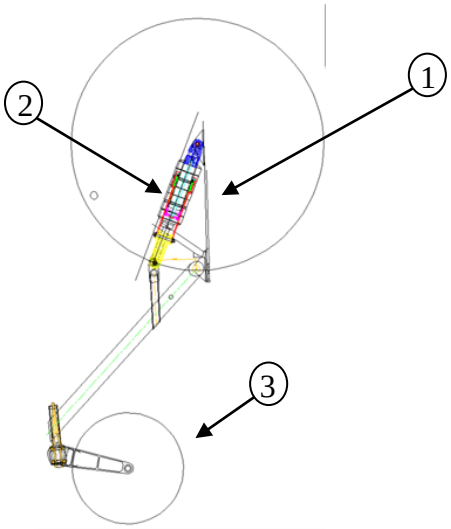


Fig. 7-4.NOSE LANDING GEAR STRUCTURE

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:

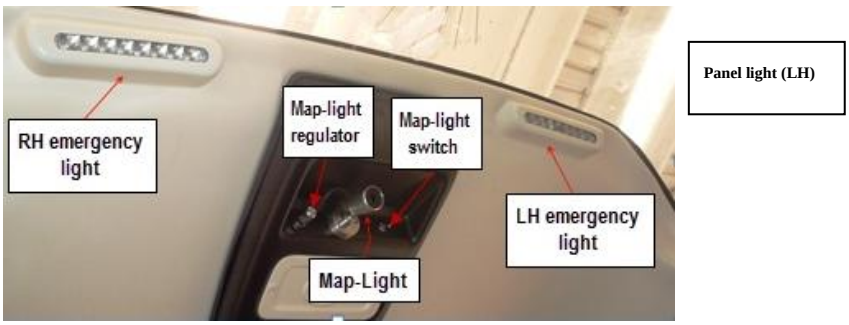
- The left area holds primary (analogue) and pilot's situational awareness (G3X LH display) flight instruments, a chronometer, a pitch trim indicator and a holds Day/night switch (selecting between two brightness levels for warning lights in the annunciator panel);
- The right area holds thus a voltmeter, 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.

4.3. CABIN HEAT

The cabin heat control knob is positioned on the lower right side of the instrument panel; when knob is pulled fully outward, cabin receives maximum hot air. If the outlets are kept closed, hot air only performs windshield defrost. Vents are located by the rudder pedals. If necessary, outside fresh air can be circulated inside cabin by opening the vents on the doors' windows.

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):

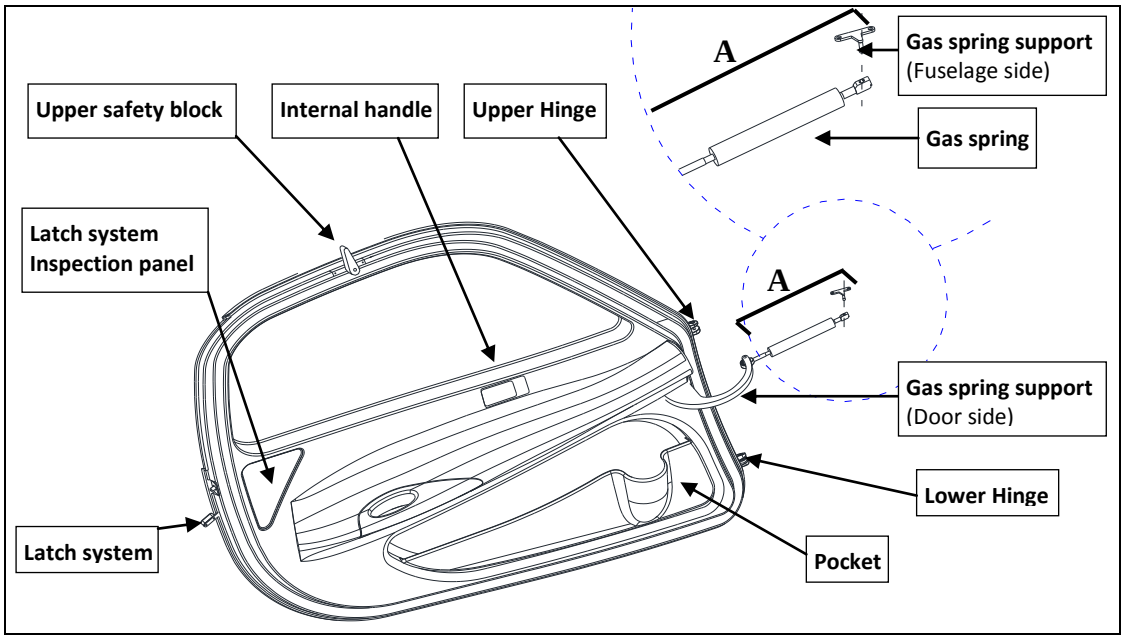


Fig. 7-6.DOOR

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

7. POWERPLANT

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: *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.

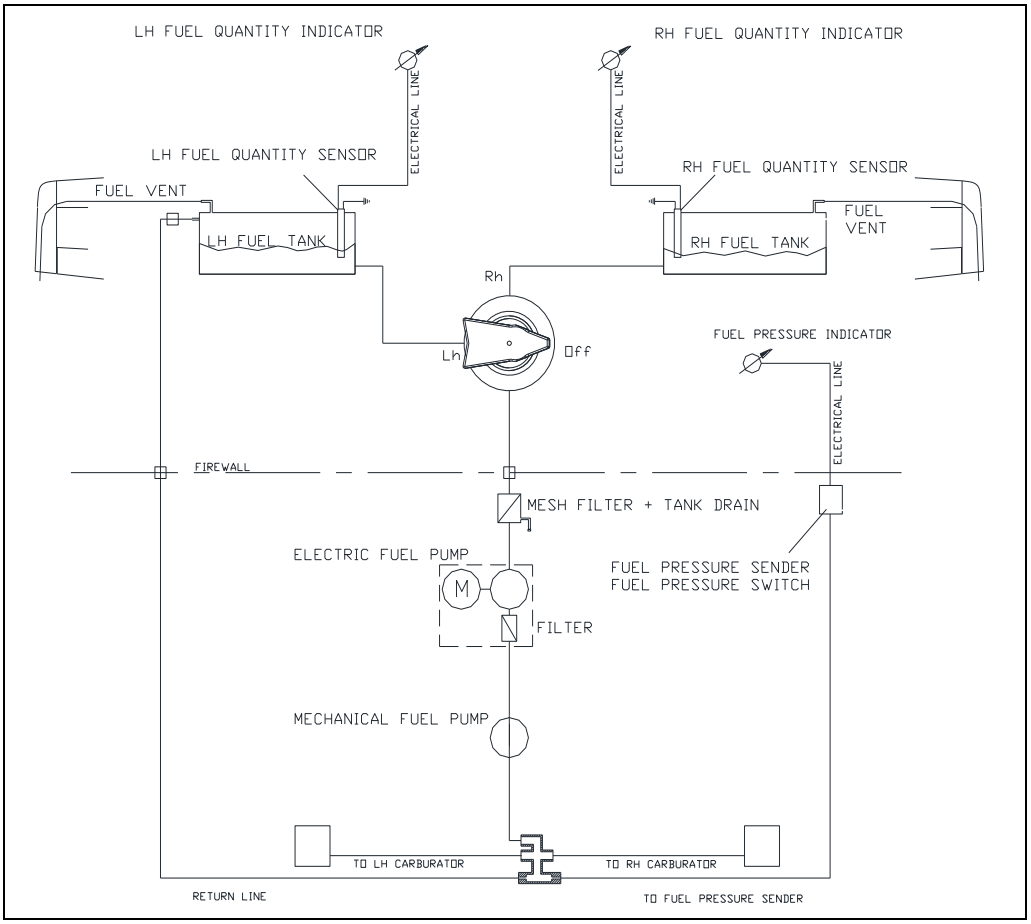


Fig.7-7. FUEL SYSTEM SCHEMATIC

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 recharges 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.

WARNING

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 air-speed 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.

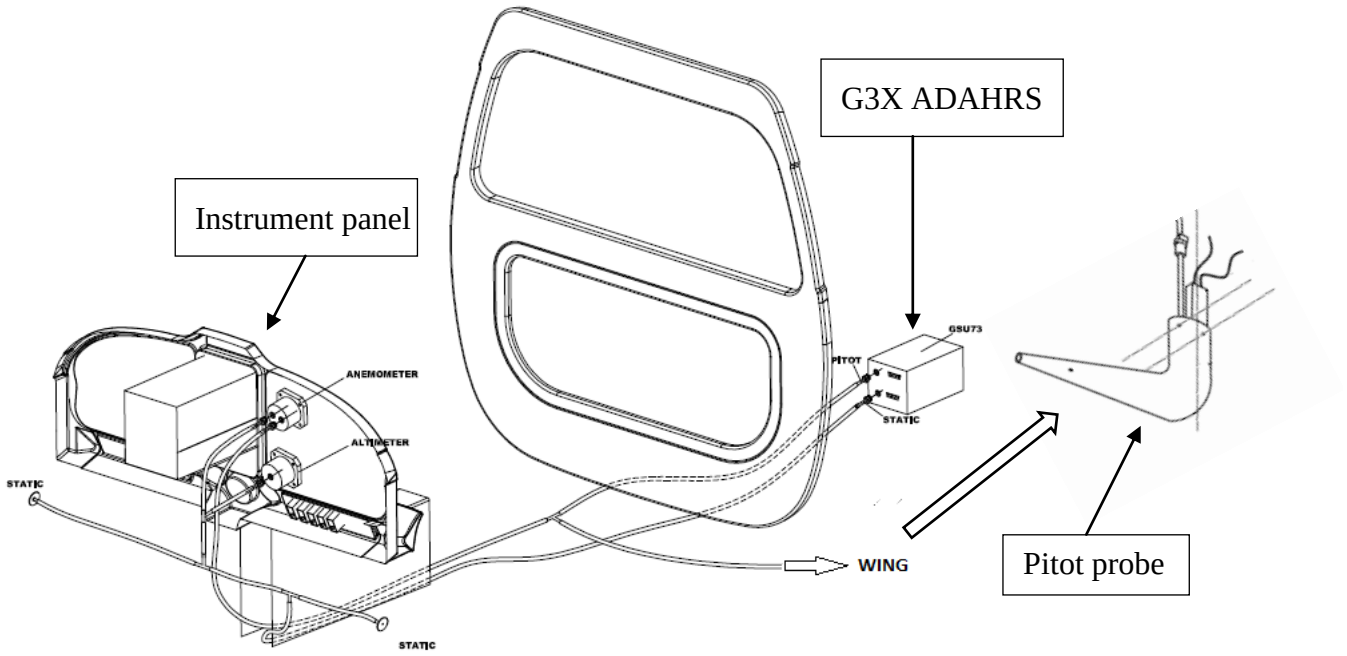


FIG.7-8. PITOT-STATIC SYSTEM

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.

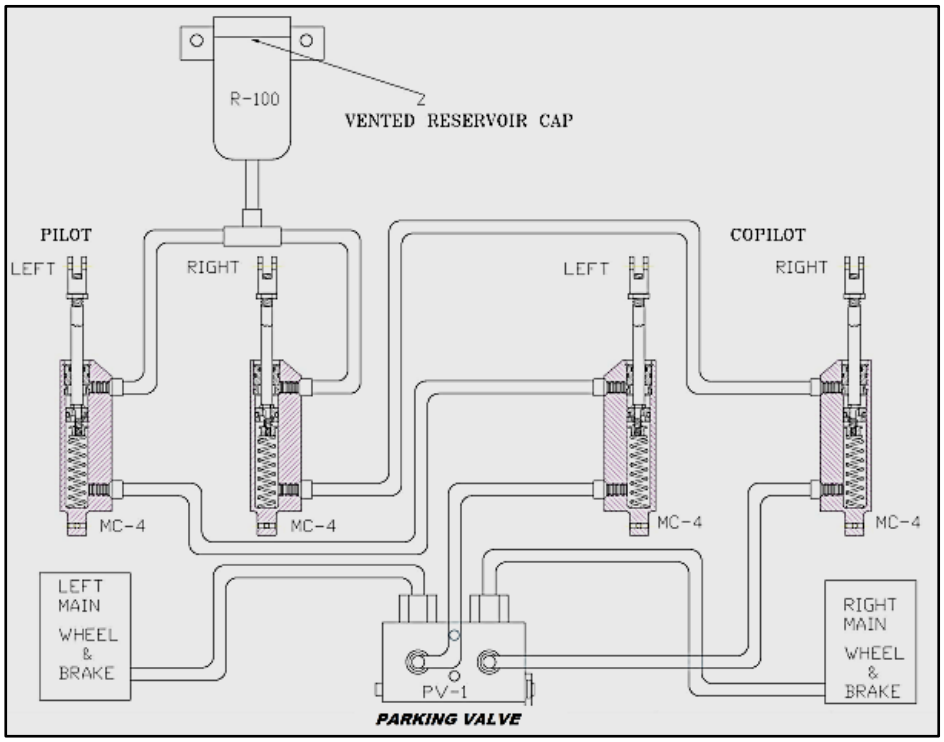


FIG. 7-9. BRAKE SYSTEM SCHEMATIC

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Supplement S1: pages replacement instructions

SECTION 8 – GROUND HANDLING & SERVICE

Refer to Basic AFM section 8.

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