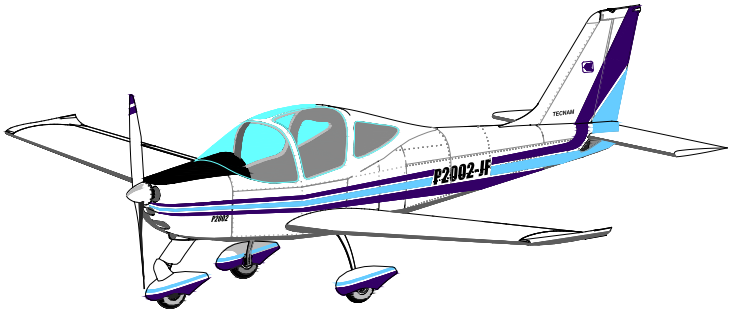
FLIGHT MANUAL

Doc. n° 2002/28
2nd edition, March 2nd 2010
3rd revision, February 10th 2011



P2002-JF

(FOR MTOW 580 KG AND MTOW 600 KG)

MANUFACTURER: *COSTRUZIONI AERONAUTICHE* ***TECNAM*** S.r.l.

AIRCRAFT MODEL: ***P2002-JF***

EASA TYPE CERTIFICATE NO. **A .006**

SERIAL NUMBER:……

BUILD YEAR: …….

REGISTRATION MARKINGS: ……..……..

This manual contains information to be furnished to the pilot as required by EASA in addition to further information supplied by the manufacturer.

This manual must always present on board the aircraft

The aircraft is to be operated in compliance with information and limitations contained herein.

Sections2, 3, 4, 5 and 9 (supp.1) are approved by EASA n°EASA.AC.01372 dated 3/8/2005

RECORD of REVISIONS

Any revision to the present Manual, except actual weighing data, is recorded: a Record of Revisions is provided at the front of this manual and the operator is advised to make sure that the record is kept 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"; subsequent revisions are identified by the change of the code from "0" to "1" for the first revision to the basic publication, "2" for the second one, etc.

Should be necessary to completely 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	
1	i-3	Update RoR	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA third country validation
	i-4 thru 6	Update LOEP	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA third country validation
	9-2	Update ToC	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA third country validation
	9-3	Update Supplement list	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA third country validation
	9-18 thru 9-34	Add Supplement 6	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA third country validation
2	i-3	Update RoR	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA no. 10033399
	i-4 thru 6	Update LOEP	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA no. 10033399
	9-2	Update ToC	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA no. 10033399
	9-3	Update Supplement list	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA no. 10033399
	9-35 thru 9-46	Add Supplement 7	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA no. 10033399
3	i-3	Update RoR	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA
	i-4 thru 6	Update LOEP	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA
	9-1thru 2	Update ToC pages numbers	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA
	9-3	Update ToC	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA
	9-4	Add blank page	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA
	9-5	Update Supplement list	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA
	9-1thru 49	Arrange material	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA
	9-50	Add blank page	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA
	9-51 thru 62	Add Supplement 8	Pasquale Violetti	Michele Oliva	Luigi Pascale	EASA

LIST OF EFFECTIVE PAGES

All the editions and revisions are listed below with their respective date of issue:

1st Edition, Rev.0……	***March 29th 2004***
1st Edition, Rev.1……	***August 3rd 2005***
1st Edition, Rev.2……	***October 23rd 2009***
1st Edition, Rev.3……	***February 11th 2010***
2nd Edition, Rev.0……...	***March 2nd 2010***
2nd Edition, Rev.1……...	***November 12th 2010***
2nd Edition, Rev.2……...	***December 12th 2010***
2nd Edition, Rev.3……...	***February10th 2010***

NOTE *The second edition has been issued in order to provide the pilot with the needful information about both 580 kg and 600 kg MTOW summarized in a compact form by means of simple tables.*

Sect.	Page	Date	Sect.	Page	Date	Sect.	Page	Date	Sect.	Page	Date
0	i-1	12/12/10	3	3-4	2/3/10	6	6-1	2/3/10	9	9-6	10/2/11
	i-2	2/3/10		3-5	"		6-2	"		9-7	"
	i-3	10/2/11		3-6	"		6-3	"		9-8	"
	i-4	"		3-7	"		6-4	"		9-9	"
	i-5	"		3-8	"		6-5	"		9-10	"
	i-6	"		3-9	"		6-6	"		9-11	"
	i-7	2/3/10		3-10	"		6-7	"		9-12	"
	i-8	"					6-8	"		9-13	"
							6-9	"		9-14	"
1	1-1	2/3/10					6-10	"		9-15	"
	1-2	"					6-11	"		9-16	"
	1-3	"	4	4-1	2/3/10		6-12	"		9-17	"
	1-4	"		4-2	"		6-13	"		9-18	"
	1-5	"		4-3	"		6-14	"		9-19	"
	1-6	"		4-4	"					9-20	"
	1-7	"		4-5	"	7	7-1	2/3/10		9-21	"
	1-8	"		4-6	"		7-2	"		9-22	"
	1-9	"		4-7	"		7-3	"		9-23	"
	1-10	"		4-8	"		7-4	"		9-24	"
	1-11	"		4-9	"		7-5	"		9-25	"
	1-12	"		4-10	"		7-6	"		9-26	"
				4-11	"		7-7	"		9-27	"
2	2-1	2/3/10					7-8	"		9-28	"
	2-2	"					7-9	"		9-29	"
	2-3	"	5	5-1	2/3/10		7-10	"		9-30	"
	2-4	"		5-2	"		7-11	"		9-31	"
	2-5	"		5-3	"		7-12	"		9-32	"
	2-6	"		5-4	"					9-33	"
	2-7	"		5-5	"	8	8-1	2/3/10		9-34	"
	2-8	"		5-6	"		8-2	"		9-35	"
	2-9	"		5-7	"		8-3	"		9-36	"
	2-10	"		5-8	"		8-4	"		9-37	"
	2-11	"		5-9	"					9-38	"
	2-12	"		5-10	"	9	9-1	10/2/11		9-39	"
				5-11	"		9-2	"		9-40	"
3	3-1	2/3/10		5-12	"		9-3	"		9-41	"
	3-2	"		5-13	"		9-4	"		9-42	"
	3-3	"		5-14	"		9-5	"		9-43	"

Sect.	Page	Date	Sect.	Page	Date	Sect.	Page	Date	Sect.	Page	Date
9	9-44	10/2/11									
	9-45	"									
	9-46	"									
	9-47	"									
	9-48	"									
	9-49	"									
	9-50	"									
	9-51	"									
	9-52	"									
	9-53	"									
	9-54	"									
	9-55	"									
	9-56	"									
	9-57	"									
	9-58	"									
	9-59	"									
	9-60	"									
	9-61	"									
	9-62	"									

TABLE OF CONTENTS

* Section approved by EASA
** Section partially approved by EASA

INTENTIONALLY LEFT BLANK

SECTION 1

GENERAL

TABLE OF CONTENTS

INTRODUCTION

The ***P2002-JF*** is a twin seat, single engine aircraft with a tapered, low wing. fixed main landing gear and steerable nosewheel.
This Flight Manual has been prepared to provide pilots and instructors with information for the safe and efficient operation of this very light aeroplane.
This manual includes the material required to be furnished to the pilot of CS-VLA. It also contains supplemental data supplied by aeroplane manufacturer.

CERTIFICATION BASIS

This type of aircraft has been approved by the European Safety Aviation Agency in accordance with CS-VLA of 14 November 2003, and the Type Certificate No. A.006 issued on 27th May 2004.
Category of Airworthiness: Normal

Noise Certification Basis: EASA CS-36 1st edition dated 17th October 2003, with reference to ICAO/Annex 16 3rd edition dated 1993, Vol.1 Chapter 10.

WARNINGS - CAUTIONS - NOTES

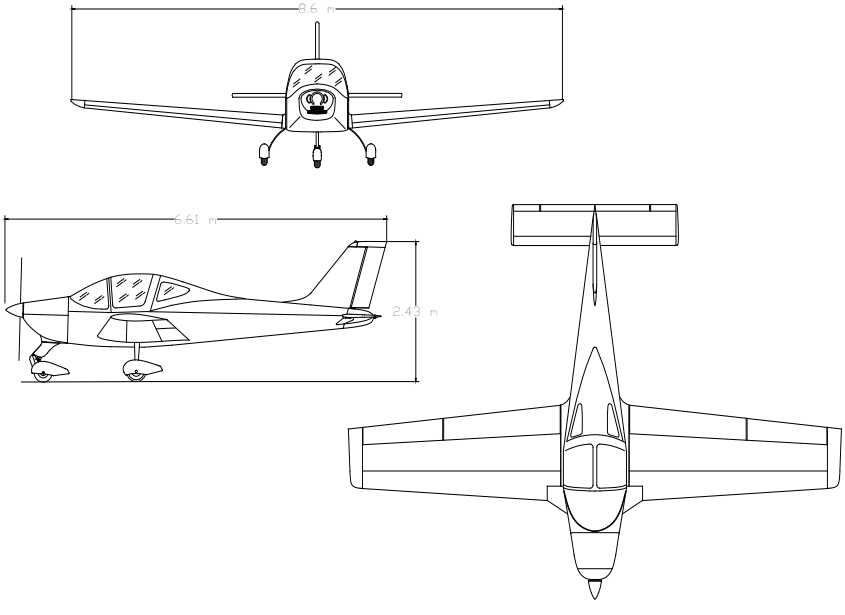
The following definitions apply to warnings, cautions and notes used in the Flight Manual.

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.

THREE-VIEW DRAWING



NOTE

- Dimensions shown refer to aircraft weight (for 580 kg and 600 kg) and normal operating tire pressure.
- Propeller ground clearance 320mm
- Propeller ground clearance with deflated front tire and nose wheel shock absorber compressed by 102mm
- Minimum ground steering radius 5.5m

DESCRIPTIVE DATA

		For 580 kg MTOW	For 600 kg MTOW
WING			
	Wing span:	8.6 m	8.6 m
	Wing surface	11.5 m^2	11.5 m^2
	Wing loading	50.4 kg/m^2	52.2 kg/m^2
	Aspect ratio	6.4	6.4
	Taper ratio	0.6	0.6
	Dihedral	5°	5°
FUSELAGE			
	Overall length	6.61 m	6.61 m
	Overall width	1.11 m	1.11 m
	Overall height	2.43 m	2.43 m
EMPENNAGE			
	Stabilator span	2.90 m	2.90 m
	Vertical tail span	1.10 m	1.10 m
LANDING GEAR			
	Wheel track:	1.85 m	1.85 m
	Wheel base:	1.62 m	1.62 m
	Main gear tires: Air Trac	5.00-5	5.00-5
	Wheel hub and brakes: Cleveland	199-102	199-102
	Nose gear tire: Sava	4.00-6	4.00-6

CONTROL SURFACES TRAVEL LIMITS

Ailerons	Up 20° down 15 ° ± 2°
Stabilator	Up 15° down 3° ± 1°
Trim-Tab	2° ; 9° ± 1°
Rudder	RH 30° LH 30° ± 2°
Flaps	0°; 40° ± 1°

ENGINE

Manufacturer:	Bombardier-Rotax GmbH
Model	912 S2
Certification basis	FAR 33 Amendment 15
Austrian T.C. No.	TW 9-ACG dated 27th November 1998
Type:	4 cylinder horizontally-opposed twins with overall displacement of 1352 c.c., mixed cooling, (water-cooled heads and air-cooled cylinders), twin carburettors, integrated reduction gear with torque damper.
Maximum power:	73.5 kW (98.5 hp) @ 5800 rpm (max. 5') 69.0 kW (92.5 hp) @ 5500 rpm (cont.)

PROPELLER

Manufacturer:	Hoffmann Propeller
Certification Basis	CAR Part 14
Type Certificate No.	SO/E 30 dated 10 December 1999
Model:	HO17GHM A 174 177 C
Number of blades:	2
Diameter:	1740 mm (no reduction permitted)
Type:	Fixed pitch – wood

FUEL

Fuel grade:	• MOGAS EN 228 Premium/Premium Plus (Min RON 95) • AVGAS 100LL (see *Section 2 page 11*)
Fuel tanks:	2 wing tanks integrated within the wing's leading edge. Equipped with finger strainers outlet and with drain fittings.
Capacity of each wing tank	50 liters
Total capacity:	100 liters
Total usable fuel	99 litres

OIL SYSTEM

Oil system type:	Forced, with external oil reservoir
Oil:	Lubricant specifications and grade are detailed into the "Rotax Operators Manual" and in its related documents.
Oil Capacity:	Max. 3.0 litres – min. 2.0 liters

COOLING

Cooling system:	Mixed air and liquid pressurized closed circuit system
Coolant:	Coolant type and specifications are detailed into the "Rotax Operator's Manual" and in its related documents.

	For 580 kg MTOW	For 600 kg MTOW

MAXIMUM WEIGHTS

Maximum take-off weight:	580 kg	600 kg
Maximum landing weight:	580 kg	600 kg
Maximum baggage weight	20 kg	20 kg

STANDARD WEIGHTS

Standard Empty Weight	337 kg	337 kg
Maximum useful load	243 kg	263 kg

SPECIFIC LOADINGS

Wing Loading	50.4 kg/m^2	52.2 kg/m^2
Power Loading	5.9 kg/hp	6.1 kg/hp

ABBREVIATIONS AND TERMINOLOGY

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

KCAS	Calibrated Airspeed is the indicated airspeed corrected for position and instrument error and expressed in knots.
KIAS	Indicated Airspeed is the speed shown on the airspeed indicator and expressed in knots.
KTAS	True Airspeed is the airspeed expressed in knots relative to undisturbed air which is KCAS corrected for altitude and temperature.
V_{FE}	Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.
V_{NO}	Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air, then only with caution.
V_{NE}	Never Exceed Speed is the speed limit that may not be exceeded at any time.
V_S	Stalling Speed.
V_{S0}	Stalling speed in landing configuration
V_{S1}	Stalling speed in clean configuration (flap 0°)
V_X	Best Angle-of-Climb Speed is the speed which results in the greatest gain of altitude in a given horizontal distance.
V_Y	Best Rate-of-Climb Speed is the speed which results in the greatest gain in altitude in a given time.
Vr	Rotation speed: is the speed at which the aircraft rotates about the pitch axis during takeoff
V_{LO}	Lift off speed: is the speed at which the aircraft generally lifts off from the ground.
Vobs	Obstacle speed: is the speed at which the aircraft flies over a 15m obstacle during takeoff or landing

METEOROLOGICAL TERMINOLOGY

OAT	Outside Air Temperature is the free 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.

ENGINE POWER TERMINOLOGY

RPM	Revolutions Per Minute: is the number of revolutions per minute of the propeller, multiplied by 2.4286 yields engine RPM.

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Crosswind Velocity	is the velocity of the crosswind component for which adequate control of the airplane during takeoff and landing is guaranteed.
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 specific range, that is, the distance (in nautical miles) which can be expected at a specific power setting and/or flight configuration per kilo 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 from the reference datum to the center of gravity (C.G.) of an item.
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 airplane.
Empty Weight	Empty Weight is the weight of the aeroplane with engine fluids and oil at operating levels.
Useful Load	is the difference between takeoff weight and the basic empty weight.
Maximum Takeoff Weight	is the maximum weight approved for the start of the takeoff run.
Maximum Landing Weight	is the maximum weight approved for the landing touch down.
Tare	is the weight of chocks, blocks, stands, etc. used when weighing an airplane, and is included in the scale readings. Tare is deducted from the scale reading to obtain the actual (net) airplane weight.

UNIT CONVERSION CHART

MULTIPLYING		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				
Kilometers	[km]	0.5396	Nautical miles	[nm]
Nautical miles	[nm]	1.853	Kilometers	[km]
Meters	[m]	3.281	Feet	[ft]
Feet	[ft]	0.3048	Meters	[m]
Centimeters	[cm]	0.3937	Inches	[in]
Inches	[in]	2.540	Centimeters	[cm]
VOLUME				
Liters	[l]	0.2642	U.S. Gallons	[US Gal]
U.S. Gallons	[US Gal]	3.785	Liters	[l]
AREA				
Square meters	[m^2]	10.76	Square feet	[sq ft]
Square feet	[sq ft]	0.0929	Square meters	[m^2]

INTENTIONALLY LEFT BLANK

SECTION 2
LIMITATIONS

TABLE OF CONTENTS

INTRODUCTION

Section 2 includes operating limitations, instrument markings, and basic placards necessary for safe operation of the ***P2002-JF***, its engine and standard systems and equipment.

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown below:

SPEED			580 kg MTOW		600 kg MTOW		REMARKS
			KIAS	KCAS	KIAS	KCAS	
V_{NE}	Never exceed speed		138	135	141	138	Never exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed		110	106	112	108	Never exceed this speed unless in smooth air, and then only with caution.
V_A	Manoeuvring speed		96	94	98	96	Do not make full or abrupt control movements above this speed as this may cause stress in excess of limit load factor
V_{FE}	Maximum flap extended speed	LDG	67	69	68	70	Do not exceed these speeds with the given flap setting.
		APP	97	95	99	97	

AIRSPEED INDICATOR MARKINGS

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

Refer to section 9 of this Flight Manual for operational limitations for aircraft fitted with optional equipment.

MARKING	**580 kg MTOW**	**600 kg MTOW**	SIGNIFICANCE
	KIAS (knots)		
White arc	**30 - 67**	**31 - 68**	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	**40 – 110**	**41 – 112**	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	**110 - 138**	**112 - 141**	Manoeuvres must be conducted with caution and only in smooth air.
Red line	**138**	**141**	Maximum speed for all operations.

POWERPLANT LIMITATIONS

The following table lists operating limitations for aircraft installed engine:

ENGINE MANUFACTURER: Bombardier Rotax GmbH.

ENGINE MODEL: 912 S2

MAXIMUM POWER: (see table below)

	Max Power kW *(hp)*	Max rpm. rpm prop.*(engine)*	Time max. (min.)
Max.	73.5 *(98.5)*	2388 *(5800)*	5
Max cont.	69 *(92.5)*	2265 *(5500)*	-

NOTE

With full throttle, at fixed point in no wind conditions, the maximum propeller's rpm should be 2100 ± 100.

TEMPERATURES:

Max cylinder heads	135° C
Max. / min. Oil	50° C / 130° C
Oil normal operating temperature (approx.)	90° C – 110° C

OIL PRESSURE:

Min	0.8 bar	(below 1400 rpm prop.)
Normal	2.0 - 5.0 bar	(above 1400 rpm prop.)

ENGINE START, OPER. TEMP:

OAT Min	-25° C
OAT Max	+50° C

WARNING

Admissible pressure for cold start is 7 bar maximum for short periods.

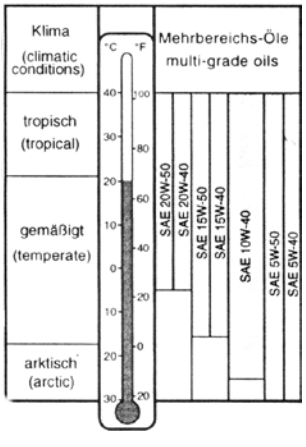
FUEL PRESSURE:

Min	2.2 psi *(0.15 bar)*
Max	5.8 psi *(0.40 bar)*

LUBRICANT

VISCOSITY

Use viscosity grade oil as specified in the following table:



WARNING

Use of Aviation Grade Oil with or without additives is not permitted

COOLANT

Coolant type and specifications are detailed into the “Rotax Operator’s Manual” and in its related documents.

PROPELLER

MANUFACTURER: Hoffmann Propeller GmbH

MODEL: HO17GHM A 174 177 C

PROPELLER TYPE: Wood twin blade fixed pitch

DIAMETER: 1740 mm (no reduction permitted)

POWERPLANT INSTRUMENT 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
Prop. tach	rpm	----	580 - 2265	2265 - 2388	2388
Oil Temp.	°C	50	90 - 110	50 - 90 110 - 130	130
Cylinder heads temp.	°C	----	0 - 135	----	135
Oil pressure	bar	0.8	2 – 5	0.8 – 2 5 – 7 (1)	7
Fuel press.	psi	2.2	2.2 – 5.8	----	5.8
Fuel q.ty	litres	---- (2)	----	----	----

OTHER INSTRUMENT MARKINGS

INSTRUMENT	RED LINE Minimum limit	GREEN ARC Normal operating	YELLOW ARC Caution	RED LINE Maximum limit
Voltmeter	10 Volt	12 - 14 Volt	----	----
Suction gage	4.0 in. Hg	4.5 – 5.5 in. Hg	----	----

1 Admissible pressure for cold start is 7 bar maximum for short periods.

2 The unusable fuel quantity for each tank is 0.5 litres

WEIGHTS

	580 kg MTOW	600 kg MTOW
Maximum takeoff weight:	580 kg	600 kg
Maximum landing weight:	580 kg	600 kg
Maximum zero fuel weight:	580 kg	600 kg
Maximum baggage weight (2.26 m aft from datum):	20 kg	20 kg

CENTER OF GRAVITY RANGE

Datum	Propeller support flange without spacer

WARNING

Ref. for levelling	Seat track supporting trusses (ref. to sect.6 for the procedure)
Forward limit	1.693 m (26.0% MAC) aft of datum for all weights
Aft limit	1.782 m (32.5% MAC) aft of datum for all weights

It is the pilot's responsibility to insure that the airplane is properly loaded. Refer to section 6 for appropriate instructions.

APPROVED MANEUVERS

This aircraft is certified in normal category under EASA CS-VLA.

CS-VLA applies 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
- Turns in which the angle of bank is not more than 60°

Acrobatic manoeuvres, including spins, are not approved.

Recommended entry speeds for each approved manoeuvre are as follows:

MANOEUVRE	**Speed** (KIAS)	
	580 kg MTOW	600 kg MTOW
Lazy eight	96	98
Chandelle	110	112
Steep turn (max 60°)	96	98
Stall	Slow deceleration (1 kts/s)	Slow deceleration (1 kts/s)

WARNING *Limit load factor could be exceeded by moving abruptly flight controls at their end run at a speed above V_A (Manoeuvring Speed: 96 KIAS for 580kg MTOW, 98 KIAS for 600kg MTOW).*

MANEUVERING LOAD FACTOR LIMITS

Manoeuvring load factors are as follows:

FLAPS		
0°	+3.8	- 1.9
40°	+1.9	0

FLIGHT CREW

Minimum crew for flight is one pilot seated on the left side.

KINDS OF OPERATION

The airplane, in standard configuration, is approved only for day VFR operation with terrain visual contact. Minimum equipment required is as follows:

- Altimeter
- Airspeed Indicator
- Heading Indicator
- Fuel Gauges
- Oil Pressure Indicator
- Oil Temp. Indicator
- Cylinder Heads Temp. Indicator
- Outside Air Temp. indicator
- Tachometer
- Chronometer
- First Aid Kit
- Hand-held fire extinguisher
- Emergency hammer

For further standard equipment refer to section 6.
Flight into expected and/or known icing conditions is prohibited.

NOTE

Additional equipments may be asked to fulfill national or specific requirements. It's a responsibility of the continued airworthiness manager to be compliant with these requirements.

FUEL

TWO TANKS: 50 liters each
TOTAL FUEL CAPACITY: 100 liters.
USABLE FUEL Q.TY: 99 liters
UNUSABLE FUEL Q.TY: 0.5 liters each (1.0 litres total)

Compensate uneven fuel tank levels by acting on the fuel selector valve located into the cabin.

APPROVED FUEL

* MOGAS EN 228 Premium/ Premium plus (min RON 95)
* AVGAS 100LL (see *Warning* below)

WARNING

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. It is therefore suggested to avoid using this type of fuel unless strictly necessary.

MAXIMUM PASSENGER SEATING

With the exception of the pilot, only **one** passenger is allowed on board of this aircraft.

DEMONSTRATED CROSS WIND SAFE OPERATIONS

The aircraft controllability during take-offs and landings has been demonstrated with a cross wind components of 22 kts.

LIMITATION PLACARDS

The following limitation placards must be placed in plain view on the aircraft. Near the airspeed indicator a placard will state the following:

MANEUVERING SPEED V_A=96 KIAS	for 580 kg MTOW
MANEUVERING SPEED V_A=98 KIAS	for 600 kg MTOW

On the left hand side of the dashboard a placard will state the following:

THIS AIRPLANE IS CLASSIFIED AS A VERY LIGHT AIRPLANE APPROVED FOR DAY VFR ONLY, IN NON-ICING CONDITIONS. ALL AEROBATIC MANEUVERS INCLUDING INTENTIONAL SPIN ARE PROHIBITED. SEE FLIGHT MANUAL FOR OTHER LIMITATIONS.

NO SMOKING

Near baggage compartment a placard will state the following:

FASTEN TIE-DOWN NET
MAXIMUM WEIGHT 20 kg
MAX. PRESS 12.5 Kg/dm^2

On the wing root there is the following placard:

NO STEP

For other placards see Maintenance Manual doc. 2002/30.

SECTION 3

EMERGENCY PROCEDURES

TABLE OF CONTENTS

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.

In case of emergency, suggestions of the present section should be considered and applied as necessary to correct the problem.

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 be provided.

In case of emergency the pilot should acts as follows:

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

ENGINE FAILURES

If an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

ENGINE FAILURE DURING TAKEOFF RUN

1. Throttle: *idle* (fully out)
2. Brakes: *apply as needed*
3. Magnetos: *OFF*.
4. Generator & Master switches: *OFF*.

With the aeroplane under control

5. Fuel selector valve: *OFF*
6. Electric fuel pump*: OFF*

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. Speed: *check*
2. Find a suitable place on the ground to land safely. The landing should be planned straight ahead with only small changes in directions not exceeding 45° to the left and 45° to the right
3. Flaps: *as needed*.
4. Throttle: *as required*

At touch down

5. Magnetos: *OFF*
6. Generator & Master switches: *OFF*.
7. Fuel selector valve: *OFF*
8. Electric fuel pump: *OFF*

ENGINE FAILURE DURING FLIGHT

IRREGULAR ENGINE RPM

1. Throttle: *check position and adjustable friction*
2. Check engine gauges.
3. Check both fuel quantity indicators.
4. Carburettors heating: *ON*
5. Electric fuel pump*: ON*

If the engine continues to run irregularly:

6. Fuel selector valve: *change the fuel feeding to the tank not in use (e.g. if you are drawing fuel from the LEFT tank, change to RIGHT or v.v.)*

If the engine continues to run irregularly:

7. Land as soon as possible.

LOW FUEL PRESSURE

If the fuel pressure indicator falls below the **2.2 psi** *(0.15 bar)* limit, it is necessary to apply the following procedure:

1. Fuel quantity indicators: *check*
2. Electric fuel pump: *ON*

If the engine continues to run irregularly:

3. Fuel selector valve: *change the fuel feeding to the tank not in use (e.g. if you are drawing fuel from the LEFT tank, change to RIGHT or v.v.)*

If the fuel pressure continues to be low:

4. Land as soon as possible

LOW OIL PRESSURE

1. Check oil temperature: *check*

If the temperature tends to increase:

2. Throttle: *set to reach a speed of 69 KIAS (maximum efficiency speed)*
3. Land as soon as possible and be alert for impending engine fault and consequent emergency landing.

If the temperature remains within the green arc limits:

4. Land as soon as possible

IN-FLIGHT ENGINE RESTART

1. Altitude: *preferably below 4000 ft*
2. Carburettors heating: *ON*
3. Electric fuel pump: *ON*
4. Fuel selector valve: *swap from one tank to another*
5. Throttle: *middle position*
6. Generator & Master switch: *ON*
7. Magnetos: *START*

If the restart attempt fails:

8. Procedure for a forced landing: *apply*

In case of an engine restart:

9. Land as soon as possible.

SMOKE AND FIRE

ENGINE FIRE DURING TAKEOFF

1. Throttle: *idle (fully out)*
2. Brakes: *as necessary*

With the aeroplane under control

3. Fuel selector valve: *OFF*
4. Electric fuel pump: *OFF*
5. Cabin heating: *OFF*
6. Magnetos: *OFF*
7. Generator & Master switch: *OFF*
8. Parking brake: *engage*
9. Escape rapidly from the aircraft.

ENGINE FIRE WHILE PARKED

1. Fuel selector valve: *OFF*
2. Electric fuel pump: *OFF*
3. Magnetos: *OFF*
4. Generator & Master switches: *OFF*
5. Parking brake: *ON*
6. Do not attempt air start.
7. Escape rapidly from the aircraft.

ENGINE FIRE IN-FLIGHT

1. Cabin heating: *OFF*
2. Fuel selector valve: *OFF*
3. Electric fuel pump: *OFF*
4. Throttle: *full in until the engine stops running*
5. Cabin vents: *OPEN*
6. Magnetos: *OFF*
7. Do not attempt an in-flight restart.
8. Procedure for a forced landing: *apply*

CABIN FIRE DURING FLIGHT

1. Cabin heating: *OFF*
2. Cabin vents: *OPEN*
3. Canopy: *open, if necessary*
4. Master switch: *OFF*
5. Try to choke the fire. Direct the fire extinguisher towards flame base
6. Procedure for a forced landing: *apply*

GLIDE

1. Flaps: *retract*
2. Speed: *69 KIAS (maximum efficiency speed)*
3. Electric equipments *(Landing, Strobo & Nav lights)*: *OFF*
4. In-flight engine restart: if conditions permit, try to restart several times

NOTE

*Glide ratio is **12.8** therefore with 1000ft elevation it is possible to cover ~4 km (~2 nautical miles) in zero wind conditions.*

LANDING EMERGENCY

FORCED LANDING WITHOUT ENGINE POWER

1. Procedure to glide: *apply (suggested airspeed 69 KIAS)*
2. Locate most suitable terrain for emergency landing, possibly upwind.
3. Fuel selector valve: *OFF*
4. Electric fuel pump: *OFF*
5. Magnetos: *OFF*
6. Tighten safety belts, canopy locks: *tighten – lock*

When certain to land

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

POWER-ON FORCED LANDING

1. Descent: *set*
2. Flaps: *as necessary*
3. Select terrain area most suitable for emergency landing and flyby checking for obstacles and wind direction.
4. Safety belts, canopy locks: *tighten – lock*

When certain to land

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

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.

LANDING WITH A FLAT MAIN TIRE

1. Pre-landing checklist: *complete*
2. Flaps: *land*
3. Land aeroplane on the side of runway opposite to the side with the defective tire to compensate for 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.

RECOVERY FROM UNINTENTIONAL SPIN

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

1. Throttle: *idle (full out position)*
2. Rudder: *full, in the opposite direction of the spin*
3. Stick: *move and hold forward until spin is halted*

As the spin is halted

4. Rudder: *neutralize*
5. Aeroplane attitude: *make a smooth recovery by pulling the stick back gently averting speeds in excess of* V_{NE} *and maximum load factor (n=+3.8)*
6. Throttle: *readjust to restore engine power.*

OTHER EMERGENCIES

UNINTENTIONAL FLIGHT INTO ICING CONDITIONS

1. Carburettor heating: *ON*
2. Get away from icing conditions by changing altitude or direction of flight in order to reach an area with warmer external temperature
3. Controls surfaces: continue to move to maintain their movability
4. Increase rpm to avoid ice formation on propeller blades.
5. Cabin heat: *ON*

WARNING

In case of ice formation on wing leading edge, stall speed may increase.

CARBURETTOR HEAT

AT TAKEOFF

At takeoff, given the unlikely possibility of ice formation at full throttle, carburettor heat is normally OFF.

IN FLIGHT

With external temperatures below 15° C, or on rainy days or with humid, cloudy, hazy or foggy conditions or whenever a power loss is detected, turn carburettor heat to ON until engine power is back to normal.

ELECTRIC POWER SYSTEM MALFUNCTION

Electric power supply system malfunctions may be avoided by carrying out inspections as scheduled and prescribed in the Maintenance Manual. Causes for malfunctions are hard to establish but, in any case, problems of this nature must be dealt with immediately. The following may occur:

GENERATOR LIGHT ILLUMINATES

Generator 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.

In both cases proceed as follows:

1. Generator switch and master switch: *OFF*
2. Generator switch and master switch: *ON*

If the problem persist

3. Generator switch: *OFF*
4. Non vital electric equipments: *OFF*
5. Radio calls: *reduce at the strictly necessary*

NOTE

The battery is capable of supply the electrical system enough time to complete flight in emergency conditions, with normal flight electric-loads including operation of flap and trim.

TRIM SYSTEM FAILURE

LOCKED CONTROL

In case the trim control should not respond, act as follows:

1. Breakers: *check*
2. Trim switch Lh/Rh: *check for correct position*
3. Speed: *adjust to control aircraft without excessive stick force*
4. Land aircraft as soon as possible.

RUNAWAY

If trim position indicator reads displacement without pilot's action on trim control, follow procedure below:

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

ESCAPING THROUGH A LOCKED CANOPY

With the engine shut off:

1. Using the emergency hammer to break a canopy's glass.
2. If it is possible, try to enlarge the hole and remove any splinter.

SECTION 4

NORMAL PROCEDURES

TABLE OF CONTENTS

INTRODUCTION

Section 4 contains checklists and the procedures for the conduct of normal operation.

RIGGING AND DERIGGING ENGINE COWLING

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° counterclockwise 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.

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.

PRE-FLIGHT INSPECTIONS

Before each flight, it is necessary to carry out a complete inspection of the aircraft starting with an external inspection followed by an internal inspection as below detailed.

CABIN INSPECTION

A Flight Manual: *check that a copy is on board*

B Weight and balance: *check if within limits*

C Safety belts: *flight controls free from safety belts*

D Magnetos: *OFF*

E Master switch: *ON and check the operation of the acoustic stall warning*

F Voltmeter: check (10-12 V); Ammeter check (red).

G Master switch: *OFF*

H Baggage: *check for a proper stowage and fastening with the retaining net*

EXTERNAL INSPECTION

To carry out the external inspection it will be necessary to follow the checklist below with the station order outlined in fig. 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.

A Left fuel filler cap: check visually for desired fuel level. Drain the left fuel tank by drainage valve using a cup to collect fuel. Check for water or other contaminants.

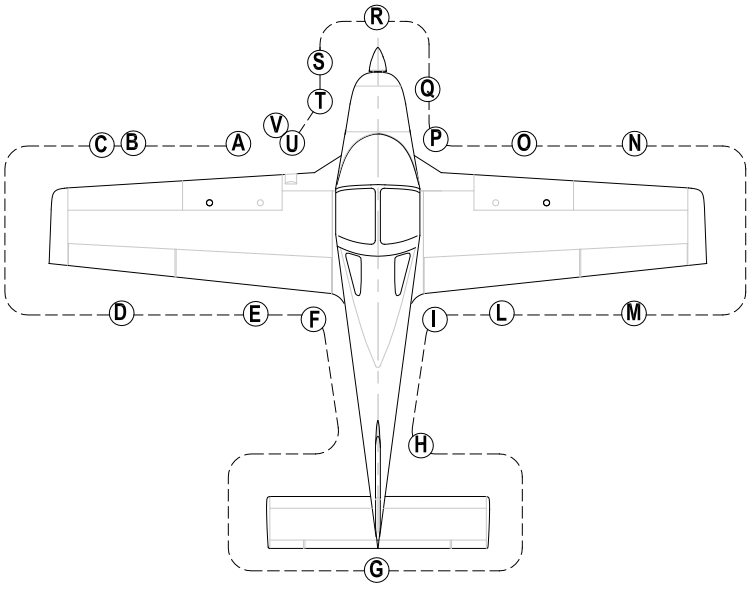


FIG. 4-1

WARNING

Fuel level indicated by the fuel quantity indicators (on the instrument panel) is only indicative. For flight safety, pilot should verify actual fuel quantity embarked before takeoff.

B Remove protection cap and check the Pitot tube and the static ports mounted on left wing are unobstructed, do not blow inside vents, place protection cap inside the aircraft.

C Left side leading edge and wing skin: visual inspection

D Left aileron: visual inspection; Left tank vent: check for obstructions.

E Left flap and hinges: visual inspection

F Left main landing gear; check inflation 23 psi (1.6 bar), tire condition, alignment, fuselage skin condition.

G Horizontal tail and tab: visual inspection.

H Vertical tail and rudder: visual inspection.

I Right main landing gear; check inflation 23 psi (1.6 bar), tire condition, alignment, fuselage skin condition.

L Right flap and hinges: visual inspection.

M Right aileron: visual inspection; Right side tank vent: check for obstructions.

N Right leading edge and wing skin: visual inspection.

O Right the side fuel filler cap for desired fuel level and secure. Drain the right fuel tank by the drainage valve using a cup to collect fuel. Check for water or other contaminants.

P Set the fuel selector valve to OFF. Drain circuit using a cup to collect fuel by opening the specific drainage valve (part of the gascolator). Check for water or other contaminants (drainage operation must be carried out with the aircraft parked on a level surface).

Q Nose wheel strut and tire: check inflation 15 psi (1.0 bar), tire condition and condition of rubber shock absorber discs.

R Propeller and spinner condition: check for nicks and security.

S Open engine cowling and perform the following checklist:

I. Check no foreign objects are present.

II. Check the cooling circuit for losses, check coolant level into the expansion tank, insure radiator honeycomb is unobstructed.

III. Check lubrication circuit for losses, check oil reservoir level, and insure radiator honeycomb is unobstructed.

IV. Inspect fuel circuit for losses.

V. Check integrity of silent-block suspensions.

VI. Check connection and integrity of air intake system, visually inspect that ram air intake is unobstructed.

VII. Check that all parts are secured or safetied.

T Close engine cowling.

U Visual inspection of the Landing Light.

V Remove tow bar and chocks.

NOTE

Avoid blowing inside Pitot-tube and inside airspeed indicator system's static vents as this may damage instruments.

CHECKLISTS

BEFORE STARTING ENGINE (after preflight inspection)

I. Flight controls: *operate until their stop checking for movement smoothness*

II. Parking brake: *engage*

III. Throttle: *adjust friction*

IV. Generator switch: *ON, generator light ON, check the ammeter.*

V. Electric fuel pump: *ON, (check for audible pump noise and fuel pressure)*

VI. Electric fuel pump: *OFF*

VII. Avionic Master switch *(if installed)*: *ON, instruments check, then set in OFF position*

VIII. Flap control: *operate flap throughout their extreme positions*

IX. Trim control: *operate from both left and right controls the trim between its extreme positions checking the trim position indicator*

X. Nav. light & Strobe light: *ON*

XI. Landing light: *ON, check*

XII. Landing light: *OFF*

XIII. Fuel quantity: *compare the fuel levels read by the fuel quantity indicators with the quantity present into the tanks (see Pre-flight inspection – External inspection)*

XIV. Flight planning, fuel consumption, refuelling.

XV. Seat position and safety belts adjustment

NOTE

In the absence of the passenger: fasten seat belts around the free seat so as to prevent interference with the operation of the aeroplane and with rapid egress in an emergency.

XVI. Canopy: *Closed and locked*

CAUTION

Master Avionic switch (if installed) must be set OFF during the engine's start-up to prevent avionic equipments damages.

STARTING ENGINE

I. Circuit Breakers: *check IN*

II. Master switch ON. Check Voltmeter and Ammeter

III. Fuel selector valve: *LEFT or RIGHT*

IV. Electric fuel pump: *ON (check for audible pump noise and fuel pressure)*

V. Engine throttle: *idle*

VI. Choke: *as needed*

VII. Propeller area: *CLEAR*

VIII. Strobe light: *ON*

WARNING

Check to insure no person or object is present in the area close to propeller.

IX. Magnetos: *BOTH*

X. Magnetos: *START*

XI. Generator switch "ON" and the check Ammeter "green".

XII. Check oil pressure rise within 10 sec. (maximum cold value 7 bar)

XIII. Check engine instruments

XIV. Choke: *OFF*

XV. Propeller rpm: *1000-1100 rpm*

XVI. Electric fuel pump: *OFF*

XVII. Check fuel pressure

XVIII. Electric fuel pump: *ON*

BEFORE TAXIING

I. Radio and Avionics: *ON*

II. Altimeter: *set*

III. Direction indicator: *set in accordance with the magnetic compass*

IV. Parking brake: *OFF and taxi*

TAXIING

I. Brakes: *check*

II. Flight instruments: *check*

PRIOR TO TAKE-OFF

I. Parking brake: *ON*

II. Check engine instruments:

- Oil temperature: 50-110 °
- Cylinder heads temperature: max 135 °
- Oil pressure: 2-5 bar *(above 1400 rpm)*; 0.8 bar *(below 1400 rpm)*
- Fuel pressure: 2.2 – 5.8 psi *(0.15-0.40 bar)*

III. Generator light: *OFF (check)*

IV. Propeller's rpm: *1560 and test magnetos (speed drop with only one ignition circuit must not exceed 130 prop's rpm; maximum difference of speed by use of either circuits LEFT or RIGHT is 50 rpm).*

V. Check fuel quantity indicators.

VI. Flaps: *T/O (15°)*

VII. Stick free and trim set at *zero*

VIII. Seat belts fastened and canopy closed and locked

TAKEOFF AND CLIMB

I. Call TWR for takeoff

II. Check for clear final and wind on runway

III. Parking brake: *OFF*

IV. Carburetor heat: *OFF*

V. Taxi to line-up

VI. Check magnetic compass and direction indicator

VII. Full throttle (approx. 2100 ± 100 rpm)

VIII. Engine instruments: *check*

IX. Rotation speed Vr = 45 KIAS (580 kg MTOW)/ 46 KIAS (600 kg MTOW)

X. Rotation and takeoff

XI. Slight braking to stop wheel spinning

XII. Flaps: *retraction (at 300ft AGL)*

XIII. Establish climb rate Vy *(580kg MTOW: 65 KIAS; 600kg MTOW: 66 KIAS)*

XIV. Trim adjustment

XV. Electric fuel pump: *OFF*

CRUISE

I. Reach cruising altitude

II. Set power and engine rpm's for cruise.

III. Check engine instruments

- Oil temperature: 90°-110 ° C.
- Temperature cylinder heads: 90° ÷ 135 °C
- Oil pressure: 2 - 5 bar.
- Fuel pressure: 2.2 – 5.8 psi *(0.15 – 0.40 bar)*

IV. Carburettor heat as needed, see paragraph on carb. heat in Section 3.

NOTE

Compensate unpredicted asymmetrical fuel consumption between left and right fuel tanks operating the fuel selector valve. Switch on the electric fuel pump prior to swap the fuel feeding from one tank to another

BEFORE LANDING

I. Electric fuel pump: *ON*

II. On downwind leg: *speed: 68 KIAS (for both MTOW); Flaps: T/O (15°)*

III. On final leg: *speed: 63 KIAS (for both MTOW); Flaps: Land (40°)*

IV. Establish descent

V. Optimal touchdown speed: *51 KIAS (for both MTOW)*

BALKED LANDING

I. Full throttle

II. Speed: *61 KIAS (for both MTOW)*

III. Electric fuel pump: *ON (check)*

IV. Flaps position: *TO*

AFTER LANDING

I. Taxiing at an appropriate speed

II. Flaps: *UP*

III. Complete stop at parking

IV. Parking brake: *engage*

ENGINE SHUT DOWN

I. Keep engine running at 1200 rpm for about one minute in order to reduce latent heat.

II. Electric fuel pump: *OFF*

III. Turn off all electrical utilities (with the exception of the Strobe Light)

IV. Magnetos: *OFF*

V. Strobe light: *OFF*

VI. Master & Generator switches: *OFF*

VII. Fuel selector valve: *OFF*

VIII. Parking brake: *engaged (check)*

POSTFLIGHT CHECK

I. Insert hood over pitot tube on left wing

II. Close canopy.

SECTION 5

PERFORMANCES

TABLE OF CONTENTS

INTRODUCTION

This section provides all necessary data for accurate and comprehensive planning of flight activity from takeoff to landing.
Data reported in graphs and/or in tables were determined using:

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

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

- airspeed
- external temperature
- altitude
- weight
- type and condition of runway

Sections approved by EASA are marked with: "*Approved data*".

USE OF PERFORMANCE CHARTS

Performance data is 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 journey with required precision and safety. Additional information is provided for each table or graph.

AIRSPEED INDICATOR SYSTEM CALIBRATION

(Approved data)

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

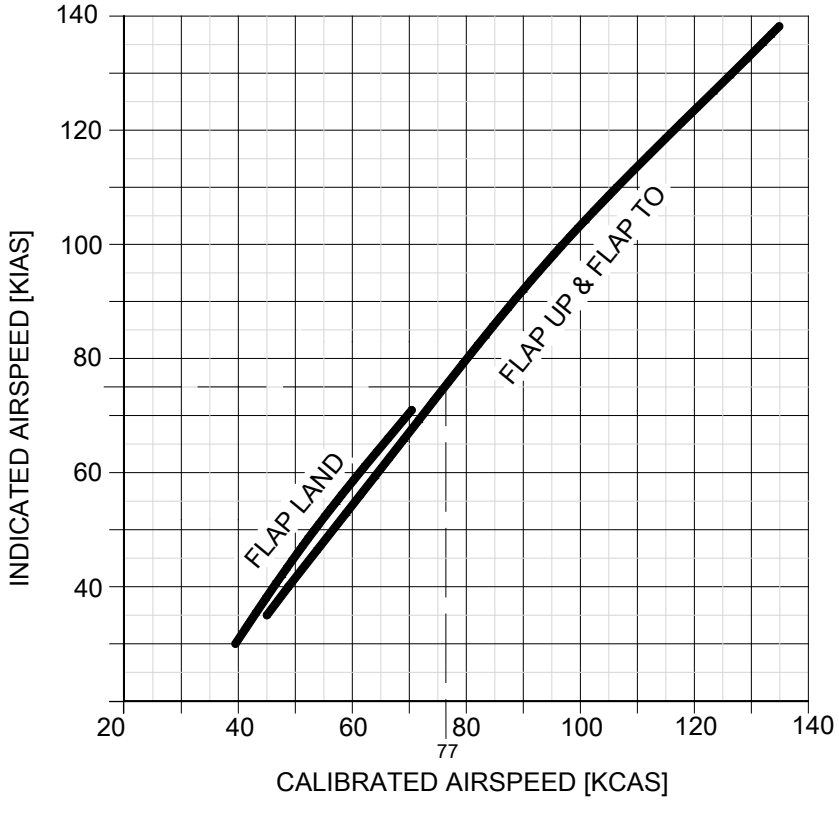


Fig. 5-1. CALIBRATED VS. INDICATED AIRSPEED -

⇒ *Example (flap UP):*

Given	***Find***
V_{IAS} = 75 kts	V_{CAS} = 77 kts

NOTE

Indicated airspeed assumes 0 as an instrument error

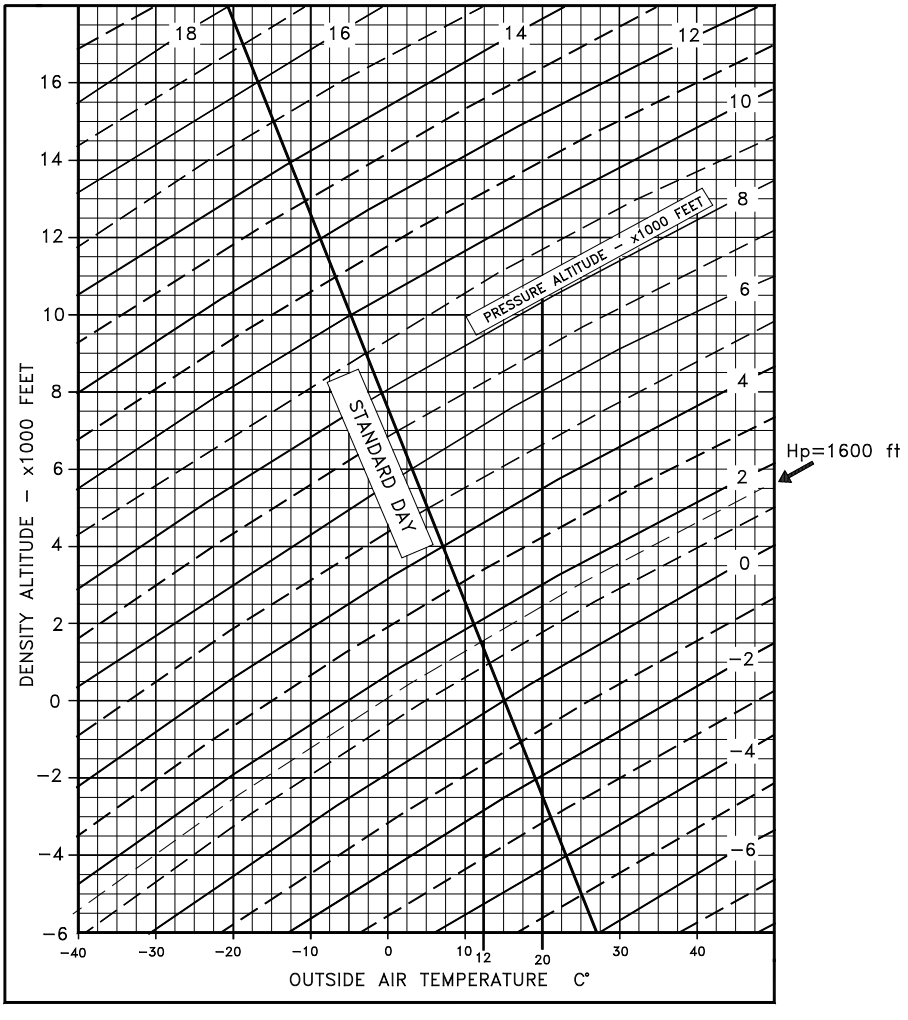


Fig.5-2. ICAO CHART

⇒ *Example:*

Given	***Find***
Temperature = 20°C	Ts = *12*°
Pressure Altitude = 1600 ft	

STALL SPEED *(Approved data)*

CONDITIONS: - Weight **580** kg
- Throttle: idle
- No ground effect

	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
FLAP UP	**40**	*49*	**45**	*53*	**53**	*58*	**67**	*70*
FLAP TO	**35**	*46*	**40**	*49*	**47**	*54*	**61**	*65*
FLAP FULL	**30**	*39*	**34**	*42*	**41**	*47*	**53**	*56*

CONDITIONS: - Weight **600** kg
- Throttle: idle
- No ground effect

	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
FLAP UP	**41**	*50*	**46**	*53*	**54**	*59*	**68**	*70*
FLAP TO	**36**	*46*	**41**	*50*	**48**	*55*	**62**	*65*
FLAP FULL	**31**	*40*	**35**	*43*	**41**	*47*	**53**	*56*

NOTE

Altitude loss during conventional stall recovery as demonstrated during test flights is approximately 100ft with banking under 30°.

CROSSWIND

Maximum demonstrated crosswind velocity is 22 kts

⇒ *Example:*

Given	***Find***
Wind direction = 30°	Headwind = 17.5 Kts
Wind velocity = 20 Kts	Crosswind = 10 Kts

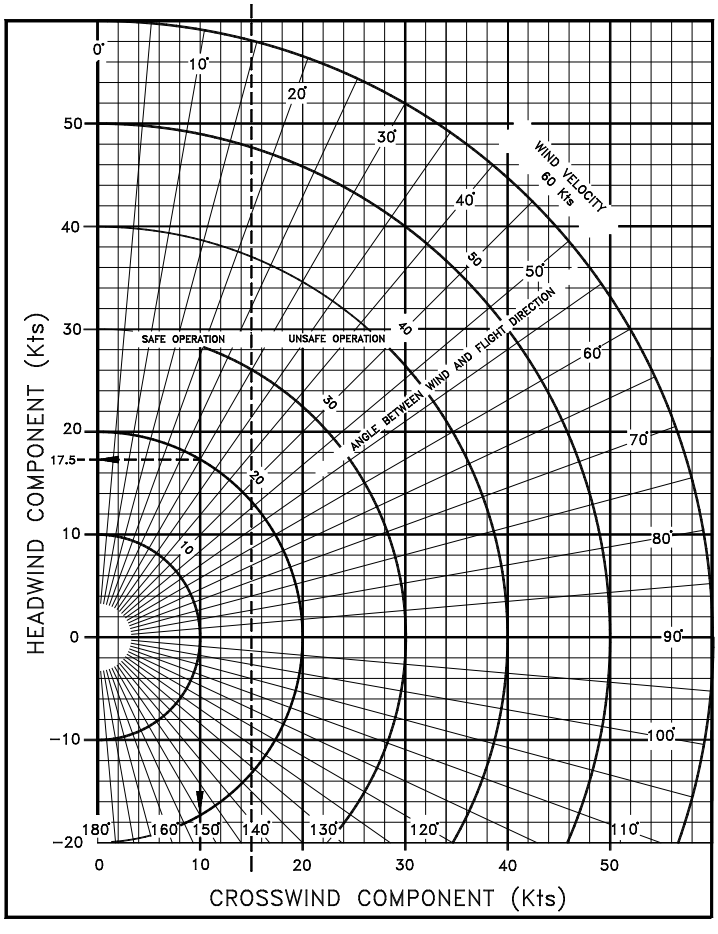


Fig.5-3.CROSSWIND CHART

TAKEOFF PERFORMANCES *(Approved data)*

TAKEOFF DISTANCE

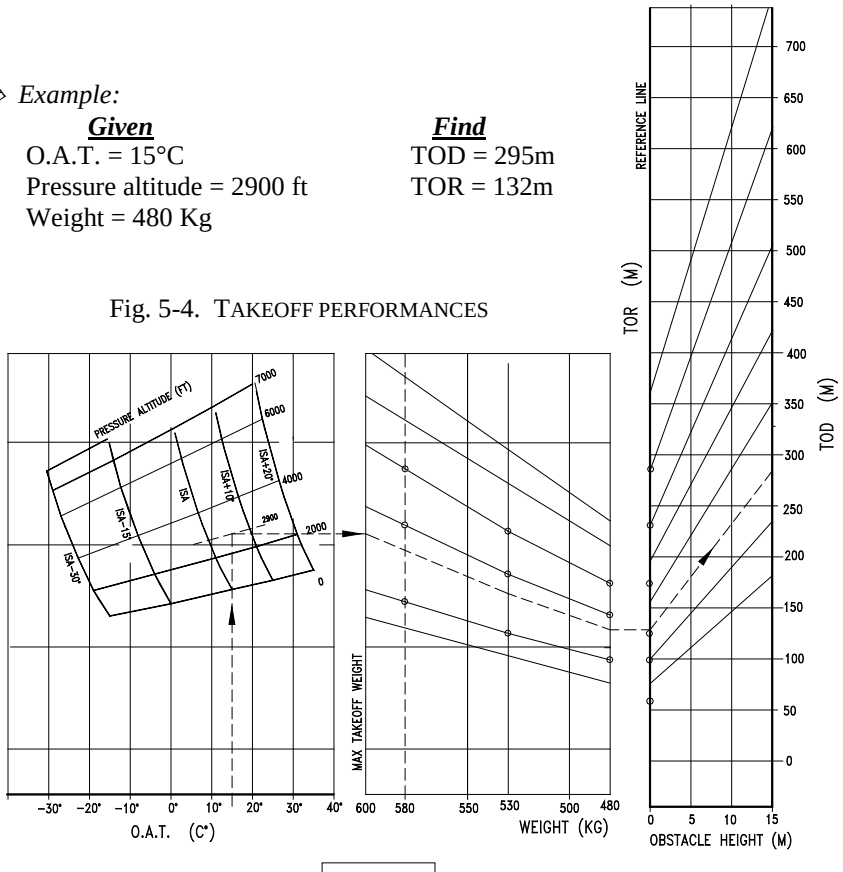
CONDITIONS:

- Flaps: TO
- Engine throttle: full throttle *(see Sect.4)*
- V_R = 45 KIAS
- V_{obs} = 45 KIAS
- Runway: dry, compact, grass
- Slope: 0°; Wind: zero
- V_{LO} = 35 KIAS
- R/C ≥ 200 ft/min

⇒ *Example:*

Given	***Find***
O.A.T. = 15°C	TOD = 295m
Pressure altitude = 2900 ft	TOR = 132m
Weight = 480 Kg	

Fig. 5-4. TAKEOFF PERFORMANCES



NOTE

1. *Decrease distances by 10% for each 10Kts of ahead wind. Increase distances by 20% for each 10 Kts of tailwind.*
2. *For dry and paved runway operation decrease round run by 6%.*

CLIMB RATE IN TAKEOFF CONFIGURATION *(Approved data)*

CONDITIONS:

		580 kg MTOW	600 kg MTOW
-	Flaps	15°	15°
-	Engine	Full throttle	Full throttle
-	V_{obs}	45 KIAS	46 KIAS

Climb rate at maximum takeoff weight (580/600kg) in demonstrated ISA s.l. conditions is 850 ft/min for 580 kg MTOW and 800 ft/min for 600 kg MTOW.

CLIMB PERFORMANCES

CLIMB RATE IN CLEAN CONFIGURATION

CONDITIONS:

- Flap: UP
- Engine: Full throttle
- V_Y = 65 KIAS (580 kg MTOW)/66 KIAS (600 kg MTOW)
- R/C residual: 100 ft/min.

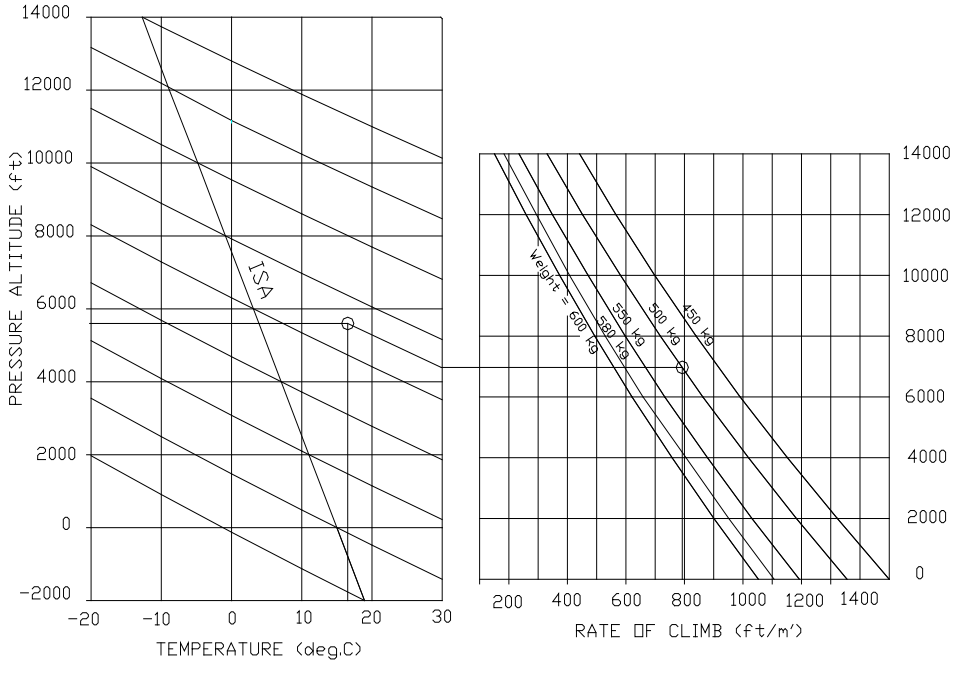


Fig. 5-5 CLIMB

⇒ *Example:*

Given

O.A.T. = 17°*C*
Pressure altitude = 5800 *ft*
Weight = 500 *Kg*

Find

Rate of climb = *793 ft/min*

CRUISE

CONDITIONS:

- ISA
- Wind: zero
- MTOW = For both MOTW

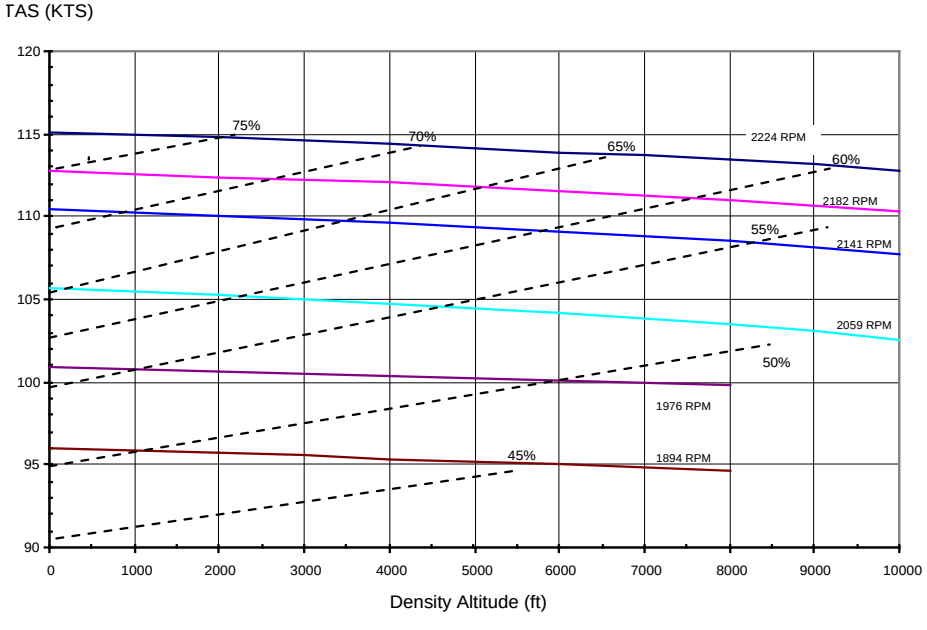


Fig. 5-6 CRUISE

BALKED LANDING

RATE OF CLIMB: BALKED LANDING

CONDITIONS:

- Maximum weight = 580 kg
- Flaps: LAND (40°)
- Engine: full throttle
- V_{Obs} = 48 KIAS

NOTE

During balked landing manoeuvre, flaps should be retracted immediately after applying full power.

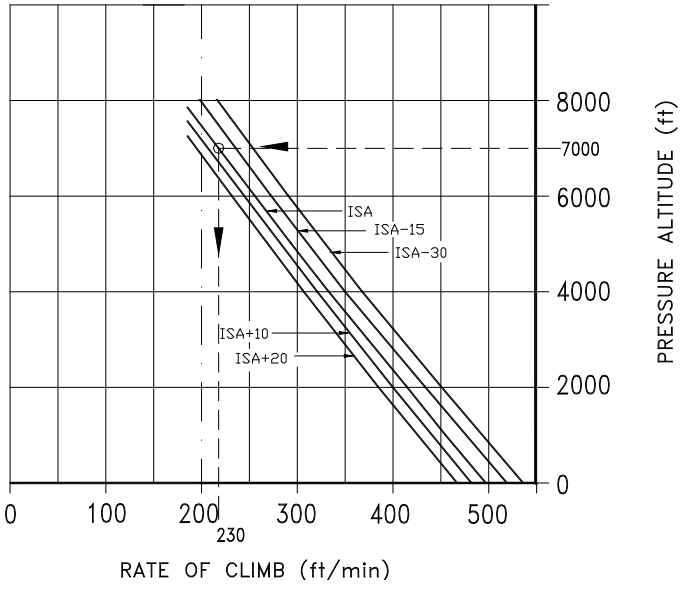


Fig.5-7 BALKED LANDING

Example:

Given
Pressure altitude = 7000 *ft*
Conditions: ISA

Find
Rate of climb = *230 ft/min*

NOTE

If the maximum takeoff weight is 600 kg, the rate of climb decreases about 10%

LANDING DISTANCE *(Approved data)*

LANDING DISTANCE AND GROUND ROLL

CONDITIONS:

Weight: 580 kg; Flap: 40° Runway: dry, compact, grass

Engine: idle Slope: 0°; Wind: zero

Distance over the obstacle of 15 m

OAT: ISA -20°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	235	88
2000	241	94
4000	248	99
6000	256	105

OAT: ISA -10°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	239	92
2000	246	97
4000	253	103
6000	261	109

OAT: ISA +0°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	243	95
2000	250	101
4000	258	107
6000	266	113

OAT: ISA +10°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	247	98
2000	255	104
4000	263	111
6000	271	118

OAT: ISA +20°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	251	101
2000	259	108
4000	268	114
6000	277	122

NOTE

1. *Decrease distances by 10% for each 10 Kts of headwind. Increase distances by 20 % for each 10 Kts of tailwind;*
2. *For dry and paved runway operation increase ground run by 10%;*
3. *If it becomes necessary to land without flap extension (flap malfunction), increase approach speed by 10 Kts, increase by 40% distance pertaining to flap setting at 40° and increase V_{obs} to 56 KIAS for 580 kg MTOW and to 57 KIAS for 600 kg MTOW;*
4. *V_{obs} (speed over obstacle) is 48 KIAS for 580 kg MTOW and 49 KIAS for 600 kg MTOW;*
5. *If the maximum takeoff weight is 600 kg, the Total Distance increases about 10%;*

CONSEQUENCES FROM RAIN AND INSECT

Flight test have demonstrated that neither rain nor insect impact build-up on leading edge have caused substantial variations to aircraft's flight qualities. Such variations do not exceed: 5 kts for stalls, 100 ft/min for climb rates and 50m for takeoff runs.

NOISE DATA

Noise level was determined according to EASA CS-36 1st edition dated 17th October 2003, with reference to ICAO/Annex 16 3rd edition dated 1993, Vol. I° chapter 10; results are shown in the following table:

	580 kg MTOW	600 kg MTOW
Noise Level (db)	62.36	62.58

SECTION 6

WEIGHT & BALANCE

TABLE OF CONTENTS

INTRODUCTION

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

AIRCRAFT WEIGHING PROCEDURES

PREPARATION

a. Carry out weighing procedure inside closed hangar
b. Remove from cabin any objects left unintentionally
c. Insure on board presence of the Flight Manual
d. Align nose wheel
e. Drain fuel via the specific drain valve.
f. Oil, hydraulic fluid and coolant to operating levels
g. Move sliding seats to most forward position
h. Raise flaps to fully retracted position (0°)
i. Place control surfaces in neutral position
j. Place scales (min. capacity 200 kg) under each wheel

LEVELLING

a. Level the aircraft.
Reference for levelling: remove a seat and then place a level between the two seat's fwd and aft supporting trusses.
b. Center bubble on level by deflating nose tire

WEIGHING

a. Record weight shown on each scale
b. Repeat weighing procedure three times
c. Calculate empty weight

DETERMINATION OF C.G. LOCATION (SEE FIG. 6-1)

a. Drop a plumb bob tangent to the leading edge (at 15mm inboard respect the rib#7 riveting line) and trace reference mark on the floor.
b. Repeat operation for other wing.
c. Stretch a taught line between the two marks
d. Measure the distance between the reference line and main wheel axis
e. Using recorded data it is possible to determine the aircraft's C.G. location and moment (see following table)

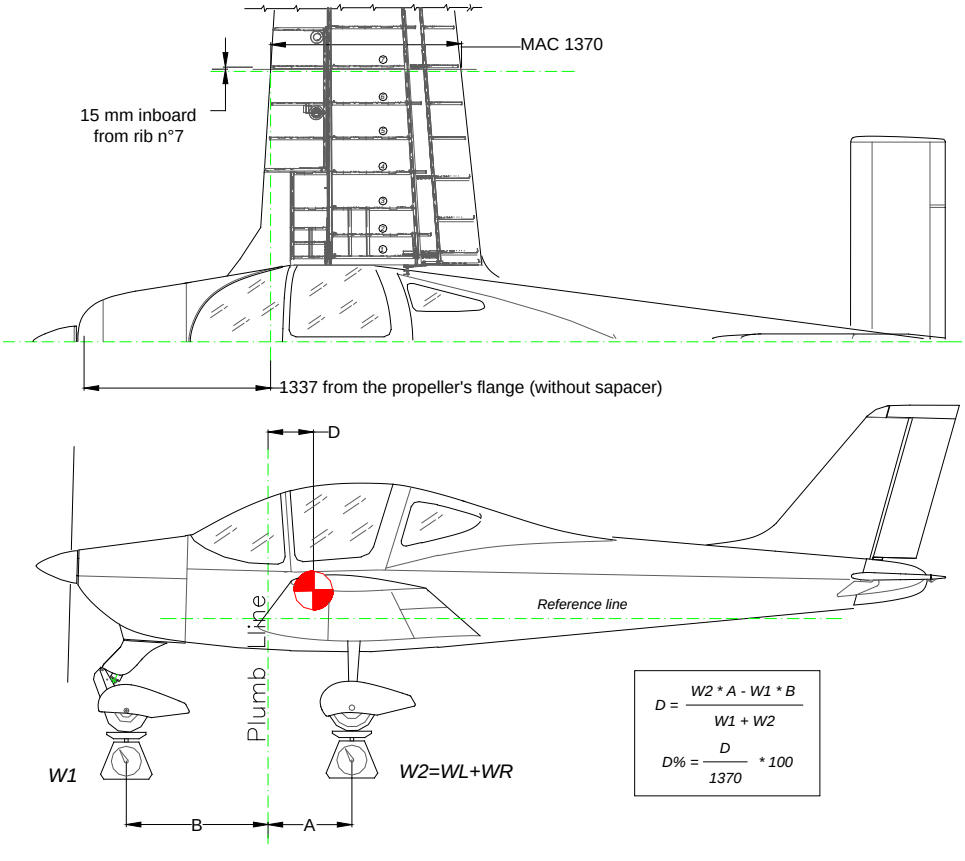
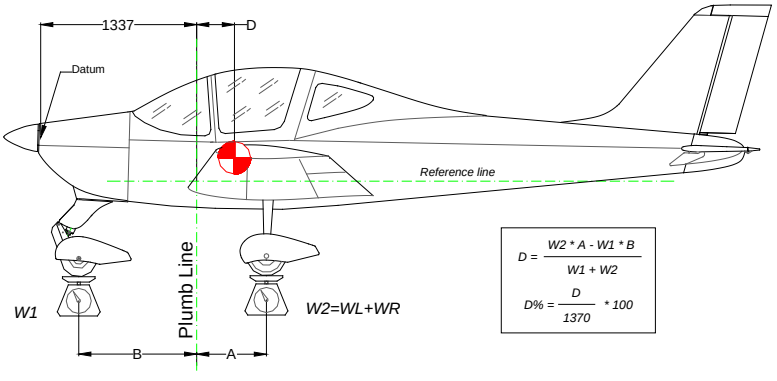

MAC 1370
15 mm inboard
from rib n°7
1337 from the propeller's flange (without sapacer)
D
Reference line
Plumb Line
W1
W2=WL+WR
B
A
D = (W2 * A - W1 * B) / (W1 + W2)
D% = D / 1370 * 100

Fig.6-1

WEIGHING REPORT

Model ***P2002-JF*** *S/N*:_____ *Weighing n°*____ *Date*:_____

Datum: Propeller support flange without spacer.



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

	meters
Plumb bob distance(1) LH wheel	A_L =
Plumb bob distance(1) RH wheel	A_R =
Average distance $(A_L + A_R)/2$	A =
Bob distance from nose wheel(1)	B =

Empty weight We = $W_1 + W_2$ =

$D = \frac{W_2 \cdot A - W_1 \cdot B}{We} =$ *m*	$D\% = \frac{D}{1.370} \cdot 100 =$

Empty weight moment: M = [(D+1.337)·We] = *Kg · m*

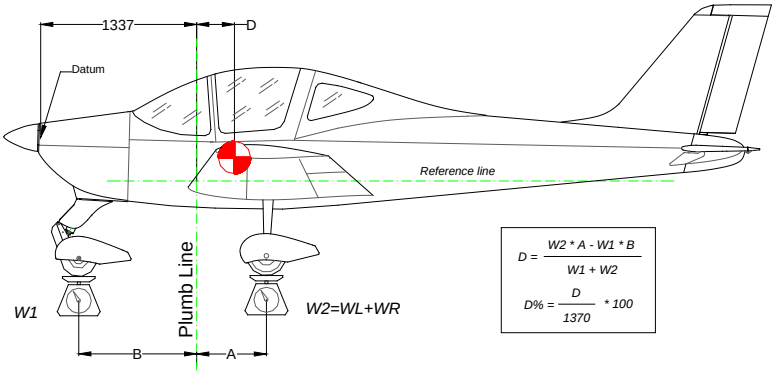
Maximum takeoff weight	W_T = 580 Kg.	W_T = 600 kg
Empty weight	We =	We =
Maximum payload W_T - We	Wu =	Wu =

(1) To determine the Mean Aerodynamic Chord (MAC) and the plumb line see FIG.6-1.

WEIGHING REPORT

Model ***P2002-JF*** *S/N*:_____ *Weighing n°*____ *Date*:_____

Datum: Propeller support flange without spacer.



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

	meters
Plumb bob distance(1) LH wheel	A_L =
Plumb bob distance(1) RH wheel	A_R =
Average distance $(A_L + A_R)/2$	A =
Bob distance from nose wheel(1)	B =

Empty weight We = $W_1 + W_2$ =

$$D = \frac{W_2 \cdot A - W_1 \cdot B}{We} = \quad m$$

$$D\% = \frac{D}{1.370} \cdot 100 =$$

Empty weight moment: M = [(D+1.337)·We] = *Kg · m*

Maximum takeoff weight	W_T = 580 Kg.	W_T = 600 kg
Empty weight	We =	We =
Maximum payload W_T - We	Wu =	Wu =

(1) To determine the Mean Aerodynamic Chord (MAC) and the plumb line see FIG.6-1.

WEIGHT AND BALANCE

To determine the aircraft's CG location and to verify that the CG lies within the predetermined CG travel range, it would be helpful to use the chart in the following page. Chart reports CG location as a function of the empty weight moment with respect to the datum as yielded by weighing report.

USE OF "WEIGHT & BALANCE" CHART (page 6-7)

In order to use the graph it is necessary to know the value of the moment arm (empty weight conditions) with respect to the datum. Once this value is found on the abscissa, a parallel to the oblique lines is drawn until it intersects the ordinate relative to the weight of pilot and passenger. From this point, a new line is drawn horizontally up to the graph limit-value of 200 kg and, from here, a parallel to the oblique lines is drawn until it intersects with the abscissa relative to fuel weight carried on board. A horizontal line is then drawn through this point up to the graph limit-value of 100 liters and a new parallel to the oblique lines is drawn until abscissa is intercepted relative to baggage loaded on board behind the seats. Another horizontal line is drawn and it is thus possible to verify that the intersection of this segment with the vertical abscissa relative to the aircraft's takeoff total weight falls within the shaded area which represents the admissible CG range as a function of total weight.

Other charts show the CG travel as a function of aircraft weight, distances in meters of pilots and baggage from datum (propeller support flange) is also provided.

EXAMPLE (see page 6-7)

Empty weight moment = 581 $kg \cdot m$
Pilot and passenger = 160 kg
Fuel = 50 L
Baggage = 15 kg
Takeoff weight = 548 kg

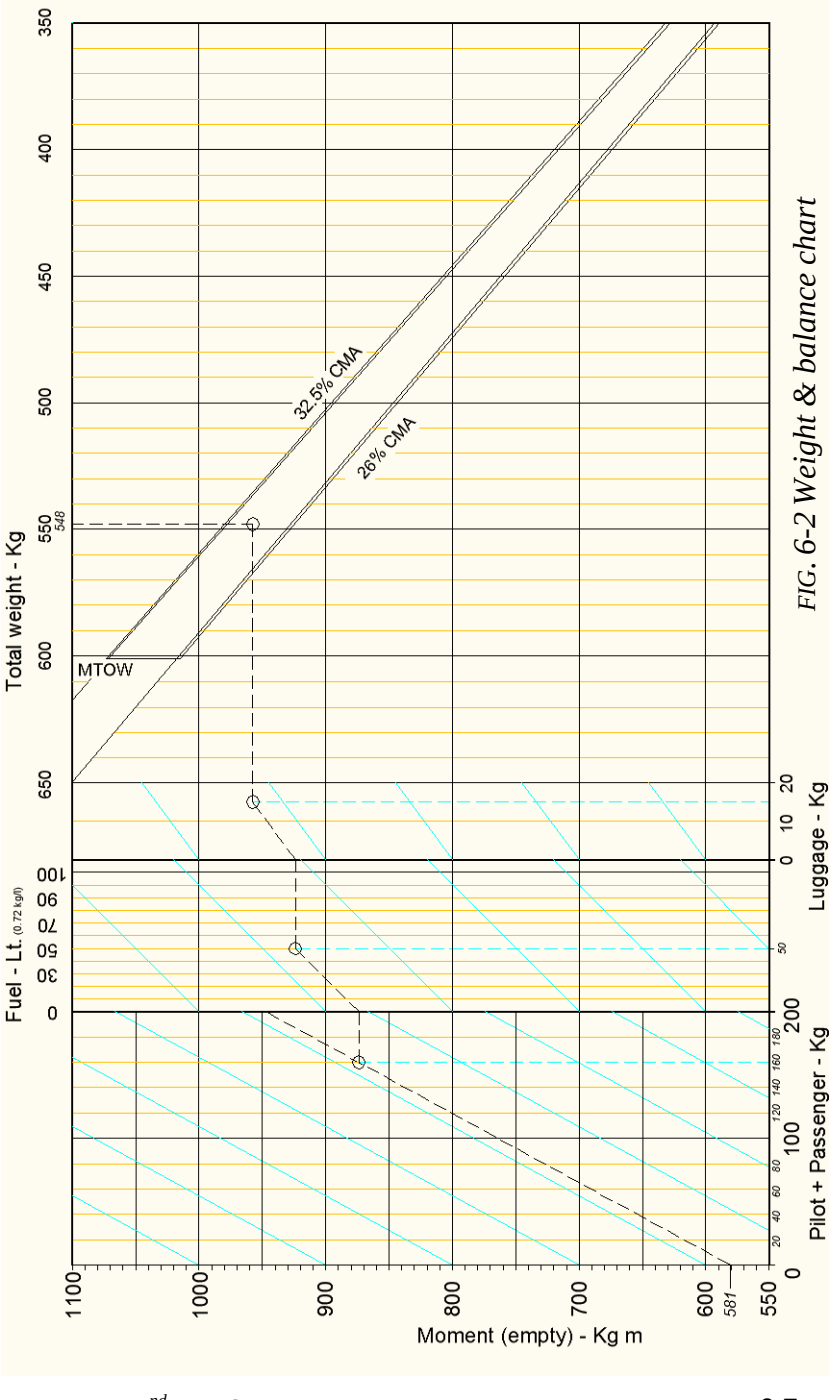


FIG. 6-2 Weight & balance chart

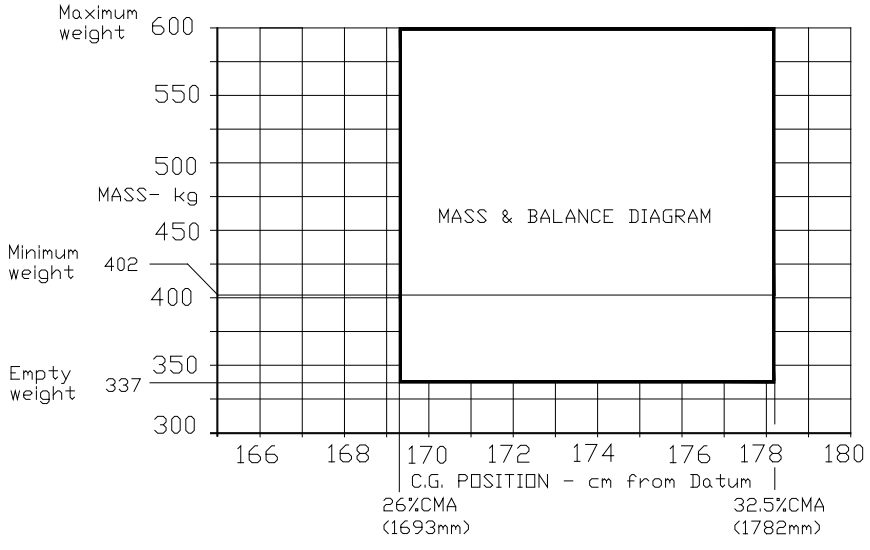


Fig 6-3 C.G. RANGE CHART

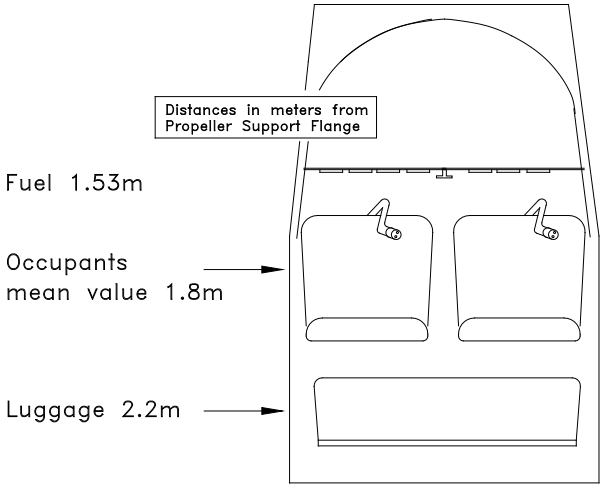


Fig 6-4 LOAD POSITION WITH RESPECT TO DATUM

LOADING

Luggage compartment is designed for a maximum load of 20 kg. Luggage size shall prevent excessive loading of utility shelf (maximum pressure 12.5 kg/dm^2). Maximum Luggage size is: 80x45x32 cm. Luggage must be secured using a tie-down net to prevent any luggage movement during maneuvers.

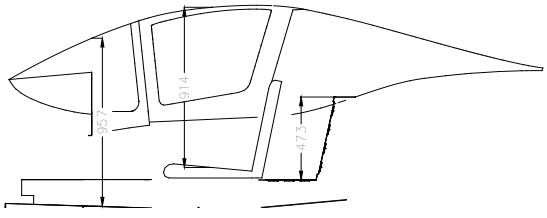


Fig 6-5 CABIN DIMENSIONS

EQUIPMENT LIST

The following is a comprehensive list of all TECNAM supplied equipment for the P2002-JF. 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
- Serial number
- 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.*

EQUIPMENT LIST		S/N	DATE:	
RIF.	DESCRIPTION & P/N	INST	WEIGHT *kg*	DATUM *m*
	ENGINE & ACCESSORIES			
A1	Engine Rotax 912S2 - p/n 309.120.133	*	61.0	0.32
A2	Prop. HOFFMANN p/n HO17GHM A 174 177C	*	6.0	-0.13
A3	Exhaust and manifolds – p/n SSB-978-480-CC	*	4.50	0.55
A4	Heat exchanger - p/n 92-11-830	*	2.00	0.55
A5	Oil Reservoir (full) - p/n 956.137	*	4.00	0.64
A6	Oil radiator - p/n 886 025	*	0.40	0.07
A7	Liquid coolant radiator. - p/n 995.697	*	0.90	0.33
A8	Air filter K&N- p/n 33-2544	*	0.40	0.60
A9	Vacuum Pump– RA215CC Rapco	*	2.00	0.25
A10	Vacuum valve RA2H3-12	*	0.10	0.71
A11	Fuel pump p/n 21-11-342-000	*	0.10	0.71
A12	Thermostatic water valve 26-9-9000-000		0.35	0.15
A13	Thermostatic oil valve 26-9-9100-000		0.20	0.20
	LANDING GEAR AND ACCESSORIES			
B1	Main gear spring-leafs - p/n 92-8-300-1	*	5.700	1.94
B2	Main gear wheel rims. - Cleveland 40-78B	*	2.050	1.94
B3	Main gear tires.-Air Trac 5.00-5 AA1D4	*	2.580	1.94
B4	Disk brakes - Cleveland 30-9	*	0.800	1.94
B5	Nose gear wheel rim - p/n 92-8-880-1	*	1.300	0.310
B6	Nose gear tire - Sava 4.00-6	*	1.200	0.460
B7	Nose gear fairing p/n 92-8-410-1/2		1.500	0.460
B8	Main gear fairing p/n 92-8-420-1/2		1.500	1.930
B9	Nose gear shock p/n 92-8-200-000	*	1.450	0.465

EQUIPMENT LIST		S/N	DATE:	
REF.	DESCRIPTION & P/N	INST	WEIGHT *kg*	DATUM *m*
	ELECTRICAL SYSTEM			
C1	Battery FIAMM 6H4P 12V 18Ah	*	6.00	2.59
C2	Regulator, rectifier - p/n 945.345	*	0.20	0.82
C3	Battery relay - p/n 111-226-5	*	0.30	2.59
C4	Flaps actuator control – SIR Mod. AO-01/M	*	2.20	2.30
C5	Trim actuator control Ray Allen C. T2-10A	*	0.40	5.73
C6	Overvoltage sensor OS75-14	*	0.30	0.80
C7	Strobe light – Aircraft Spr. p/n 2005		0.15	5.89
C8	Navigation lights - AS W1285-PR		0.15	1.75
C9	Stall warning - AS 164R	*	0.10	1.36
C10	Landing light - AS GE 4509		0.50	1.38
	Instruments			
D1	Altimeter United Instruments p/n 5934PM-3 or LUN 1128.10B4 –TSO C10b	*	0.39	1.35
D2	Anemometro – MIKROTECHINA 1106.B0B2	*	0.30	1.35
D3	Compass - Airpath C2400 L4P	*	0.29	1.35
D4	Clock – DAVTRON mod. M 800	*	0.15	1.35
D5	Vertical speed indicator – MIKROTECHINA UL 30-42.2	*	0.35	1.35
D6	Turn and Bank Indicator – FALCON GAUGER TC02E-3-1	*	0.56	1.35
D7	Attitude Indicator - RCA ALLEN INSTR. RCA 22-7	*	1.10	1.35
D8	Directional Gyro – RCA ALLEN INSTR. RCA 11A-8	*	1.10	1.35
D9	OAT Indicator – VDO 397035001G	*	0.05	1.35
D10	Oil & head temp.indicator VDO 641-011-7047/-7048	*	0.10	1.35
D11	Oil Temp.Ind. - VDO 644-001-7030	*	0.10	1.35
D12	Trim Position Indicator – RAY ALLEN C. RP3	*	0.05	1.35

EQUIPMENT LIST		S/N	DATE:	
REF.	DESCRIPTION & P/N	INST	WEIGHT *kg*	DATUM *m*
D13	Vacuum Instr.Ind.- UMA Inc. 3-200-12	*	0.10	1.35
D14	Prop. RPM Ind. Aircraft Mitchell. D1-112-5041		1.10	1.35
D15	Fuel Quantity Ind. Road GmbH XID4000800	*	0.56	1.35
D16	Amperometer Ind. VDO 190-037-001G or Speed Com Instruments 0203	*	0.10	1.35
D17	Fuel Pressure Ind. UMA 4-360-007U	*	0.13	1.35
D18	Oil pressure indicator (Sorlini) SOR 50		0.10	1.35
D19	RPM indicator (Sorlini) SOR 52		0.10	1.35
	AVIONICS AND OTHERS			
E1	Nav/CommTrans.-Bendix/King, KX155		2.24	1.35
E2	Nav/CommTrans.-Garmin SL30		1.50	1.35
E3	Nav Indicator - Bendix/King KI208		0.46	1.35
E4	Transponder - Bendix/King KT76A		1.36	1.35
E5	GPS/NAV Receiver and R/T COM GNS 430		2.31	1.35
E6	R/T VHF COMM ICOM IC-A200		1.20	1.35
E7	ELT Artex ME 406		1.10	2.74
E8	Transponder-Garmin GTX327		1.00	1.35
E9	Transponder-Garmin GTX328		1.00	1.35
E10	Audio panel –Garmin GMA 340		0.50	1.35
E11	Vor/Loc Indicator–Garmin GI106A		0.64	1.35
E12	Transponder Antenna-Bendix/King KA60		0.17	1.09
E13	Transponder Antenna Garmin GTX		0.17	1.09
E14	Mic - Telex TRA 100		0.17	1.90
E15	GPS Antenna.Garmin GA56		0.27	1.08
E16	Comm Antenna Command Industries CI 291		0.34	3.30

EQUIPMENT LIST		S/N	DATE:	
REF.	DESCRIPTION & P/N	INST	WEIGHT *kg*	DATUM *m*
E17	VOR/ILS Antenna. Command Industries CI 138C		0.26	5.80
E18	ELT Antenna Kit Model ME 406		0.21	2.70
E19	Fire Extinguisher Enterprises Ltd BA51015-3		2.20	2.32
E20	First Aid Kit	*	0.28	2.30
E21	Altitude Encoder- Amery King Ak-30	*	0.25	1.00
E22	Emergency Hammer-Dmail 108126	*	0.35	2.30
E23	ADF Bendix King KR87		1.38	1.35
E24	ADF Antenna Bendix King KA44B		1.89	2.05
E25	Comm Garmin SL40		1.50	1.35

INTENTIONALLY LEFT BLANK

SECTION 7

AIRCRAFT & SYSTEMS DESCRIPTION

TABLE OF CONTENTS

INTRODUCTION

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

AIRFRAME

WING

The wing is constructed of a central light alloy torque box; an aluminium leading edge with integrated fuel tank is attached to the front spar while flap and aileron are hinged to rear spar. Flaps and ailerons are constructed of a centre spar to which front and rear ribs are joined; wrap-around aluminium skin panels cover the structure.

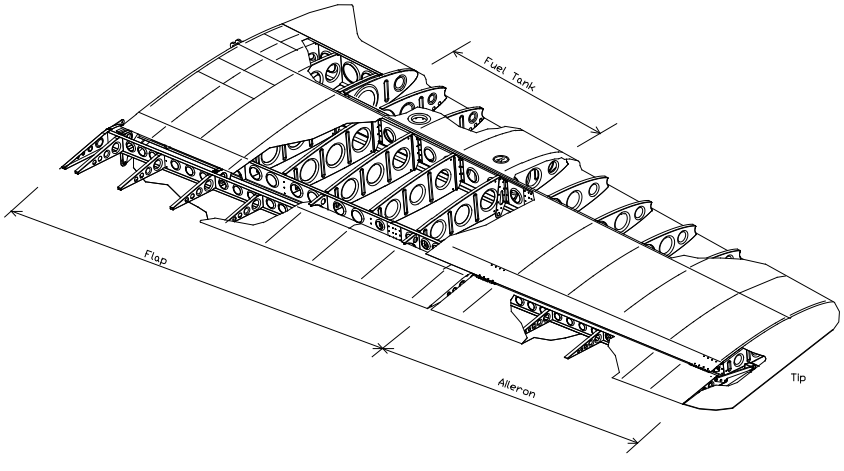


Fig. 7-1. RIGHT WING EXPLODED VIEW

FUSELAGE

The front part of the fuselage is made of a mixed structure: a truss structure with special steel members for cabin survival cell, and a light-alloy semi-monocoque structure for the cabin's bottom section. The aft part of the fuselage is constructed of an aluminium alloy semi-monocoque structure. The engine housing is isolated from the cabin by a firewall; the steel stringers engine mount is attached to the cabin's truss structure in four points.

EMPENNAGES

The vertical tail is entirely metal: the vertical fin is made up of a twin spar with stressed skin while the rudder consists of an aluminium torque box made of light alloy ribs and skin. The horizontal tail is an all-moving type (stabilator); its structure consists of an aluminium tubular spar connected to ribs and leading edge covered by an aluminium skin.

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. Aileron control is of mixed type with push-rods and cables; the cable control circuit is confined within the cabin and is connected to a pair of push-rods positioned in the wings that 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 the two positions relative to takeoff (15°) and landing (40°). A breaker positioned on the right side of the instrument panel protects the electric circuit.
Longitudinal trim is performed by a small tab positioned on the stabilator and controlled via an electric servo by pushing Up/Down the push-button on the control stick, a shunt switch placed on the instrument panel enables control of either left or right stick.

INSTRUMENT PANEL

The conventional type instrument panel allows placement of a broad range of equipment. Instruments marked with an asterisk (*) are optional.

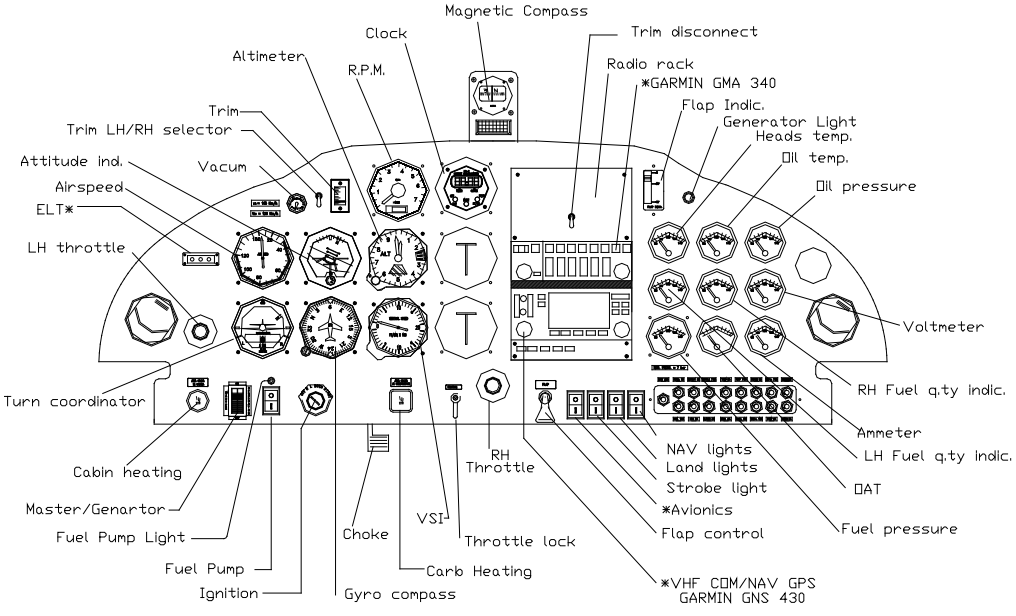


Fig. 7-2. INSTRUMENT PANEL

CARBURETTOR HEAT

Carburettor heat control knob is located just to the left of the centre throttle control; when the knob is pulled fully outward from the instrument panel, carbs receive maximum hot air. During normal operation, the knob is OFF.

CABIN HEAT

The cabin heat control knob is positioned on the lower left side of the instrument panel; when knob is pulled fully outward, cabin receives maximum hot air. Vents are located by the rudder pedals and above instrument panel. If necessary, outside fresh air can be circulated inside cabin by opening the vents on the dashboard.

THROTTLE FRICTION LOCK

It is possible to adjust the engine's throttle friction lock by appropriately tightening the friction lock knob located on the instrument panel near the center throttle control.

SEATS AND SAFETY HARNESS

Aircraft features four point fitting safety belts 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.

CANOPY

The cabin's canopy slides on wheel bearings along tracks located on fuselage sides; canopy is made out of composite material. Latching system uses a central lever located overhead and two additional levers positioned on canopy's sides. The canopy could be opened both from in and outside. In correspondence with each lock is present a placard indicating the emergency release procedure.

LUGGAGE COMPARTMENT

The Luggage compartment is located behind the pilots' seats. Luggage shall be uniformly distributed on utility shelf and its weight shall not exceed 20kg.
Tie-down luggage using adjustable tie-down net.

WARNING

Before loading luggage, check aircraft's weight and CG location (see Sect. 6)

POWERPLANT

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

PROPELLER

Manufacturer	Hoffmann Propeller
Model	HO17GHM A 174 177C
N° of blades	2
Diameter	1740 mm (no reduction permitted)
Type	wood, fixed pitch

FUEL SYSTEM

The system is equipped with two aluminium fuel tanks integrated within the wing leading edge and accessible for inspection through dedicated covers. Capacity of individual tank is 50lt and the total fuel capacity is 100lt. A multi-position fuel selector valve is located into the cabin. It is possible to select the following fuel feeding: LEFT (means a left tank feeding), RIGHT (means a right tank feeding) and a third OFF position which could not be accidentally operated. A strainer cup with a drainage valve (Gascolator) is located beneath the cabin, just behind the firewall. Fuel level indicators for each tank are located on instrument panel. Fuel feed is through an engine-driven mechanical pump and also through an electric pump that supplies adequate engine feed in case of main pump failure. Figure 7-3 illustrates the schematic layout of the fuel system.

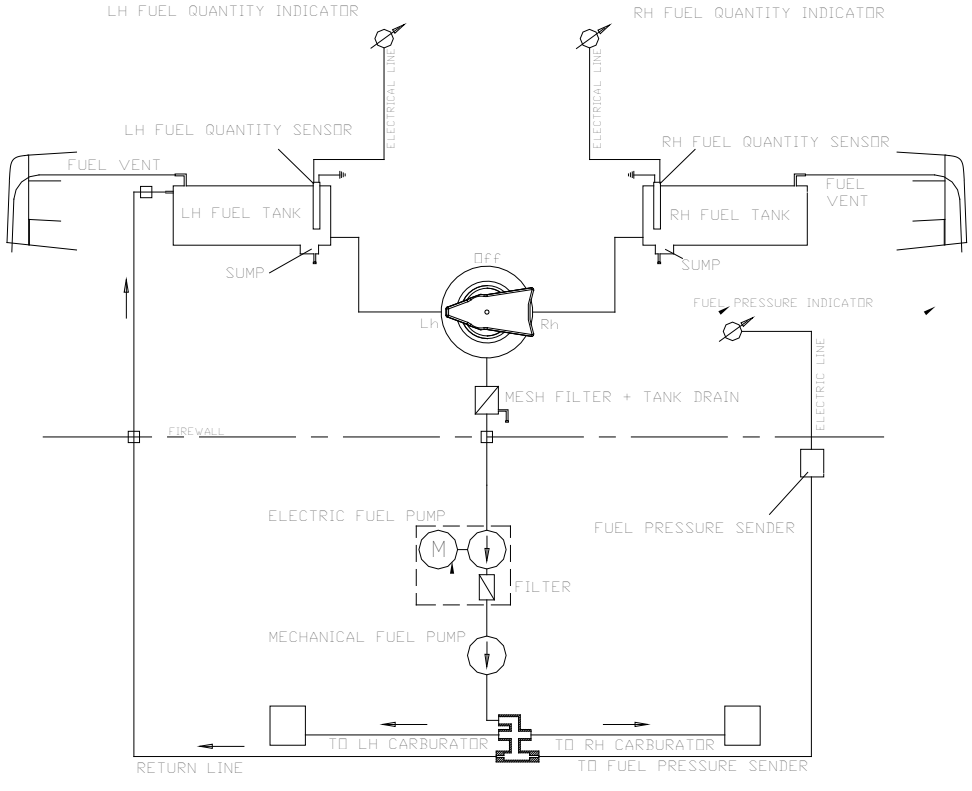


Fig.7-3. FUEL SYSTEM SCHEMATIC

ELECTRICAL SYSTEM

The aircraft's electrical system consists of a 12 Volt DC circuit controlled by the Master Switch located on the instrument panel. Electricity is provided by an alternator and by a buffer battery. Generator light is located on the right side of the instrument panel.

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.

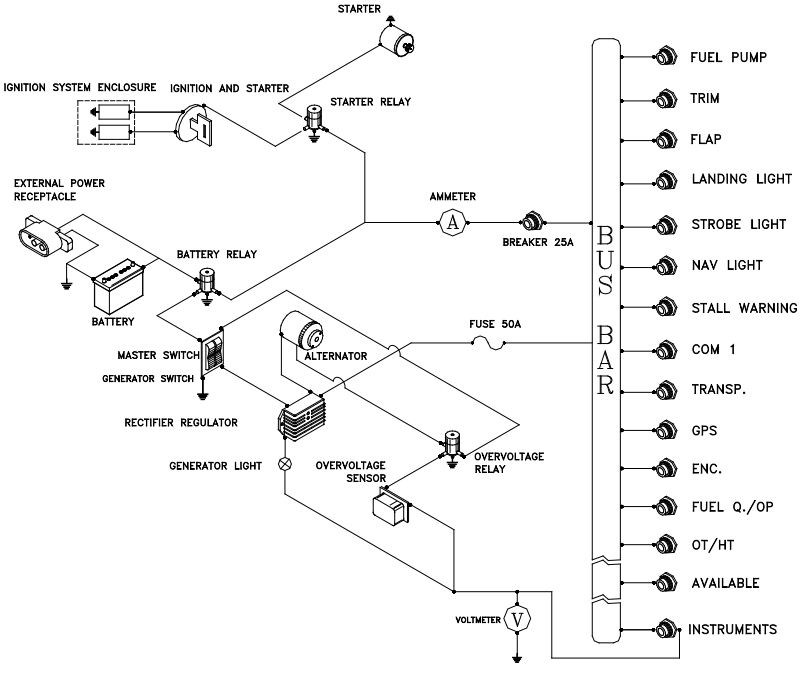


FIG.7-4. ELECTRICAL SYSTEM SCHEMATIC

GENERATOR LIGHT

Generator light (red coloured) illuminates either:

- for a generator failure.

- for a failure of the regulator/rectifier, with consequent overvoltage sensor shut off.

VOLTMETER AND AMMETER

The voltmeter indicates voltage on bus bar. A positive ammeter indication warns that the generator is charging the battery, a negative value indicates the battery's discharge rate.

OIL AND CYLINDER HEADS TEMP. - OIL PRESSURE

These instruments are connected in series with their respective sensors. The same breaker protects all temperature instruments while a second breaker protects oil pressure indicator and other instruments.

O.A.T. INDICATOR

A digital Outside Air Temperature indicator (°C) is located on the upper left side of the instrument panel.

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.

AVIONICS

The central part of the instrument panel holds room for avionics equipment.
The manufacturer of each individual system furnishes features for each system.

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.

PITOT AND STATIC PRESSURE SYSTEMS

The airspeed indicator system for the aircraft is shown below.
Below the left wing's leading edge are positioned in a single group (1) both the Pitot tube (3, total pressure intake) and a series of static ports (6). Two flexible hoses (5) feed the airspeed indicator (4) on the instrument panel.

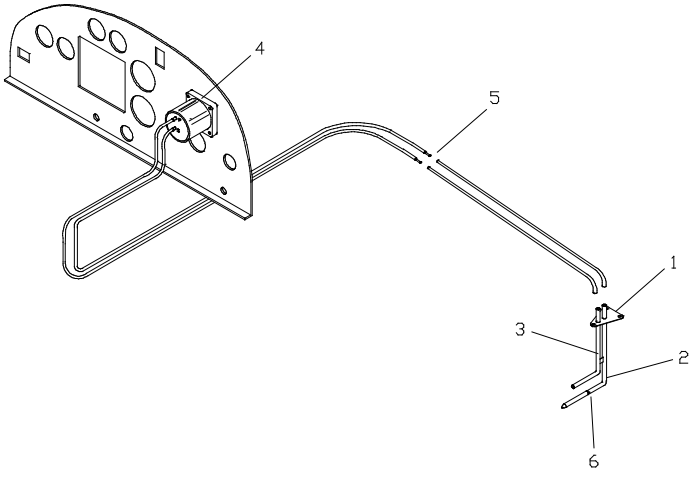


FIG.7-5. AIRSPEED INDICATOR SYSTEM

BRAKES

The aircraft's braking system is a single system acting on both wheels of main landing gear through disk brakes, the same circuit acts as parking brake via an intercept valve (2).
To activate brakes it is sufficient to verify that brake shut-off valve (2) positioned on tunnel between pilots is OFF, then activate brake lever (1) as necessary.
To activate parking brake pull brake lever (1) and set brake shut-off valve (2) to ON.

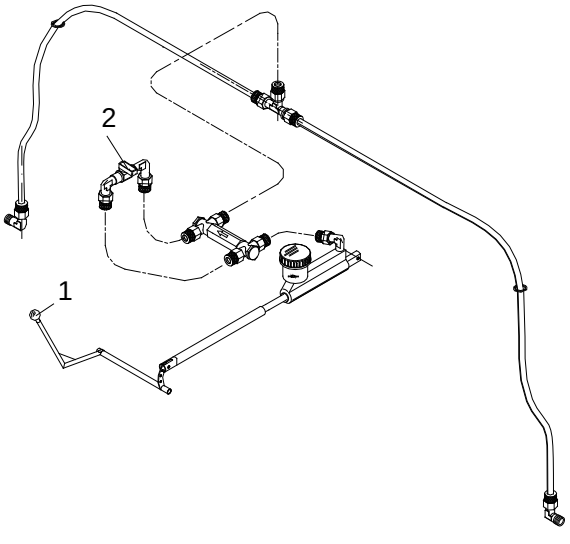


FIG. 7-6. BRAKE SYSTEM

INTENTIONALLY LEFT BLANK

SECTION 8

GROUND HANDLING & SERVICE

TABLE OF CONTENTS

INTRODUCTION

This section contains factory-recommended procedures for proper ground handling and routine care and servicing. It also identifies certain inspection and maintenance requirements, which must be followed if the aircraft is to retain its new-plane performance and dependability. It is recommended to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered locally.

AIRCRAFT INSPECTION PERIODS

Inspection intervals occur at 100 hours and in accordance with special inspection schedules which are added to regularly scheduled inspections. Correct maintenance procedures are described in the aircraft's Maintenance Manual or in the engine's Maintenance Manual.

AIRCRAFT ALTERATIONS OR REPAIRS

It is essential that the responsible Airworthiness Authority be contacted prior to any alterations on the aircraft to ensure that airworthiness of the aircraft is not violated. For repairs, refer to aircraft's Maintenance Manual.

GROUND HANDLING

TOWING

The aircraft is most easily and safely maneuvered by pulling it by its propeller near the axle. Aircraft may be steered by turning rudder or, for steep turns, by pushing lightly on tailcone to lift nose wheel.

PARKING AND TIE-DOWN

When parking airplane outdoors, head it into the wind and set the parking brake. If chocks or wedges are available it is preferable to use the latter.
In severe weather and high wind conditions it is wise to tie the airplane down. Tie-down ropes shall be fastened to the lug present on the wing's lower surface. Nose gear fork can be used for front tie-down location.
Flight controls shall be secured to avoid possible weathervaning damage to moving surfaces.

JACKING

Given the light empty weight of the aircraft, lifting one of the main wheels can easily be accomplished even without the use of hydraulic jacks. For an acceptable procedure please refer to the Maintenance Manual.

LEVELING

Aircraft leveling may become necessary to check wing incidence, dihedral or the exact location of CG. Longitudinal leveling verification is obtained placing a level between the front and aft seat's supporting trusses (slide off the seats to get the access to the two trusses).

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.

CLEANING AND CARE

To clean painted surfaces, use a mild detergent such as shampoo normally used for car finish; use a soft cloth for drying

The plastic windshield and windows should never be dusted when dry; use lukewarm soapy water and dry using chamois only. It is possible to use special glass detergents but, in any case, never use products such as gasoline, alcohol, acetone or other solvents.

To clean cabin interior, seats, upholstery and carpet, it is generally recommended to use foam-type detergents.

LEFT INTENTIONALLY BLANK

SECTION 9

SUPPLEMENTS

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

SUPPLEMENTS LIST

Aircraft S/N:	Registration marks**:**		Date:		
Sup. No.	**Title**	**Rev. no.**	**Date**	**APPLICABLE:**	
				YES	**NO**
1	GARMIN GNS 430 GPS/VHF COMM/NAV			☐	☐
2	GARMIN GNS 530 GPS/VHF COMM/NAV			☐	☐
3	NEW ANALOGICAL INSTRUMENTS PANEL			☐	☐
4	DIFFERENTIAL BRAKE SYSTEM			☐	☐
5	CENTRAL THROTTLE CONTROL SYSTEM			☐	☐
6	AFM supplement for CIS countries operators			☐	☐
7	Garmin G500 Avionics Display System			☐	☐
8	VFR Night equipment			☐	☐

SUPPLEMENT N° 1

GARMIN GNS 430 GPS/VHF COMM/NAV

INTRODUCTION

This section contains supplementary information for safe and efficient operation of the aircraft if equipped with a Garmin GNS 430 system.

1.1 GENERAL

1. The GPS GNS 430 Global Positioning System is an integrated system that contains a GPS navigation system in addition to a VHF COMM radiotransceiver and a VOR/ILS receiver.
2. The system includes an antenna for GPS, a receiver for GPS, a VOR/LOC antenna, a VOR/ILS receiver, a VHF Comm antenna and a VHF Comm tranceiver.
3. The main function of the VHF Comm is to allow communication with the control tower.
4. The VOR/ILS function is to receive and demodulate VOR and LOC signals.
5. The GPS section is dedicated to signal acquisition from the GPS satellite system and to furnish real-time information with respect to position, speed and time.
6. With appropriate signals the GPS GNS 430 can:
   - plan VFR/IFR routes, track waypoints and plan non-precision instrument approaches (GPS, LORAN-C, VOR, VOR-DME, TACAN, NDB, NDB-DME, RNAV) in accordance with AC 20-138;
7. Reference coordinates used for navigation are WGS-84.

1.2 LIMITATIONS

1. The "Pilot's guide and Reference" p/n 190-00140-00 rev. F dated July 2000 or later versions, must be available for proper use of the instrument.
2. Only VFR use is permitted.
3. The GPS section must use the following (or more recently approved) software versions:

Subsystem	*Software version*
MAIN	2.00
GPS	2.00
COMM	1.22
VOR/LOC	1.25

The software version of the main subsystem is displayed by the GNS 430 immediately after start-up for 5 seconds. Remaining subsystems software versions may be verified in sub-page 2 of the AUX Group display for "SOFTWARE/DATA BASE VER".

4. The following default settings must be keyed-in in the SETUP 1 menu of the GNS430 receiver before any other operation:

- **DIS, SPD** *nm kt* (select navigation unit to "nautical miles" and "knots");
- **ALT,VS** *ft fpm* (select altitude to "feet " and "feet per minute");
- **MAP DATUM** *WGS 84* (select map datum WGS84);
- **POSN** *deg-min* (select grid for nav unit to decimal-minutes);

1.3 EMERGENCY PROCEDURES

1. If the information provided by the Garmin GNS430 is not available or manifestly wrong, it is necessary to use other navigation instruments.
2. If the message "WARN" appears in the lower left portion of the display, the receiver cannot be considered useful as a navigation aid. The pilot must use the VLOC receiver or an alternative navigation system.
3. If the message "INTEG" appears in the lower left portion of the display, the RAIM function is unavailable. The pilot must use the VLOC receiver or an alternative navigation system;
4. In emergency flight conditions, pressing the COM flip-flop knob for 2 seconds will automatically tune-in the 121.500MHz emergency frequency.

1.4 NORMAL OPERATION

1. DETAIL FOR NORMAL OPERATION

   Normal operation is described in the "Pilot's guide and Reference" P/N 190-00140-00 rev. F dated July 2000 or later versions.

2. GARMIN GNS 430 DISPLAY.

   Data for GNS 430 system appears on GARMIN GNS430 display.

   Data source is either the GPS or the VLOC as indicated above the CDI switch of the GARMIN 430 display.

1.5 PERFORMANCE

No variations.

1.6 WEIGHT AND BALANCE

See section 6 of the present manual.

1.7 SYSTEMS

See “GNS 430 Pilot’s Guide” p/n 190-00140-00 rev. F dated July 2000 or later versions, for a complete description of the system.

SUPPLEMENT N° 2

GARMIN GNS 530 GPS/VHF COMM/NAV

INTRODUCTION

This section contains supplementary information for safe and efficient operation of the aircraft if equipped with a Garmin GNS 530 system.

2.1 GENERAL

8. The GPS GNS 530 Global Positioning System is an integrated system that contains a GPS navigation system in addition to a VHF COMM radiotransceiver and a VOR/ILS receiver.
9. The system includes an antenna for GPS, a receiver for GPS, a VOR/LOC antenna, a VOR/ILS receiver, a VHF Comm antenna and a VHF Comm tranceiver.
10. The main function of the VHF Comm is to allow communication with the control tower.
11. The VOR/ILS function is to receive and demodulate VOR and LOC signals.
12. The GPS section is dedicated to signal acquisition from the GPS satellite system and to furnish real-time information with respect to position, speed and time.
13. With appropriate signals the GPS GNS 530 can:
    - plan VFR/IFR routes, track waypoints and plan non-precision instrument approaches (GPS, LORAN-C, VOR, VOR-DME, TACAN, NDB, NDB-DME, RNAV) in accordance with AC 20-138;
14. Reference coordinates used for navigation are WGS-84.

2.2 LIMITATIONS

The "Pilot's guide and Reference" p/n 190-00181-00 rev. A dated April 2000 or later versions, must be available for proper use of the instrument.

Only VFR use is permitted.

The GPS section must use the following (or more recently approved) software versions:

Subsystem	*Software version*
MAIN	2.00
GPS	2.00
COMM	1.22
VOR/LOC	1.25

The software version of the main subsystem is displayed by the GNS 530 immediately after start-up for 5 seconds. Remaining subsystems software versions may be verified in sub-page 2 of the AUX Group display for "SOFTWARE/DATA BASE VER".

The following default settings must be keyed-in in the SETUP 1 menu of the GNS430 receiver before any other operation:

- **DIS, SPD** *nm kt* (select navigation unit to "nautical miles" and "knots");
- **ALT,VS** *ft fpm* (select altitude to "feet " and "feet per minute");
- **MAP DATUM** *WGS 84* (select map datum WGS84);
- **POSN** *deg-min* (select grid for nav unit to decimal-minutes);

2.3 EMERGENCY PROCEDURES

If the information provided by the Garmin GNS530 is not available or manifestly wrong, it is necessary to use other navigation instruments.

If the message "RAIM POSITION WARNING " appears in the display, the receiver cannot be considered useful as a navigation aid. The pilot must use the VLOC receiver or an alternative navigation system.

If the message "RAIM IS NOT AVAILABLE " appears in the the display, the RAIM function is unavailable. The pilot must use the VLOC receiver or an alternative navigation system;

In emergency flight conditions, pressing the COM flip-flop knob for 2 seconds will automatically tune-in the 121.500MHz emergency frequency.

2.4 NORMAL OPERATION

1. DETAIL FOR NORMAL OPERATION

   Normal operation is described in Garmin GNS 530 "Pilot's guide " P/N 190-00181-00 rev. A dated April 2000 or later versions.

2. GARMIN GNS 530 DISPLAY.

   Data for GNS 530 system appears on GARMIN GNS530 display.

   Data source is either the GPS or the VLOC as indicated above the CDI switch of the GARMIN5430 display.

2.5 PERFORMANCE

No variations.

2.6 WEIGHT AND BALANCE

See section 6 of the present manual.

2.7 SYSTEMS

See "GNS 530 Pilot's Guide" p/n 190-00181-00 rev. A dated April 2000 or later versions, for a complete description of the system.

SUPPLEMENT N° 3

NEW ANALOGICAL INSTRUMENTS PANEL

INTRODUCTION

This section contains supplementary information for safe and efficient operation of the aircraft if equipped with the new analogical instruments panel.

3.1 GENERAL

No variations.

3.2 LIMITATIONS

No variations.

3.3 EMERGENCY PROCEDURES

No variations.

3.4 NORMAL OPERATION

No variations.

3.5 PERFORMANCE

No variations.

3.6 WEIGHT AND BALANCE

No variations.

3.7 SYSTEMS

The new analogical instruments panel is designed with a modular concept to improve the instruments visibility.

The new instruments panel is divided into three main parts. The left part with the flight instruments, central part with the avionic instruments and the right part with the engine instruments.

The following picture shown the new analogical instruments panel.

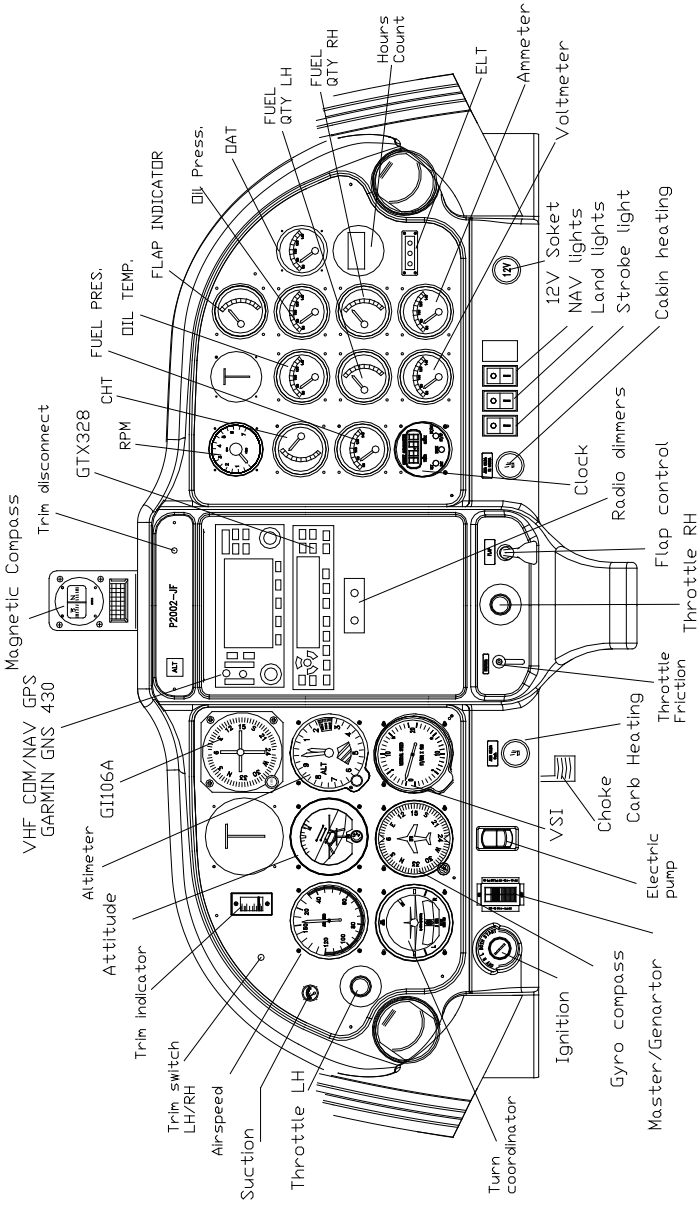


Figure 9-1 New analogical instruments panel

SUPPLEMENT N° 4

DIFFERENTIAL BRAKE SYSTEM

INTRODUCTION

This section contains supplementary information for safe and efficient operation of the aircraft if equipped with the differential brake system.

4.1 GENERAL

No variations.

4.2 LIMITATIONS

No variations.

4.3 EMERGENCY PROCEDURES

No variations.

4.4 NORMAL OPERATION

No variations.

4.5 PERFORMANCE

No variations.

4.6 WEIGHT AND BALANCE

No variations.

4.7 SYSTEMS

Figure 9-2 shows the brake system schematic diagram.

The left and right wheel brakes are independent systems. The system has a reservoir (4) on the co-pilot's brake pedals (1). The reservoir is directly connected to the brake master cylinders (3). Two flexible hoses connect the master cylinders on the co-pilot's brake pedals to the master cylinders on the pilot's brake pedals.

The parking brake valve (6) is mounted on the floor of the fuselage, below the seats and it's activated by lever (2). Each main wheel has a brake disc (7).

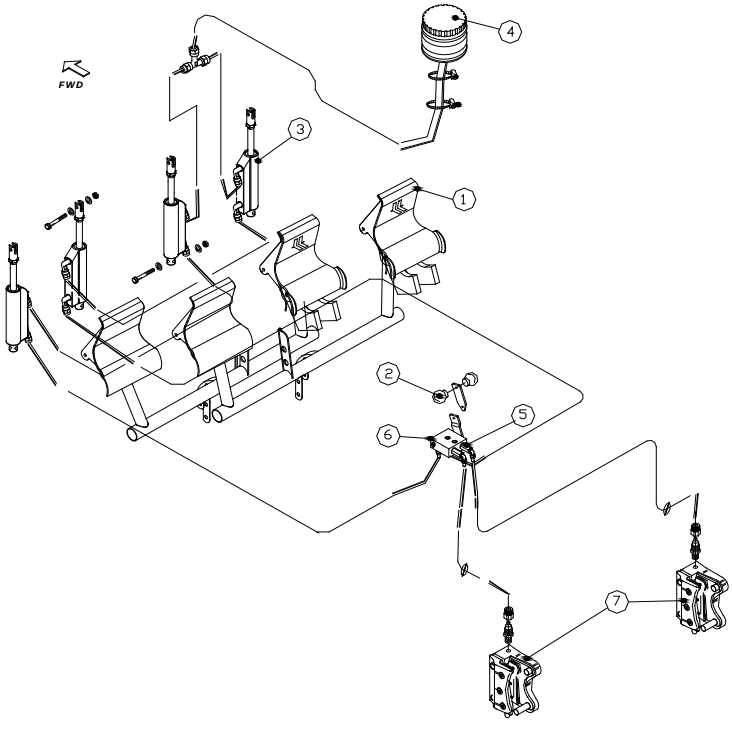


Figure 9-2 Differential brake system

SUPPLEMENT N° 5

CENTRAL THROTTLE CONTROL SYSTEM

INTRODUCTION

This section contains supplementary information for safe and efficient operation of the aircraft if equipped with the central throttle control system.

5.1 GENERAL

No variations.

5.2 LIMITATIONS

No variations.

5.3 EMERGENCY PROCEDURES

No variations.

5.4 NORMAL OPERATION

No variations.

5.5 PERFORMANCE

No variations.

5.6 WEIGHT AND BALANCE

No variations.

5.7 SYSTEMS

The figure 9-3 shows the central throttle control system.

The engine throttle lever is located on the left site and the choke lever is located on the right site.
The levers friction is located on the lateral right site of the central throttle control system.

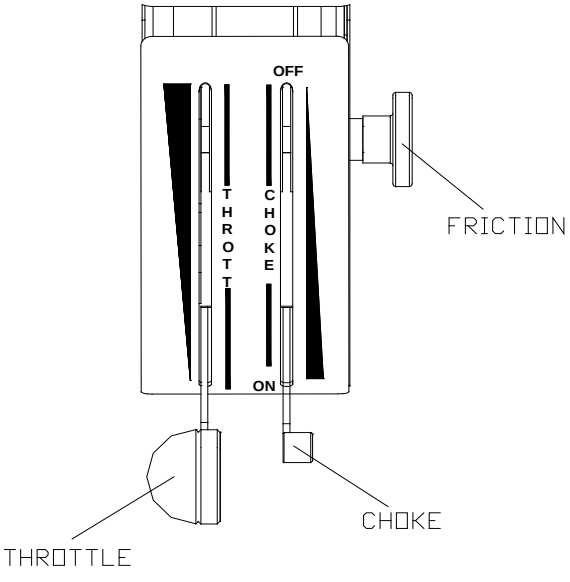


Figure 9-3 Central throttle control system

INTENTIONALLY LEFT BLANK

SUPPLEMENT N° 6

AFM SUPPLEMENT FOR CIS COUNTRIES OPERATORS

INTRODUCTION

This supplement applies for CIS countries operators.

6.1 GENERAL

This supplement must be placed in EASA Approved P2002JF Aircraft Flight Manual Section 9, if the airplane is certified to the CIS configuration. The information contained herein complements the basic information in the EASA Approved Aircraft Flight Manual. For limitations, procedures, and performance information not contained in this supplement, refer to the EASA Approved Aircraft Flight Manual.

ABBREVIATIONS AND TERMINOLOGY

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

V_{LOF}	Lift off speed: is the speed at which the aircraft generally lifts off from the ground.

6.2 LIMITATIONS

AMBIENT TEMPERATURE

Ambient temperature from -25°C to 40°C.

AIRFIELD ELEVATION

Maximum airfield elevation (Pressure Altitude) less than 2100m (7000ft).

FLIGHT ALTITUDE

Flight Altitude limitation of 3000m (9800ft) and of 3600m (11800ft) during 30 min.

OPERATION FROM UNPAVED RUNWAYS

Operation form unpaved runways is limited by soil strength of 6 kg per sq. Centimetre ($\sigma \geq 6 kg/cm^2$)

OVER-WATER FLIGHTS

Extended over-water flights are allowed within the limitations prescribed by CIS operational regulations (distance from the coast shall not exceed gliding distance with engine failed).

SINGLE-PILOTS OPERATIONS

In case of single-pilot operations, the right crew seat may not be occupied by a passenger without removal of control stick.

6.3 EMERGENCY PROCEDURES

ENGINE FAILURES

ENGINE FAILURE DURING FLIGHT

IRREGULAR ENGINE RPM

1. Throttle: *check position and adjustable friction*
2. Check engine gauges.
3. Check both fuel quantity indicators.
4. Carburettors heating: *ON*
5. Electric fuel pump*: ON*

If the engine continues to run irregularly:

6. Fuel selector valve: *change the fuel feeding to the tank not in use (e.g. if you are drawing fuel from the LEFT tank, change to RIGHT or v.v.)*

If the engine continues to run irregularly:

7. Ignition key: *check both*
8. Land as soon as possible.

NOTE Glide ratio is ***12.8*** (landing gear up) therefore with *1000ft* elevation it is possible to cover *~4km* (*~2* nautical miles) in zero wind conditions.

NOTE The lost of altitude by turning of 180° with bank angle of 30° is about 200ft on the V_Y.

SMOKE AND FIRE

ENGINE FIRE WHILE PARKED

1. Fuel selector valve: *OFF*
2. Electric fuel pump: *OFF*
3. Magnetos: *OFF*
4. Generator & Master switches: *OFF*
5. Parking brake: *ON*
6. Do not restart the engine.
7. Escape rapidly from the aircraft.

ENGINE FIRE IN-FLIGHT

1. Procedure for a forced landing: *apply*
2. Cabin heating: *OFF*
3. Fuel selector valve: *OFF*
4. Electric fuel pump: *OFF*
5. Throttle: *full in until the engine stops running*
6. Cabin vents: *OPEN*
7. Magnetos: *OFF*
8. Speed: *69 KIAS (maximum efficiency speed)*
9. Do not restart the engine.

RECOVERY FROM UNINTENTIONAL SPIN

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

1. Throttle: *idle (full out position)*
2. Rudder: *full, in the opposite direction of the spin*
3. Stick: *move and hold forward until spin is halted*

As the spin is halted

4. Rudder: *neutralize*
5. Aeroplane attitude: *make a smooth recovery by pulling the stick back gently averting speeds in excess of V_{NE} and maximum load factor (n=+3.8)*

OTHER EMERGENCIES

ELECTRIC POWER SYSTEM MALFUNCTION

. Causes for malfunctions are hard to establish but, in any case, problems of this nature must be dealt with immediately. The following may occur:

GENERATOR LIGHT ILLUMINATES

Generator 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.

In both cases proceed as follows:

1. Generator switch and master switch: *OFF*
2. Generator switch and master switch: *ON*

If the problem persist

3. Generator switch: *OFF*
4. Non vital electric equipments: *OFF*
5. Radio calls: *reduce at the strictly necessary*

NOTE

The battery is capable of supply the electrical system enough time to complete flight in emergency conditions, with normal flight electric-loads including operation of flap and trim.

If the light turns off:

6. No further action is requested.

TRIM SYSTEM FAILURE

LOCKED CONTROL

In case the trim control should not respond, act as follows:

1. Breakers: *check*
2. Trim switch Lh/Rh: *check for correct position*
3. Trim disconnect: *ON (check)*
4. Speed: *adjust to control aircraft without excessive stick force*
5. Land aircraft as soon as possible.

RUNWAY

If trim position indicator reads displacement without pilot's action on trim control, follow procedure below:

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

6.4 NORMAL OPERATION

PRE-FLIGHT INSPECTIONS

Before each flight, it is necessary to carry out a complete inspection of the aircraft starting with an external inspection followed by an internal inspection as below detailed.

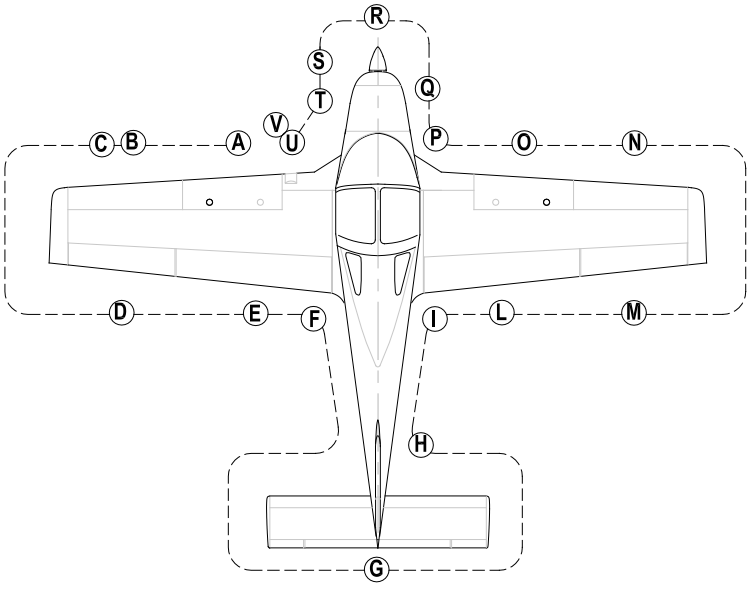
EXTERNAL INSPECTION

To carry out the external inspection it will be necessary to follow the checklist below with the station order outlined in fig. 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.

A Left fuel filler cap: check visually for desired fuel level then secure filler cup. Drain the left fuel tank by drainage valve using a cup to collect fuel. Check for water or other contaminants.



WARNING

Fuel level indicated by the fuel quantity indicators (on the instrument panel) is only indicative. For flight safety, pilot should verify actual fuel quantity embarked before takeoff.

B Remove protection cap and check the Pitot tube and the static ports mounted on left wing are unobstructed, do not blow inside vents, place protection cap inside the aircraft.

C Left side leading edge and wing skin: visual inspection. Check stall strips.

D Left aileron: visual inspection; Left tank vent: check for obstructions.

E Left flap and hinges: visual inspection

F Left main landing gear; check inflation 23 psi (1.6 bar), tire condition, alignment, fuselage skin condition.

G Horizontal tail and tab: visual inspection.

H Vertical tail and rudder: visual inspection.

I Right main landing gear; check inflation 23 psi (1.6 bar), tire condition, alignment, fuselage skin condition.

L Right flap and hinges: visual inspection.

M Right aileron: visual inspection; Right side tank vent: check for obstructions.

N Right leading edge and wing skin: visual inspection. Check stall strips.

O Right fuel filler cap: check visually for desired fuel level then secure filler cup. Drain the right fuel tank by drainage valve using a cup to collect fuel. Check for water or other contaminants.

P Set the fuel selector valve to OFF. Drain circuit using a cup to collect fuel by opening the specific drainage valve (part of the gascolator). Check for water or other contaminants (drainage operation must be carried out with the aircraft parked on a level surface).

Q Nose wheel strut and tire: check inflation 15 psi (1.0 bar), tire condition and condition of rubber shock absorber discs.

R Propeller and spinner condition: check for nicks and security.

S Open engine cowling and perform the following checklist:

I. Check no foreign objects are present.

II. Check the cooling circuit for losses, check coolant level into the expansion tank, insure radiator honeycomb is unobstructed.

III. Check lubrication circuit for losses, check oil reservoir level, and insure radiator honeycomb is unobstructed.

IV. Inspect fuel circuit for losses.

V. Check integrity of silent-block suspensions.

VI. Check connection and integrity of air intake system, visually inspect that ram air intake is unobstructed.

VII. Check that all parts are secured or safetied.

T Close engine cowling.

U Visual inspection of the Landing Light.

V Remove tow bar and chocks.

NOTE

Avoid blowing inside Pitot-tube and inside airspeed indicator system's static vents as this may damage instruments.

CHECKLISTS

BEFORE STARTING ENGINE (after preflight inspection)

I. Flight controls: *operate until their stop checking for movement smoothness*

II. Parking brake: *engage*

III. Throttle: *adjust friction*

IV. Master switch: ON, Generator switch: *ON, generator light ON, check the ammeter.*

V. Electric fuel pump: *ON, (check for audible pump noise and fuel pressure)*

VI. Electric fuel pump: *OFF*

VII. Avionic Master switch *(if installed)*: *ON, instruments check, then set in OFF position*

VIII. Flap control: *operate flap throughout their extreme positions*

IX. Trim control: *operate from both left and right controls the trim between its extreme positions checking the trim position indicator*

X. Nav. light & Strobe light: *ON*

XI. Landing light: *ON, check*

XII. Landing light: *OFF*

XIII. Fuel quantity: *compare the fuel levels read by the fuel quantity indicators with the quantity present into the tanks (see Pre-flight inspection – External inspection)*

XIV. Flight planning, fuel consumption, refuelling.

XV. Seat position and safety belts adjustment

NOTE

In the absence of the passenger: fasten seat belts around the free seat so as to prevent interference with the operation of the aeroplane and with rapid egress in an emergency.

XVI. Canopy: *Closed and locked*

CAUTION

Master Avionic switch (if installed) must be set OFF during the engine's start-up to prevent avionic equipments damages.

PRIOR TO TAKE-OFF

I. Parking brake: *ON*

II. Check engine instruments:

- Oil temperature: 50-110 °
- Cylinder heads temperature: max 135 °
- Oil pressure: 2-5 bar *(above 1400 rpm)*; 0.8 bar *(below 1400 rpm)*
- Fuel pressure: 2.2 – 5.8 psi *(0.15-0.40 bar)*

III. Generator light: *OFF (check)*

IV. Propeller's rpm: *1560 and test magnetos (speed drop with only one ignition circuit must not exceed 130 prop's rpm; maximum difference of speed by use of either circuits LEFT or RIGHT is 50 rpm).*

V. Check fuel quantity indicators.

VI. Flaps: *T/O (15°)*

VII. Stick free and trim set at *zero*

VIII. Seat belts fastened and canopy closed and locked

CRUISE

Flights in the CIS airspace are allowed only along the routes with continuous ATC monitoring using RBS mode in the VHF covering zones.

I. Reach cruising altitude

II. Set power and engine rpm's for cruise.

III. Check engine instruments

- Oil temperature: 90°-110 ° C.
- Temperature cylinder heads: 90° ÷ 135 °C
- Oil pressure: 2 - 5 bar.
- Fuel pressure: 2.2 – 5.8 psi *(0.15 – 0.40 bar)*

IV. Carburettor heat as needed, see paragraph on carb. heat in Section 3.

NOTE

Compensate unpredicted asymmetrical fuel consumption between left and right fuel tanks operating the fuel selector valve. Switch on the electric fuel pump prior to swap the fuel feeding from one tank to another

BEFORE LANDING

I. Electric fuel pump: *ON*

II. On downwind leg: *speed: 68 KIAS (for both MTOW); Flaps: T/O (15°)*

III. On downwind base*: speed: 65 KIAS (for both MTOW); Flaps: T/O (15°)*

IV. On final leg: *speed: 63 KIAS (for both MTOW); Flaps: Land (40°)*

V. Establish descent

VI. Optimal touchdown speed: *51 KIAS (for both MTOW)*

COLD WEATHER OPERATIONS

If the aircraft is operated in cold weather conditions (from -25ºC till -5ºC) it is necessary to perform following procedures:

- Heat the cabin to +25ºC to avoid windshield frost in flight
- Heat the engines with external source to + 20º C

6.5 PERFORMANCE

STALL SPEED *(Approved data)*

CONDITIONS: - Weight **580** kg
- Throttle: idle
- No ground effect

Lateral Bank	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
FLAP UP	**40**	*49*	**45**	*53*	**53**	*58*	**67**	*70*
FLAP TO	**35**	*46*	**40**	*49*	**47**	*54*	**61**	*65*
FLAP FULL	**30**	*39*	**34**	*42*	**41**	*47*	**53**	*56*

CONDITIONS: - Weight **600** kg
- Throttle: idle
- No ground effect

Lateral Bank	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
FLAP UP	**41**	*50*	**46**	*53*	**54**	*59*	**68**	*70*
FLAP TO	**36**	*46*	**41**	*50*	**48**	*55*	**62**	*65*
FLAP FULL	**31**	*40*	**35**	*43*	**41**	*47*	**53**	*56*

NOTE

Altitude loss during conventional stall recovery as demonstrated during test flights is approximately 100ft with banking under 30°.

TAKEOFF PERFORMANCES *(Approved data)*

TAKEOFF DISTANCE

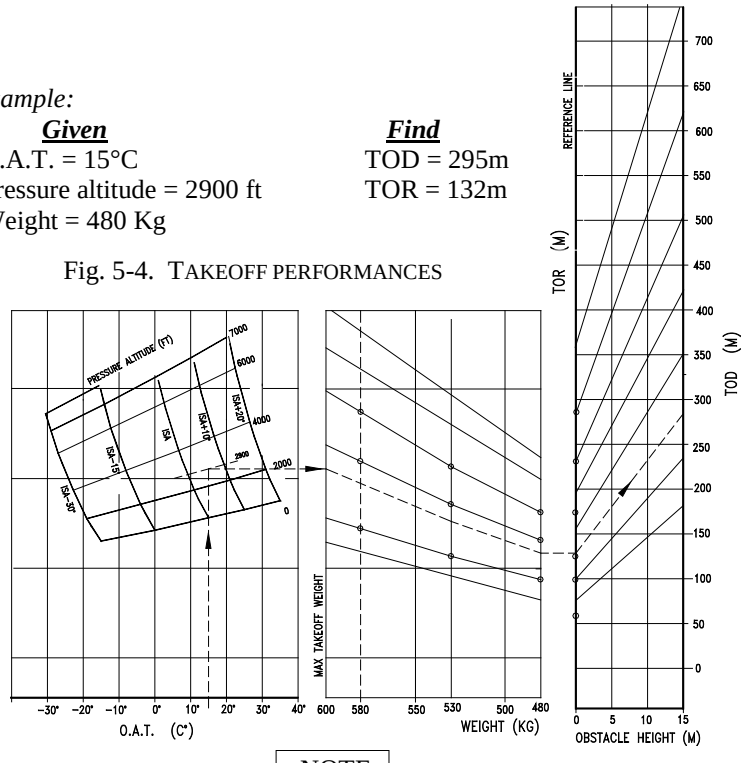
CONDITIONS:

- Flaps: TO
- Engine throttle: full throttle *(see Sect.4)*
- R/C ≥ 200 ft/min
- Runway: paved
- Slope: 0°; Wind: zero

⇒ *Example:*

Given	***Find***
O.A.T. = 15°C	TOD = 295m
Pressure altitude = 2900 ft	TOR = 132m
Weight = 480 Kg	

Fig. 5-4. TAKEOFF PERFORMANCES



NOTE

1. *Decrease distances by 10% for each 10Kts of ahead wind. Increase distances by 20% for each 10 Kts of tailwind.*
2. *Measurement distance for short grass (less than 2 inches) must be increased of 10%. Measurement distance for high grass (more than 2 inches) must be increased of 15%.*
3. *A rising runway with a gradient of 1% causes an acceleration decreasing of the same intensity and, consequently, the takeoff run increases by5%.*

CLIMB RATE IN TAKEOFF CONFIGURATION *(Approved data)*

CONDITIONS:

		580 kg MTOW	600 kg MTOW
-	Flaps	15°	15°
-	Engine	Full throttle	Full throttle
-	V_{obs}	45 KIAS	46 KIAS

Climb rate at maximum takeoff weight (580/600kg) in demonstrated ISA s.l. conditions is 850 ft/min for 580 kg MTOW and 800 ft/min for 600 kg MTOW.

CRUISE

CONDITIONS:

- ISA
- Wind: zero
- MTOW = For both MOTW

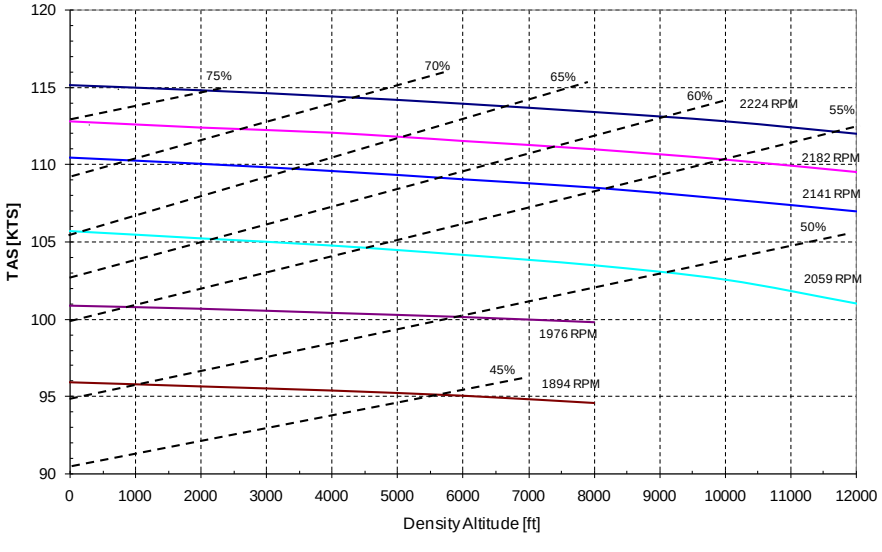


Fig. 5-6 CRUISE

LANDING DISTANCE *(Approved data)*

LANDING DISTANCE AND GROUND RUN

CONDITIONS:

Weight: 580 kg; Flap: 40° Runway: dry, compact, grass

Engine: idle Slope: 0°; Wind: zero

Distance over the obstacle of 15 m

OAT: ISA -20°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	235	88
2000	241	94
4000	248	99
6000	256	105

OAT: ISA -10°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	239	92
2000	246	97
4000	253	103
6000	261	109

OAT: ISA +0°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	243	95
2000	250	101
4000	258	107
6000	266	113

OAT: ISA +10°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	247	98
2000	255	104
4000	263	111
6000	271	118

OAT: ISA +20°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	251	101
2000	259	108
4000	268	114
6000	277	122

OAT: ISA +40°C

Hp (ft)	Total Distance (m)	Ground Run (m)
0	258	108
2000	269	116
4000	270	120
6000	289	130

NOTE

1. *Decrease distances by 10% for each 10 Kts of headwind. Increase distances by 20 % for each 10 Kts of tailwind;*
2. *For dry and paved runway operation increase ground run by 10%;*
3. *If it becomes necessary to land without flap extension (flap malfunction), increase approach speed by 10 Kts, increase by 40% distance pertaining to flap setting at 40° and increase V_{obs} to 56 KIAS for 580 kg MTOW and to 57 KIAS for 600 kg MTOW;*
4. *V_{obs} (speed over obstacle) is 48 KIAS for 580 kg MTOW and 49 KIAS for 600 kg MTOW;*
5. *If the maximum takeoff weight is 600 kg, the Total Distance increases about 10%;*

6.6 WEIGHT AND BALANCE

No variations.

6.7 SYSTEMS

No variations.

SUPPLEMENT N° 7

GARMIN G500 AVIONICS DISPLAY SYSTEM

INTRODUCTION

This AFM Supplement contains supplemental information to operate, in a safe and efficient manner, the aircraft when equipped with Garmin G500 Avionics Display System (Design Change MOD 2002/041).

CAUTION

Garmin G500 Pilot's Guide (P/N 190-01102-02) – last issue - must be carried onboard the airplane at all times.

NOTE

Garmin G500 Cockpit Reference Guide (P/N 190-01102-03) – last issue – provides a synthetic explanation of system operation.

7.1 GENERAL

The G500 is an integrated display system that presents primary flight instrumentation, navigation, and a moving map to the pilot through large format displays.

In normal operating mode, the Primary Flight Display (PFD) presents graphical flight instrumentation (attitude, heading, airspeed, altitude, vertical speed), replacing the traditional flight instrument cluster. The Multi-Function Display (MFD) normally displays a full-color moving map with navigation information.

An analogue stand-by airspeed indicator and a stand-by altimeter provide the pilot with the primary flight information also in event of G500 failure.

7.2 LIMITATIONS

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown below:

SPEED			KIAS	KCAS	REMARKS
V_{NE}	Never exceed speed		141	138	Never exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed		112	108	Never exceed this speed unless in smooth air, and then only with caution.
V_A	Manoeuvring speed		98	96	Do not make full or abrupt control movements above this speed as this may cause stress in excess of limit load factor
V_{FE}	Maximum flap extended speed	LDG	68	70	Do not exceed these speeds with the given flap setting.
		APP	99	97	

AIRSPEED INDICATOR MARKINGS

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

Garmin G500 Airspeed Indicator displays airspeed on a rolling number gauge using a moving tape: a color-coded (white, green, yellow, and red/white "barber pole") speed range strip is located on the moving tape.

NOTE

Refer to Garmin G500 Pilot's Guide (P/N 190-01102-02) – last issue – for airspeed indicator description.

MARKING	KIAS	SIGNIFICANCE
White band	**31 - 68**	Positive Flap Operating Range (lower limit is V_{SO}, at maximum weight [600 kg] and upper limit is the maximum speed permissible with landing flaps extension).
Green band	**41 – 112**	Normal Operating Range (lower limit is V_{S1} at maximum weight [600 kg] and most forward c.g. with flaps retracted and upper limit is maximum structural speed V_{NO}).
Yellow band	**112 - 141**	Manoeuvres must be conducted with caution and only in smooth air.
Red line	**141**	Maximum speed for all operations.

7.3 EMERGENCY PROCEDURES

Before operating the aircraft, the pilot should become thoroughly familiar with the Garmin G500 Pilot's Guide (P/N 190-01102-02) – last issue.

CAUTION

Garmin G500 Pilot's Guide (P/N 190-01102-02) – last issue - must be carried onboard the airplane at all times.

Further, a continued and appropriate training should be provided.

WARNING

For safety reasons, G500 operational procedures must be learned on the ground.

WARNING

The Garmin G500 has a very high degree of functional integrity.

However, the pilot must recognize that providing monitoring and/or self-test capability for all conceivable system failures is not practical. Although unlikely, it may be possible for erroneous operation to occur without a fault indication shown by the G500. It is thus the responsibility of the pilot to detect such an occurrence by means of cross-checking with all redundant or correlated information available in the cockpit.

In case of emergency the pilot should acts as follows:

1. ***Keep self-control and aircraft control***
2. ***Analyse the situation identifying, if required, the area for a likely emergency landing***
3. ***Apply the pertinent procedure***
4. ***Inform the Air Traffic Control if time and conditions allow for it***

IN-FLIGHT ENGINE RESTART

Make reference to the instructions reported on Section 3 of this Manual.

Additionally, take into account what below addressed:

NOTE

After starter engagement during in-flight engine restart, GNS 430 (or the alternative equipment GNS 530) indication may be temporarily lost. Recovery can last up to 1 minute.

G500 SYSTEM FAILURES

LOSS OF INFORMATION DISPLAYED

When a LRU or a LRU function fails, a large red 'X' is typically displayed on the display field associated with the failed data.

NOTE

In most of cases, the red "X" annunciation is accompanied by an Alert Message. Refer to G500 Pilot's Guide (P/N 190-01102-02), last issue, Chapter 6, Annunciations and Alerts list.

LOSS OF AIRSPEED INFORMATION

If the display system is not receiving airspeed input from the Air Data Computer, a red X is displayed on the field.

INSTRUCTION: refer to standby analogical airspeed indicator

LOSS OF ALTITUDE INFORMATION

If the display system is not receiving altitude input from the Air Data Computer, a red X is displayed on the field.

INSTRUCTION: refer to standby analogical altitude indicator

7.4 NORMAL OPERATION

Document Garmin G500 Pilot's Guide (P/N 190-01102-02) – last issue - reports detailed instructions to operate the system in subject. Make always reference to the information addressed within the above mentioned document.

CAUTION

Garmin G500 Pilot's Guide (P/N 190-01102-02) – last issue - must be carried onboard the airplane at all times.

WARNING

For safety reasons, G500 operational procedures must be learned on the ground.

WARNING

To reduce the risk of unsafe operation, carefully review and understand all aspects of the G500 Pilot's Guide. Thoroughly practice basic operation prior to actual use. During flight operations, carefully compare indications from the G500 to all available navigation sources, including the information from other NAVAIDs, visual sightings, charts, etc.

For safety purposes, always resolve any discrepancies before continuing navigation.

7.5 PERFORMANCE

Garmin G500 Avionics Display System installation does not affect the aircraft performance.

7.6 WEIGHT AND BALANCE

For weight and balance, make reference to Section 6 of this Manual; additionally, the equipment list is so integrated:

EQUIPMENT LIST		A/C S/N	DATE:	
REF.	DESCRIPTION & P/N	INST	WEIGHT *kg*	DATUM *m*
	Garmin GDU 620 Display	*	2.9	1.35
	Garmin GRS 77 AHRS	*	1.27	2.77
	Garmin GDC 74A ADC	*	0.72	0.81
	Garmin GMU 44 magnetometer	*	0.16	4.91
	Garmin GTP 59 temperature probe	*	0.2	2.08
	Stand-by airspeed indicator Mid Continent P/N 25020-0179	*	0.27	1.35
	Stand-by altimeter Mid Continent P/N 15035-1102	*	0.36	1.35
	Bank angle indicator (optional) Falcon Gauge P/N SI-2Q		0.2	1.35

7.7 SYSTEMS

Garmin G500 system is an avionics system which interfaces with the NAV devices and integrates the functions of a VOR/ILS/GPS indicator.

An overview of the configuration of the system installed on Tecnam P2002 is shown in the figure below:

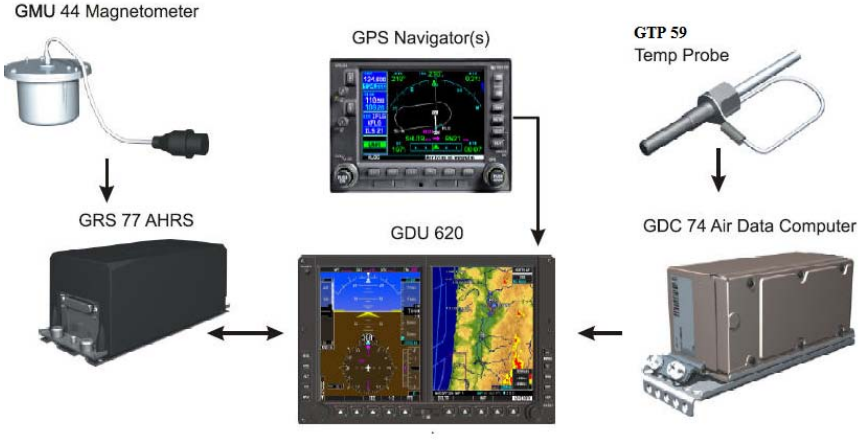


Fig. 3

Below a brief description of each unit of the suite is provided.

The GDU 620 has dual VGA 6.5 inch LCD displays. The left side of the GDU is a PFD and the right side is the MFD. The MFD shows a moving map, flight plan and more. The PFD shows primary flight information, in place of traditional pitot-static and gyroscopic systems and also provides an HSI for navigation.

The GRS 77 is an Attitude and Heading Reference System (AHRS) unit that provides aircraft attitude information to the G500 display. The unit contains advanced tilt sensors, accelerometers, and rate sensors. In addition, the GRS 77 interfaces with both the GDC 74A Air Data Computer and the GMU 44 magnetometer. The GRS 77 also utilizes GPS data forwarded from the GDU620.

The GMU 44 magnetometer senses the earth's magnetic field. Data is sent to the GRS 77 AHRS for processing to determine aircraft magnetic heading. This unit receives power directly from the GRS 77.

The GDC 74A Air Data Computer (ADC) compiles information from the pitot/static system and an Outside Air Temperature (OAT) sensor. The GDC 74A provides pressure altitude, airspeed, vertical speed, and OAT information to the G500 system. The GDC 74A communicates with the GDU 620 and GRS 77.

GTP59 It is the temperature probe which provides Outside Air Temperature (OAT) data to the GDC74A.

The GPS unit is the same installed on analogue P2002 configuration: the Garmin GNS 430 or GNS 530.

An analogue airspeed indicator and an altimeter have been added to provide the pilot with main flight information also in case of G500 failure.

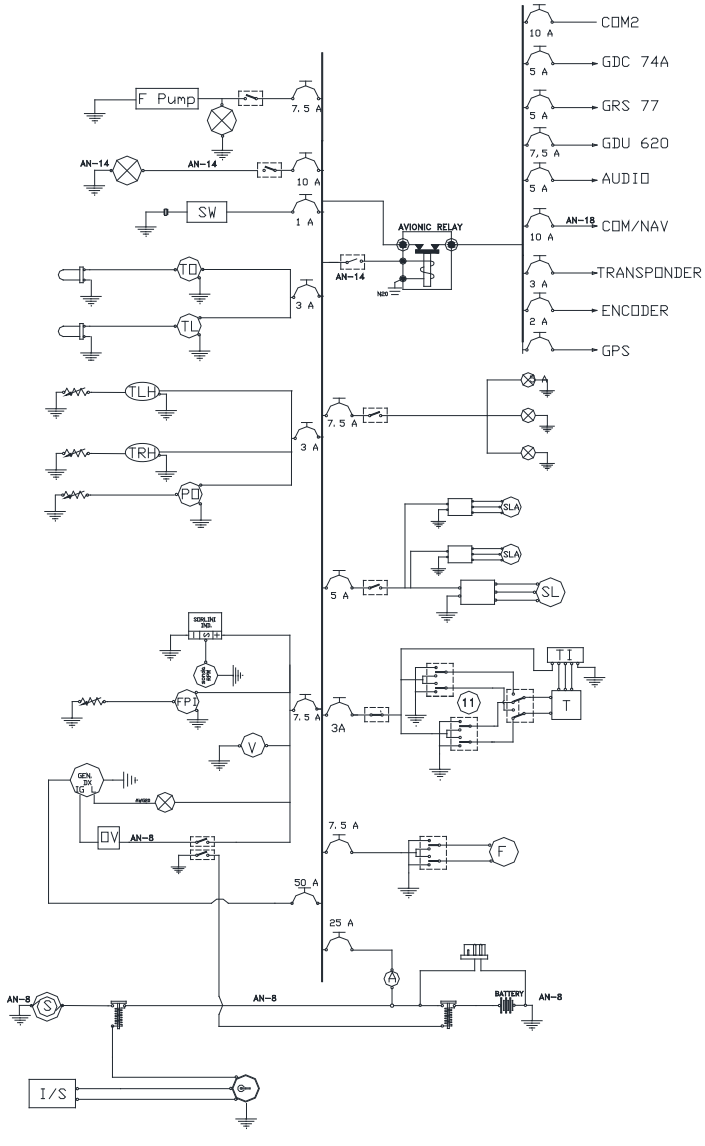
The above mentioned instruments are pneumatic and they don't need electrical supply.

CAUTION

The G500 PFD and MFD displays use a lens coated with a special anti-reflective coating that is very sensitive to skin oils, waxes, and abrasive cleaners. CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING. It is very important to clean the lens using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.

ELECTRICAL SYSTEM

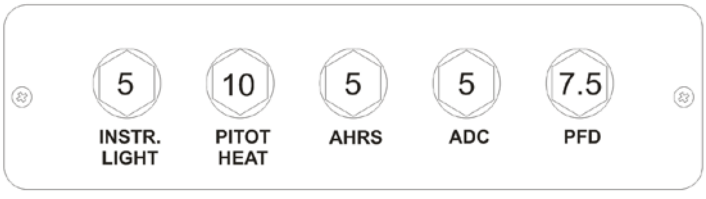
The drawing below shows the electrical system schematic:



The Garmin G500 units are connected to the avionic bus through dedicated circuit breakers.

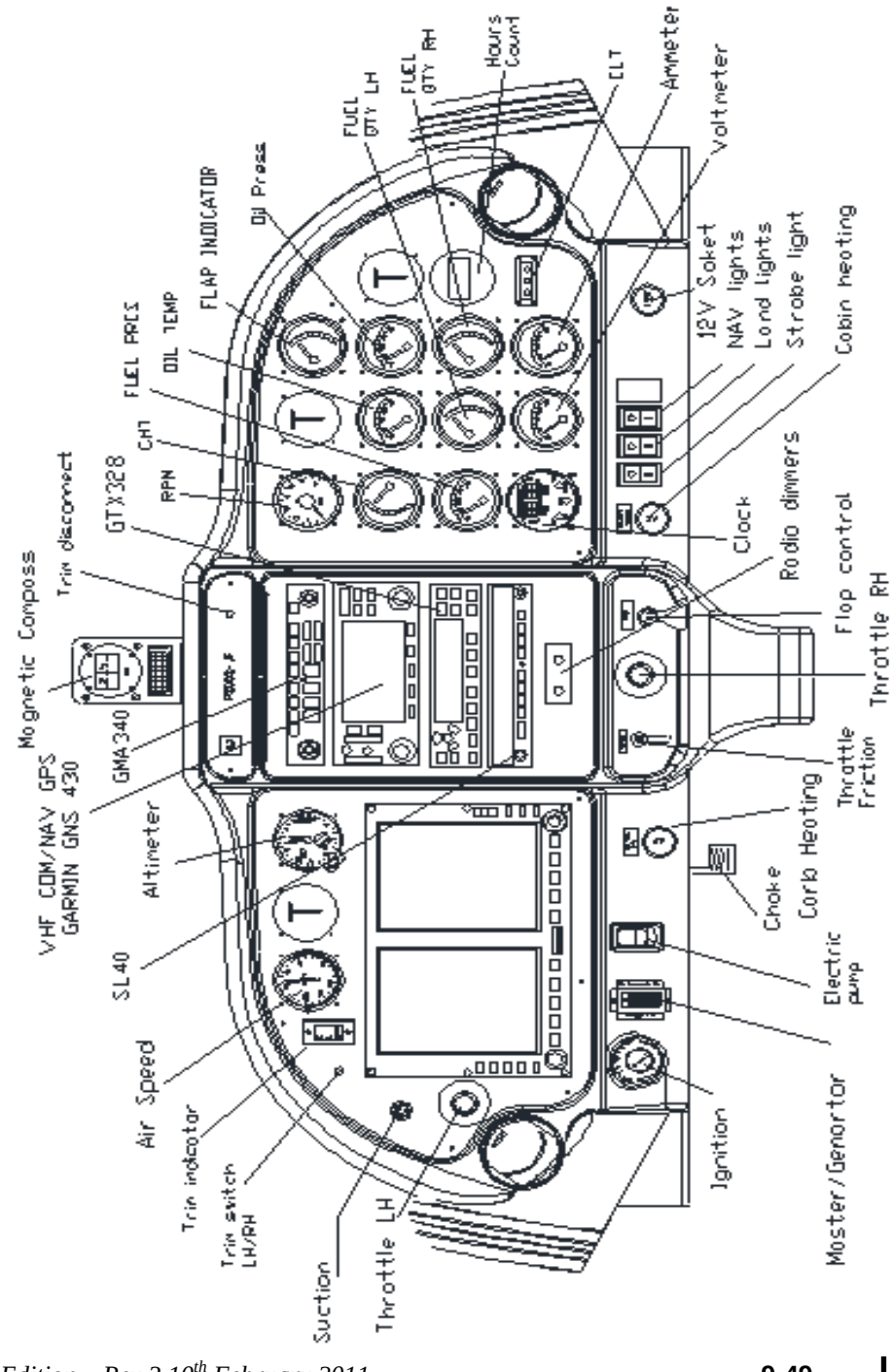
When the G500 is installed, also the design change 2002/026 “Optional External Generator” is applied to provide the necessary amount of current to the new electrical loads.

A dedicated breaker panel is therefore installed:



INSTRUMENTS PANEL

The instrument panel (typical layout) is shown on the following page.


Magnetic Compass
Trim disconnect
GTX328
RPM
CHT
FUEL PRES
OIL TEMP
FLAP INDICATOR
Oil Press
FUEL QTY LH
FUEL QTY RH
Hours Count
CLT
Ammeter
Voltmeter
12V Soket
NAV lights
Land lights
Strobe light
Cabin heating
Clock
Radio dimmers
Flap control
Throttle RH
Throttle Friction
Choke
Carb Heating
Electric pump
Ignition
Master/Generator
VHF COM/NAV GPS
GARMIN GNS 430
GMA340
Altimeter
SL40
Air Speed
Trim indicator
Trim switch LH/RH
Suction
Throttle LH

INTENTIONALLY LEFT BLANK

SUPPLEMENT N° 8

VFR NIGHT EQUIPMENT

INTRODUCTION

This AFM Supplement contains supplemental information to operate the airplane, in VFR Night conditions, in a safe and efficient manner.

In this case the airplane must embody both Design Change MOD 2002/050 "VFR Night" and Design Change MOD 2002/041 "Garmin G500 Avionics Display System".

Additionally, following equipment must be installed:

- Garmin GNS 430 (or 530) GPS/VHF COMM/NAV or Garmin SL30 VHF COMM/NAV
- Garmin SL40 VHF COMM/NAV
- Garmin GTX328 Mode S Transponder

8.1 GENERAL

In order to allow flight in VFR Night conditions, the airplane is fitted with additional equipment, namely:

- an airspeed indicating system connected to a heated Pitot tube
- an alternate static port
- two instruments lights fitted with dimmer device
- a dimmable annunciator panel
- a dome light
- a torch

8.2 LIMITATIONS

KINDS OF OPERATION

Following table contains the list of minimum equipment, in addition to those reported on Section 2 of the basic AFM, required on board to allow flight operations in VFR Night: flight in VFR Night is permitted only if the prescribed additional equipment is installed and operational.

2nd VHF COMM equipment
Pitot heating system
Instruments lights
Landing light
Strobe lights
ELT
Transponder
Torch
Dome light

Flight into expected and/or known icing conditions is prohibited.

NOTE

Additional equipments may be asked to fulfill national or specific requirements. It's a responsibility of the continued airworthiness manager to be compliant with these requirements.

LIMITATIONS PLACARDS

The following limitation placard is placed in clear pilot's view on the instruments panel:

THIS AEROPLANE IS CLASSIFIED AS A VERY LIGHT AEROPLANE APPROVED FOR DAY AND NIGHT VFR IN NON-ICING CONDITIONS. ALL AEROBATIC MANOEUVRES INCLUDING INTENTIONAL SPINNING ARE PROHIBITED. SEE FLIGHT MANUAL FOR OTHER LIMITATIONS

8.3 EMERGENCY PROCEDURES

GENERATOR WARNING LIGHT

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

Apply following procedure::

1	Generator switch and master switch	*OFF*
2	Generator switch and master switch	*ON*

If generator warning light ALT stays displayed

1	Generator switch	*OFF*
2	Non essential electric equipments	*OFF*
3	Strobe lights mode switch	*Set to EMER*
4	Radio calls	*reduce at the strictly necessary*
5	Five minutes before landing	*Pitot heat OFF*
6	Limit the *landing light* use	

NOTE

The battery is able to supply the electrical system for at least 30 minutes to complete flight in emergency conditions, with normal flight electric-loads including operation of flap and trim.

INSTRUMENTS LIGHTS FAILURE

In event of failures affecting the instruments lights, if required, apply following instructions:

	Dome light	*ON*

.

STATIC PORT FAILURE

In case of static port failure, the alternate static port in the cabin (pedestal, right side) must be activated.

In this case apply following procedure:

1.	Cabin ventilation	*OFF (hot and cold air)*
2.	Alternate static port	*OPEN*
3.	Continue the mission	

UNINTENTIONAL FLIGHT INTO ICING CONDITIONS

1.	Carburettor heating:	*ON*
2.	*Pitot heat:*	*ON*
3.	Get away from icing conditions by changing altitude or direction of flight in order to reach an area with warmer external temperature	
4.	Controls surfaces: continue to move to maintain their movability	
5.	Increase RPM to avoid ice formation on propeller blades.	
6.	Cabin heat:	*ON*

WARNING

In event of ice build-up in correspondence of wing leading edges, stall speed increases.

8.4 NORMAL OPERATION

PRE-FLIGHT INSPECTIONS

Before each flight, in addition to the inspections prescribed on Section 4 of the basic AFM, it is necessary to carry out following functional checks:

CABIN INSPECTION

MASTER SWITCH	*ON*
Torch	*TEST*
Instrument lights	*TEST*
Dome light	*TEST*
Pitot heating system	*Make sure plug is removed, set to ON, CHECK advisory light ON. After about 5 seconds, turn OFF Pitot heating system. Check Pitot if warm.*
Alternate static port	*CHECK closed*
Strobe lights mode switch	*NORM*
Strobe lights switch	*ON, check wing and vertical fin strobe lights ON*
Strobe lights mode switch	*EMER, check wing strobe lights OFF, check vertical fin strobe ON*
Strobe lights mode switch	*NORM*
Strobe lights switch	*OFF*
Landing light	*TEST*
MASTER SWITCH	*OFF*

8.5 PERFORMANCE

VFR Night equipment installation does not affect the aircraft performance.

8.6 WEIGHT AND BALANCE

For weight and balance, make reference to Section 6 of this Manual; additionally, the equipment list is so integrated:

EQUIPMENT LIST		A/C S/N	DATE:	
REF.	DESCRIPTION & P/N	INST	WEIGHT *kg*	DATUM *m*
	Instruments lights (two items) - each	*	0.1	1.55
	Alternate static port	*	0.03	1.55
	Pitot heated	*	0.3	1.73
	Dome light	*	0.1	2.70
	Landing light - AS GE 4509	*	0.5	0.2

8.7 SYSTEMS

VFR NIGHT EQUIPMENT

In order to allow flight in VFR Night conditions, the airplane is fitted with additional equipment, herein described.

Instruments lights

A couple of instrument lights (LED type) is connected to the main bus through a circuit breaker and installed in correspondence of fixed part of the canopy, one for each side. Fitted with flexible struts, they can be adapted to illuminate the instruments panel, as per pilot needs.

A dimmer device, located next to the annunciator panel, allows for regulating instruments lights brightness.

Dome light

In event of electrical failures, the dome light, installed on the cabin ceiling and directly connected to the battery through a circuit breaker, provides the pilot with an additional mean to illuminate the cabin and the instruments panel.

Torch

An emergency torch is provided in the cabin.

Annunciator panel

Instruments panel features an annunciator panel consisting of three lights, namely:

- ALT warning light: it indicates that the alternator is OFF or not working properly
- PITOT HEAT advisory light: it indicates that Pitot heating system is ON
- FUEL PUMP advisory light: it indicates that the electrical fuel pump is ON

The 'VFR day/night' switch allows for regulating annunciator panel brightness, depending upon light conditions; it is located next to the annunciator panel itself and it permits two brightness set-ups (day and night).

Strobe lights mode switch

Strobe lights (located on the wings and on the vertical fin) are activated by means of a switch located on the instruments panel, RH lower side.

The strobe lights mode switch, instead, allows for selecting two operational modes:

NORM: all strobe lights are ON
EMER: only the strobe light on the vertical fin is ON

The switch allows for reducing electrical loads in event of electrical system failures.

Landing light

Landing light is located under the engine nacelle, instead of the left wing leading edge, in order to prevent pilot blinding during night operations..

Pitot heating system

The airplane airspeed indicating system is connected to a heated Pitot tube; heating system is activated by means of a switch which activates the advisory light (PITOT HEAT) on the annunciator panel.

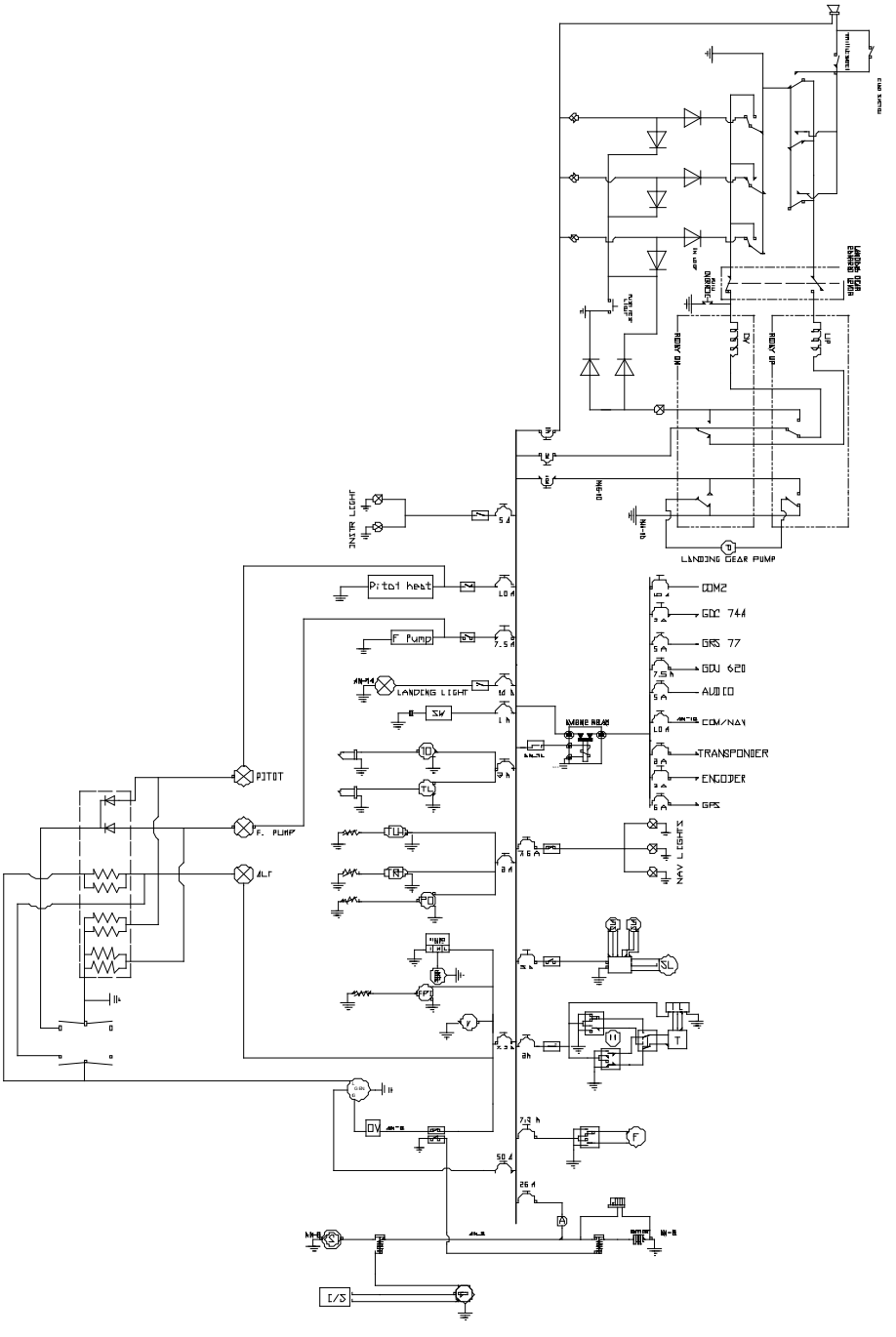
The advisory light informs the pilot that the system is activated but it does not indicate whether it works properly.

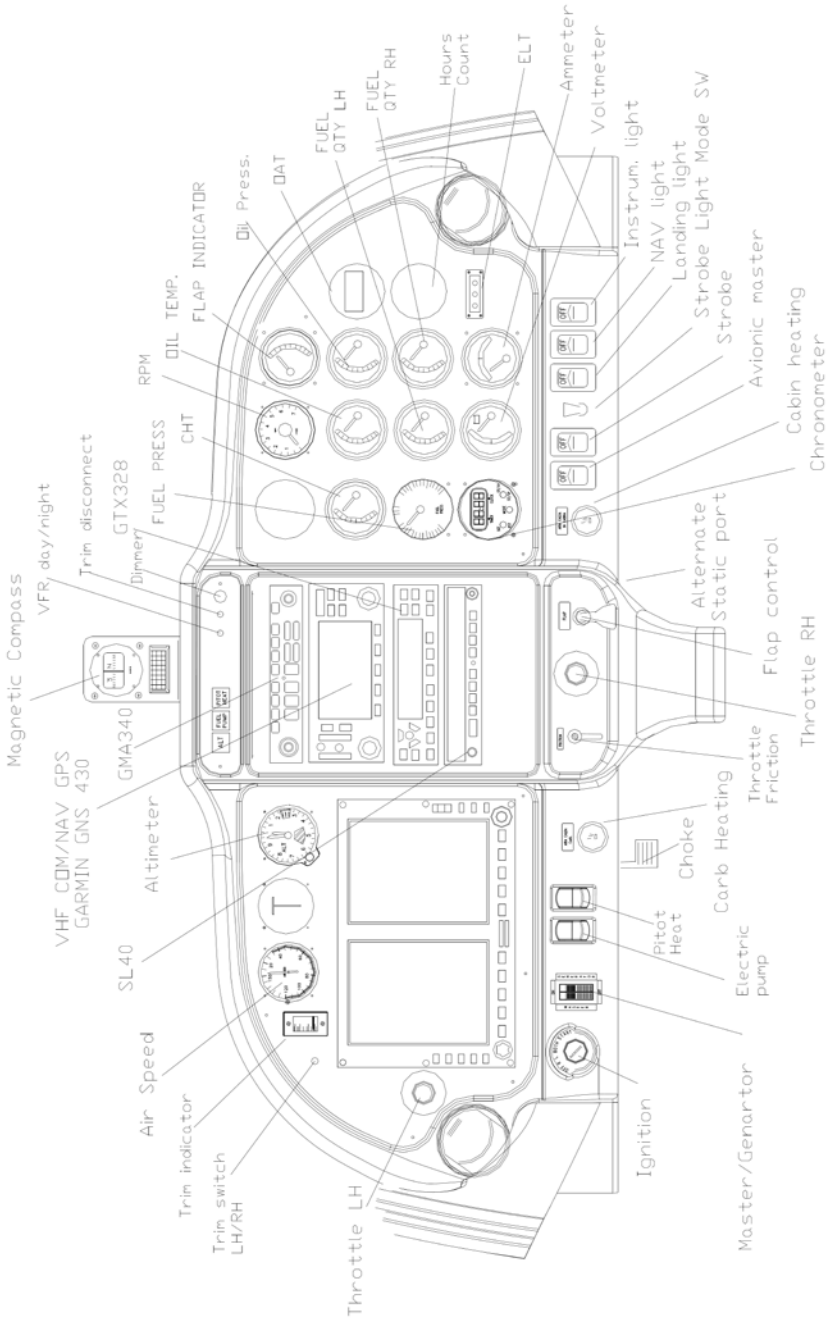
Alternate static port

The airplane is fitted with an alternate static port located in the cabin in correspondence of the pedestal, RH side. It is activated by means of a lever.

ELECTRICAL SYSTEM AND INSTRUMENTS PANEL

The drawings below show the electrical system schematic and the instruments panel (typical layout).


Pitot heat
F Pump
LANDING LIGHT
SW
PITOT
F. PUMP
ALT
COM2
GDC 74A
GRS 77
GDU 620
AUDIO
COM/NAV
TRANSPONDER
ENCODER
GPS
NAV LIGHTS
LANDING GEAR PUMP
INSTR LIGHT


Hours Count
ELT
Ammeter
Voltmeter
FUEL QTY RH
FUEL QTY LH
OAT
Oil Press.
FLAP INDICATOR
OIL TEMP.
RPM
CHT
FUEL PRESS
Instrum. light
NAV light
Landing light
Strobe Light Mode SW
Strobe
Avionic master
Cabin heating
Chronometer
GTX328
Dimmer
Trim disconnect
VFR day/night
Magnetic Compass
Alternate Static port
Flap control
Throttle RH
Throttle Friction
Carb Heating
Choke
Pitot Heat
Electric pump
Master/Genartor
Ignition
GMA340
VHF COM/NAV GPS GARMIN GNS 430
Altimeter
SL40
Air Speed
Trim indicator
Trim switch LH/RH
Throttle LH

INTENTIONALLY LEFT BLANK