QUALITY AIRCRAFT SINCE 1948
TECNAM

Pilot's Operating Handbook

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MANUFACTURER:

COSTRUZIONI AERONAUTICHE ***TECNAM*** *S.r.l.*
Via Maiorise - 81043 Capua (CE) - Italy

AIRCRAFT MODEL: ***Tecnam Astore***
ENGINE: ***ROTAX 912iS2***

SERIAL NUMBER: …….....….....

BUILD YEAR: …….....…….....

AIRPLANE REGISTRATION NUMBER: …….....……..

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

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, higher 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
0	-	First issue
01	10-13	LND light breaker rating typing error corrected to 3A

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List of effective pages

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

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

1st Edition, Rev 0 ..... Jan, 14th 2014
1st Edition, Rev 1 ..... Mar, 25th 2014

Section	Pages	Revision
Section 1	Pages 1 thru 23	Rev 0
Section 2	Pages 1 thru 7	Rev 0
Section 3	Pages 1 thru 21	Rev 0
Section 4	Pages 1 thru 19	Rev 0
Section 5	Pages 1 thru 15	Rev 0
Section 6	Pages 1 thru 15	Rev 0
Section 7	Pages 1 thru 9	Rev 0
Section 8	Pages 1 thru 11	Rev 0
Supplements [Section 9]		
Supplements LOEP: make reference to the Supplements Cover Pages		
Section 10	Pages 1 thru 16	Rev 1

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Sections List

According with the applicable ASTM, this manual is composed by the following sections:

Introduction

The Tecnam Astore is a low wing, two-place, single-engine airplane equipped with tricycle landing gear. It is made entirely in metal with fairings and upper radome in carbon/glass fibers with epoxy matrix. Astore is designed to be flown by sport pilot rated pilots as well as higher rated pilots (refer to the latest requirements in terms of licenses and medical clearance).

This aircraft is designed and built in Italy at Tecnam plant in Capua.

www.tecnam.com

This Flight Manual has been prepared in compliance with all the applicable ASTM standards to provide pilots and instructors with information for the safe and efficient operation of this aircraft.

Applicable standards

The following shows the standards used to design and build the aircraft. Also, the reference to the Continued Airworthiness standard used is shown.

Design and Performance	F2245-12d
Required Equipment	F2279-06
Quality Assurance	F2279-06
Production Acceptance Tests	F2279-06
Aircraft Operating Instructions	F2245-12d
Maintenance and Inspection Procedures	F2483-12
Identification and Recording of Major Repairs and Major Alterations	F2483-12
Continued Airworthiness	F2295-06
Required Product Information	F2745-11
Pilot's Operating Handbook (POH)	F2746-12
Airframe Emergency Parachutes*	F2316-12
Standard Practice for Design and Manufacture of Reciprocating Spark Ignition Engines for Light Sport Aircraft	F2339-06
Standard Specification for Design and Testing of Fixed-Pitch or Ground Adjustable Light Sport Aircraft Propellers	F2506-10

*If applicable, see related Supplement

New revision of each standard will be carefully evaluated by Tecnam and, for each case, they could result into the revision of internal reports (so no impact on the manuals revisions) and/or could result into a revision of this POH, AMM and other customer's owned manuals.

1. Section No. 1 - General Information

Thank you for being a new Tecnam Astore owner! Before your first flight with this aircraft you should carefully read this manual and be aware of all the aircraft aspects, including those regarding its correct maintenance.

Even if, in order to have a fast cross reference with the limitation placards, limitations are highlighted in this document, you should be aware that the correct use of this aircraft needs further information here following described:

NOTE

the complete kit of documentation of installed equipment will be supplied at date of delivery. The following information are essential to be updated constantly concerning new manual editions and continued airworthiness communications.

- The ENGINE manuals

These manuals are all available on FLYROTAX website in the technical support section. Tecnam strongly recommend to subscribe to the ROTAX mailing list in order to be always updated concerning the latest manuals editions/revisions, and also to be informed immediately when airworthiness affecting documents have been issued. Tecnam recommend to use the same e-mail address used to subscribe all the aircraft-related mailing lists.

The direct link to the ROTAX T-Publications page is:

http://www.flyrotax.com/customer-serviceImpressum/technical-publications.aspx

Note that all the ROTAX engines suitable for Tecnam Astore aircraft are compliant with the ASTM F2339-06.

- The avionics documentation

Some version of Tecnam Astore is equipped with avionics covered by respective manufacturer's documentation in terms of Operator's Manual. The brands have their own website section with all relevant manuals. Link to these sections are the following (other brands information, if applicable, are covered within the related Supplement):

Garmin	• Avionic suites (EFIS/EMS); • Autopilot; • Radio equipment; • Transponder; • Audio Panels; • GPS;	http://www.garmin.com/en-US/explore/intheair/
Dynon	• Avionic suites (EFIS/EMS); • Autopilot; • Engine Monitoring; • Radio equipment; • Transponder;	http://www.dynonavionics.com/index.html

- The propeller documentation

The Astore can be equipped with three types of propellers, two ground-adjustable and one wooden made-fabric covered (standard equipment). All of three are built in USA by Sensenich. Following the P/N and factory details to the web service page.

3B0R5R68C	Three blades - ground adjustable propeller with 68" diameter	http://www.sensenich.com/support/documents
2A0R5R70EN	Two blades - ground adjustable propeller with 70" diameter	
W68T2ET-70J	Two blades wood propeller with glass fiber wrap and 68" diameter	

- Tecnam Aircraft Continued Airworthiness instructions

These instructions need the registration to the mailing list Tecnam. Tecnam website is provided with a LOG IN section in which all the latest manuals revisions are available and so all the safety information, which are automatically sent also by e-mail. The following is the link to the NEW ACCOUNT registration page:

http://www.tecnam.com/Register-User.aspx

If you have already an user name and password, you can link directly to the LOGIN page to access the Manuals:

http://www.tecnam.com/Login.aspx

The links for the Tecnam support page and Service Bulletin page are following reported:

http://tecnam.com/Customer-Care/Support.aspx

http://tecnam.com/Customer-Care/Service-Bulletins.aspx

1.1. Airplane description

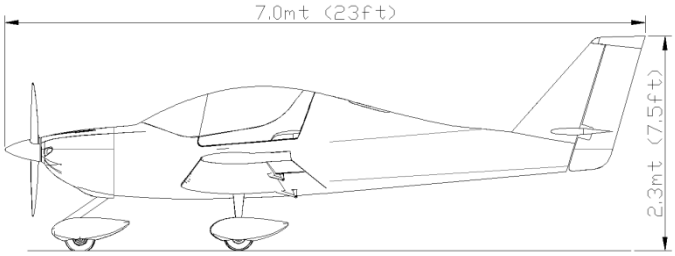
The Tecnam Astore is a low wing, two-place, single-engine airplane equipped with tricycle landing gear. It is made entirely in metal with fairings and upper radome in carbon/glass fiber with epoxy matrix. The main landing gear is made by a couple of 7075T6 light alloy springs which are hinged inside the fuselage in order to maximize the wheel deflection and energy absorption. The springs are supported by machined components which discharge the load directly on the wing carry through and rear bulkhead. Two rawhide liners are inserted between each spring-leaf and the external machined beam. Two bolts secure the individual spring-leaf to the edge of the beam via a light alloy clamp while a single bolt secures the inboard end of the leaf-spring to the hinge and inner machined beam. The nose gear is pivoting and the energy absorption is made via an oleo-pneumatic shock absorber. It is fitted directly on the first fuselage bulkhead.

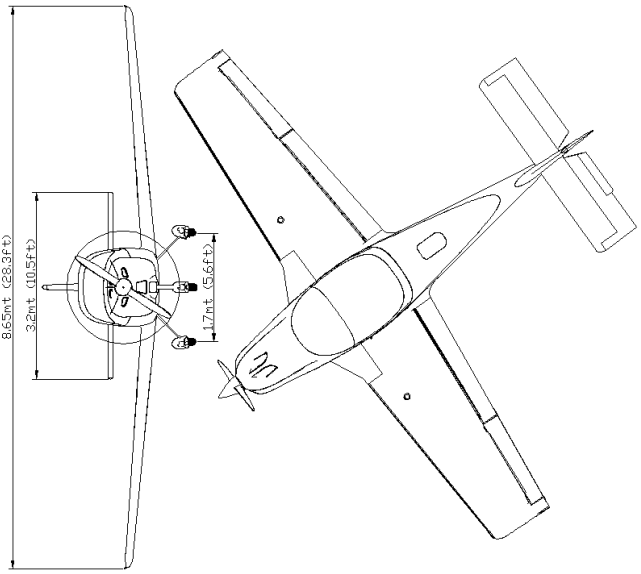
The horizontal tail is made by a stabilizer and elevator with tip balancing horns. All the control surfaces, except for the flaps and trim tab, are balanced.

In order to read more about the airframe and systems refer to the Section No.7.

1.2. Views and dimensions

Following the three views of the aircraft with most relevant dimensions.





1.3. Data and Characteristics

1.3.1. Dimensions and areas

Wing Span	28.4 ft	8.65 mt
Wing Area	131 ft^2	12.15 mt^2
Aspect Ratio	6.2	
Overall length	23.0 ft	7.0 mt
Overall width (cabin)	45.3 in	1.15 mt
Overall height	7.5 ft	2.3 mt
Stabilator span	10.5 ft	3.2 mt
Stabilator area	24.0 ft^2	2.23 mt^2
Vertical tail area	11.5 ft^2	1.07 mt^2
Wheel track	5.6 ft	1.7 mt
Wheel base	5.6 ft	1.7 mt
Main gear tire	5.00-5 Air Trac or Goodyear	
Nose Gear tire	5.00-5 Air Trac or Goodyear	
Wheels and brakes	Marc-Ingegno or Cleveland	

1.3.2. **Weights and capacities**

MTOW	1320 lb	599 kg
Ramp Weight	1324 lb	601 kg
Maximum allowed empty weight (100 hp Rotax 912iS2)	892 lb	405 kg
Maximum allowed empty weight (115 hp Rotax 914)	885 lb	402 kg
Maximum allowed baggage weight	77 lb	35 kg
Total usable fuel	2x14.4 US Gal	2x54.5 lt

1.3.3. **Performances**

Top speed (S.L. - IAS)	127kt	235km/h
Stall speed (S.L. - IAS) - clean	35kt	65km/h
Stall speed (S.L. - IAS) - T/O	34kt	63km/h
Stall speed (S.L. - IAS) - LDG	32kt	59km/h
Full fuel endurance (+30' res.) Engine rpm: 5.100 Cruise speed (TAS): 102kt Pressure Altitude: 6.000ft	7h:20'	
Rate of Climb (V_x - IAS)	57kt	106km/h
Rate of Climb (V_y - IAS)	69kt	128km/h

1.3.4. **Engine type**

This manual refer to the engine type ROTAX 912iS2, as per the cover page. Anyway, two alternative engines can be installed and their respective manuals managed via dedicated POH. The allowed engines are:

ROTAX	ROTAX	ROTAX
912ULS2*	912iS2**	914UL2

* basic aircraft configuration

** this POH equipment

1.3.5. **Propeller type**

This manual refer to the propeller type Sensenich W68T2ET-70J. Anyway, alternative propellers can be installed and their respective manuals managed via POH Supplements. Three alternative propellers will not need a POH Supplement as the resulting performances and weighing and balancing are negligible:

SENSENICH	SENSENICH	GT-Tonini
2A0R5R70EN	3B0R5R68C	GT-2/173/VRR-FW101
2 blades - ground adj	3 blades - ground adj	2 blades - fix pitch

1.3.6. **Fuel**

Following the list of approved fuel to be operated with Rotax 912ULS2, 912iS2 and 914UL2.

CAUTION

Refer and familiarize with the latest approved ROTAX manuals in order to have a continue check of approved fuels.

This list is based on ROTAX SI-912-016R6

	Usage / Description					
	912 A / F / UL Min. RON 90 (min. AKI* 87)		**912 S / ULS - 914 F / UL** Min. RON 95 (min. AKI 91)		**912 iSc / iS** Min. RON 95 (min. AKI 91)	
MOGAS						
European standard	EN 228 Normal					
	EN 228 Super		EN 228 Super		EN 228 Super	
	EN 228 Super plus		EN 228 Super plus		EN 228 Super plus	
Canadian standard	CAN/CGSB-3.5 Qualität 1		CAN/CGSB-3.5 Qualität 3			
Russian standard	R 51105-97	R 51866-2002	R 51105-97	R 51866-2002		
	Regular-91/92	Regular Euro-92				
	Premium-95	Premium Euro-95	Premium-95	Premium Euro-95		
	Super-98	Super Euro-98	Super-98	Super Euro-98		
US standard	ASTM D4814		ASTM D4814			
Ukrainian standard	DSTU 4839-2007		DSTU 4839-2007		DSTU 4839-2007	
	A-92-Euro					
	A-95-Euro		A-95-Euro		A-95-Euro	
	A-98-Euro		A-98-Euro		A-98-Euro	
AVGAS						
leaded	AVGAS 100 LL ASTM D910		AVGAS 100 LL ASTM D910		AVGAS 100 LL ASTM D910	
unleaded	UL91 ASTM D7547		UL91 ASTM D7547			
released brand-name [1)]						
	HJELMCO AVGAS 91/96 UL		HJELMCO AVGAS 91/96 UL			
	HJELMCO AVGAS 91/98 UL		HJELMCO AVGAS 91/98 UL			

06266

[1)] unleaded, mainly available in the Scandinavian area

* Anti-Knock Index, (RON+MON)/2

The Tecnam Astore is equipped with two leading edge tanks while the entire fuel line is located below the cabin floor.

Following the capacity of each tank is shown:

Total fuel capacity (both tanks):	29US Gal	(110lt)
Total Usable	28.8US Gal	(109lt)

1.3.7. **Oil**

The oil specification to be used on Rotax engines are within the latest applicable revisions of Operator's Manual.

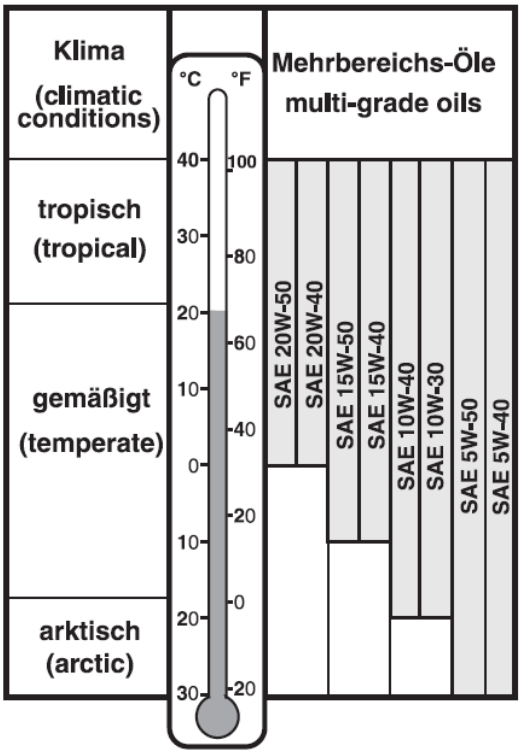
CAUTION

Refer and familiarize with the latest approved ROTAX manuals in order to have a continue check of approved fuels.

This list is based on ROTAX SI-912-016R6

The maximum oil consumption is 0.016USGal/hr 0.06l/hr while the table of allowed lubricants is following reported. This oil consumption is always enough to perform a maximum endurance flight as the difference between the maximum and minimum oil level, at maximum hourly consumption, will need 8.3 hours to be consumed.

The oil tank capacity is 0.8US Gal (3.0lt) without the oil line, so without radiator, engine and hoses.


Klima
(climatic conditions)
tropisch
(tropical)
gemäßigt
(temperate)
arktisch
(arctic)
°C
°F
40
30
20
10
0
10
20
30
100
80
60
40
20
0
20
Mehrbereichs-Öle
multi-grade oils
SAE 20W-50
SAE 20W-40
SAE 15W-50
SAE 15W-40
SAE 10W-40
SAE 10W-30
SAE 5W-50
SAE 5W-40

1.3.8. WARNING - CAUTION - NOTE

The following definitions apply to warnings, cautions and notes used in this Pilot's Operating Handbook

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

2. Section No. 2 - Limitations

2.1. Airspeed Indicator

The ASI (Air Speed Indicator) shows the airspeed in IAS (Indicated Air Speed). The correlation between the IAS and CAS (Calibrated Air Speed) is given in the Section 5 - Performances.

Following the table of ASI markings is shown.

Arc Color	Lwr Limit IAS	Upper Limit IAS	Remarks
White	V_{s0} = 32	V_{FE} = 68	Flap Operating Range
Green	V_{s1} = 35	V_{NO} = 115	Normal Operating Range
Yellow	V_{NO} = 115	V_{NE} = 150	Caution Range*
Red	V_{NE} = 150		Never Exceed Speed (red line)

*Speeds above V_{NO} and up to V_{NE} can be reached and flown only in calm and smooth air. Flights into gusts conditions above V_{NO} should be performed carefully.

Maneuvering Speed (V_A) is 97 KIAS

2.2. Stall Speeds

The following table shows the stalling speeds at MTOW. The three flap position are shown in the table. Approach to stall is executed with engine idle and speed decrease 1kt/sec while the CoG is in its full fwd position.

STALL SPEED TABLE							
Weight	Bank	Flaps 0°		Flaps T/O		Flaps LND	
[kg/lb]	[deg]	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
599/1320 [FWD CoG]	**0**	35	44	34	43	32	38
	15	36	46	35	44	32	39
	30	39	49	38	46	35	41
	45	45	54	44	51	40	46
	60	58	64	55	61	50	54

2.3. Ceiling

Maximum Service Ceiling is 15.500ft (residual rate of climb 100 ft/min).

2.4. Load Factors

Clean configuration positive/negative load factors: **+4 / -2**

T/O and LND flap load factors: **+2 / 0**

2.5. Approved maneuvers

This aircraft is intended for non-aerobatic and VFR operation only. Non-aerobatic operation includes:

- Any maneuver pertaining to "normal" flight
- Stalls (except whip stalls)
- Lazy eights
- Chandelles
- Turns with maximum angle of bank of 60°

WARNING

Max entry speed for all these maneuvers is the V_A

WARNING

Flight into expected and/or known icing conditions is **prohibited**
IFR flight is **prohibited**
Aerobatic flight is **prohibited**
Intentional spins **not allowed**

WARNING

Limit load factor could be exceeded by moving the flight controls abruptly to full control deflection at a speed above V_A (Maneuvering Speed)

2.6. Powerplant limitations

This section refers to the 912iS2 limitations and related markings. Refer to the dedicated POH if your aircraft is equipped with different engine (912ULS2 or 914UL2).

2.6.1. Power Output

	Max Power kW (hp)	Max rpm. rpm prop.(engine)	Time max. (min)
Max.	73.5 (100)	2388 (5800)	5
Max cont.	69.0 (92.0)	2265 (5500)	-

NOTE

Static engine rpm should be 5100 ± 250 under no wind conditions.

2.6.2. **Temperature/Pressure limits**

Following, with reference to the current version of ROTAX 912iS operator's manual, the table with the temperature and pressure limits.

ITEM	value	value	Remarks
Max. coolant temperature	120°C	248F	
Max. CHT	135°C	275F	
MIN oil temperature	50°C	120F	
MAX oil temperature	130°C	266F	
Normal oil temp. range	90-110°C	190-230F	
MIN oil pressure	0.8bar	12psi	Rpm < 3.500
Normal oil pressure range	2.0-5.0bar	29-73psi	Rpm > 3.500
MAX oil pressure	7.0bar	102psi	Short period at cold start
MIN temperature at start	-20°C	-13F	Oil temp.
MAX OAT at start	50°C	120F	On ground
MAX OAT at start	60°C	140F	In flight
MIN fuel pressure	2.80bar	42psi	
MAX fuel pressure	3.20bar	45psi	
MAX EGT	950°C	1740	
Acceleration	max -0.5g max 5sec.		

NOTE

Tecnam strongly recommend to be always updated concerning the latest manuals editions/revisions.

The direct link to the ROTAX T-Publications page is:

2.7. Weights

MTOW	1320 lb	599 kg
Ramp Weight	1324 lb	601 kg
Maximum allowed baggage weight	77 lb	35 kg

2.8. Center of Gravity

FWD Limit	19% MAC 1.86mt [73.3in]	All weights
AFT Limit	32% MAC 2.04mt [80.3in]	All weights
Datum	engine flange without spacer (See sect.6) or MAC leading edge (See sect.6)	
Level plane	Baggage compartment floor (both planes)	

2.9. **Pilot's seat**

The PIC (Pilot In Command) can seat either on Left or Right seat as all flight controls can be easily reached.

NOTE

If two pilots are flying together, the PIC is the pilot seating on the Left

NOTE

The flight instructor seats on the Right

3. Section No. 3 - Emergency Procedures

3.1. Introduction

This Section 3 includes checklists and procedures to be used in the event of emergencies. Emergencies caused by a malfunction of the aircraft or engine is 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 be familiar with the present manual and so with the present section. Further, a continued and appropriate training program should be provided to be always able to manage simulated emergencies.

In case of emergency the pilot should act as follows:

- Keep control of the airplane
- Analyze the situation
- Apply the pertinent procedure
- Inform the Air Traffic Control if time and conditions allow

AIRSPEEDS FOR EMERGENCY SITUATIONS - KIAS	
Engine failure after takeoff (T/O flaps)	**67** Knots
Engine failure during flight	**71** Knots
Maneuvering speed	**97** Knots
Maximum glide	**71** Knots

Standard safety equipment, even if not part of Minimum Equipment List, includes a **Fire Extinguisher** and **Hammer.**

3.2. Emergency frequencies and codes

First radio ALERT MESSAGE to the FREQUENCY in use

Radio EMERGENCY FREQ. = **121.50**Mhz

Transponder CODE = **7700**

NOTE

If your aircraft is equipped with ELT, refer to the related POH Supplement in the Section 9

3.3. Emergency Checklists

3.3.1. Engine fire DURING START

Throttle	IDLE
Fuel Pump 1 & 2	BOTH OFF
Fuel Valve	OFF
Cabin heat	OFF
Parking brake	APPLY
Master key	OFF
Fire extinguisher	IF POSSIBLE GRAB IT
Emergency EXIT	ESCAPE FROM THE A/C

3.3.2. Engine fire DURING TAKE OFF

Throttle	IDLE
Fuel Pump 1 & 2	BOTH OFF
Brakes	APPLY
when the aircraft is under control	
Fuel Valve	OFF
Cabin heat	OFF
Master key	OFF
Lane A & B	BOTH OFF
Parking brake	APPLY
Fire extinguisher	IF POSSIBLE GRAB IT
Emergency EXIT	ESCAPE FROM THE A/C

3.3.3. **Engine fire IN FLIGHT**

Throttle	IDLE
Fuel Pump 1 & 2	BOTH OFF
Cabin heat	OFF
Fuel Valve	OFF
Cabin vents	OPEN
communicate the emergency to the ATC	
Master key	OFF
Forced Landing	APPLY CHECKLIST

WARNING

Do not attempt an in-flight engine restart

3.3.4. **Cabin fire IN FLIGHT**

Cabin heat	OFF
Cabin vents	OPEN
communicate the emergency to the ATC	
Master key	OFF
Fire extinguisher	SPRAY TO THE FLAME BASE
Forced Landing	APPLY CHECKLIST

3.3.5. Engine failure DURING TAKE OFF

Throttle	IDLE
Brakes	APPLY
Fuel Pump 1 & 2	BOTH OFF
when the aircraft is under control	
Fuel Valve	OFF
Master key	OFF
Lane A & B	BOTH OFF
Parking brake	APPLY
Emergency EXIT	ESCAPE FROM THE A/C

3.3.6. Engine failure IMMEDIATELY AFTER TAKE OFF

Airspeed	67 KIAS
Throttle	IDLE
Fuel Pump 1 & 2	BOTH OFF
Fuel Valve	OFF
Flaps	LANDING
Landing area	NO MORE OF ±45° (LEFT OR RIGHT AHEAD)
Forced Landing	APPLY CHECKLIST
Just before touch down	
Canopy	UNLATCH CENTRAL*

3.3.7. **Engine failure IN FLIGHT (RESTART)**

Airspeed	71 KIAS
Throttle	~75%
Fuel Pump 1 & 2	BOTH ON
Fuel Valve	CHANGE TANK
Starter button	PUSH
If the engine does not restart	
Forced Landing	APPLY CHECKLIST

3.3.8. **POWER-OFF Forced landing**

Airspeed	71 KIAS
Throttle	IDLE
Fuel Pumps	BOTH OFF
Fuel Valve	OFF
Safety Belts	TIGHT
CANOPY LATCHES	UNLOCK LH & RH
Once a safe landing area has been located	
Communication with ATC	ESTABLISH
Flaps	AS NEEDED
Touchdown Speed	41 KIAS
Just immediately before touchdown	
CANOPY LATCHES	UNLOCK CENTRAL*

*The canopy has been designed in order to avoid hitting the passengers heads when opened. Before normal take-off, check if your and your passenger's heads are clear from the canopy track.

3.3.9. **POWER-ON Forced landing**

Airspeed	71 KIAS
Throttle	AS NEEDED
Safety Belts	TIGHT
CANOPY LATCHES	UNLOCK LH & RH
Once a safe landing area has been located	
Communication with ATC	ESTABLISH
Flaps	AS NEEDED
Touchdown Speed	41 KIAS
Just immediately before touchdown	
CANOPY LATCHES	UNLOCK CENTRAL*
after touchdown	
Throttle	IDLE
Fuel Pump 1 & 2	BOTH OFF
Fuel Valve	OFF
LANE A & B	BOTH OFF
Master key	OFF

3.3.10. **Engine OUT GLIDING**

Flaps	RETRACTED
Airspeed	71 KIAS
Engine RESTART	PERFORM
Glide ratio is 11.5 therefore with 1000 ft of altitude, it is possible to cover ~1.9 nautical miles in zero wind conditions	

3.3.11. **FLAT NLG TIRE landing**

Pre-landing checklist	COMPLETE
Once landed maintain aircraft NOSE HIGH attitude as long as possible	

3.3.12. **FLAT MLG TIRE landing**

Pre-landing checklist	COMPLETE
Align the a/c on the opposite side of runway in respect of the defective tire side to compensate for change in direction, which is to be expected during final rolling. Touchdown with the GOOD TIRE FIRST and hold aircraft with the flat tire off the ground as long as possible unless crosswind component does not avoid this	

3.3.13. **Inadvertent SPIN**

NOTE

The first letter in each of the four primary recovery inputs spells out the acronym, **PARE**. The **PARE** format mimics the most docile spin configuration possible, affording the greatest response to recovery inputs. Errant control inputs that may aggravate the spin are avoided in the process. As a mental checklist, it forces you to focus on the appropriate recovery actions. Calling each item out loud also tends to reinforce the physical inputs.

Power	IDLE
Ailerons	NEUTRAL
Rudder	FULL OPPOSITE ROTAT.
Elevator	THROUGH NEUTRAL
HOLD THESE INPUTS UNTIL ROTATION STOPS THEN	
Rudder	NEUTRAL
Elevator	RECOVER

3.3.14. **Inadvertent ICING encounter**

WARNING

Immediately get away from icing conditions considering a suitable path to return to the last non-icing area (in some cases could be a climb with full throttle).

Pitot Heat (if present)	ON
Throttle	INCREASE
Cabin heat	ON
Landing	PERFORM with FLAPS 0°
Approach and touch down	INCREASED AIRSPEED NECESSARY

CAUTION

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

WARNING

If your Astore is not equipped with heated pitot and ASI fails, you can carefully use the Ground Speed indication from the GPS in order to have further information on your actual speed. Try to compare the GS with the wind speed asking ATC or finding some chimney.

3.3.15. **912 iS ECU system failures**

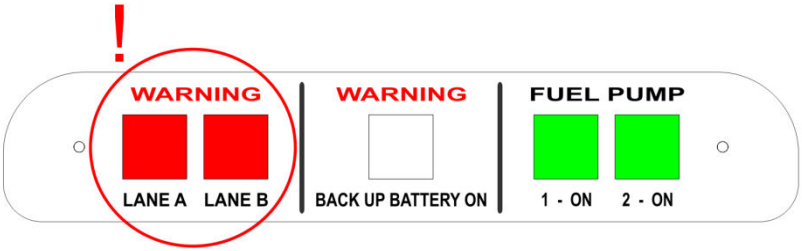
Some of the failures can be detected by the annunciator panel's lights on the cockpit centerline - upper position. The panel is composed by 5 lamps:

LANE A/B: they illuminate during the pre-start check and when some problem occurs. They can flash or be permanently ON in case of some failure;

BACK UP BATTERY ON: it illuminates when the related guarded switch is in ON position (check EMS GENERATOR FAILURE procedure);

FUEL PUMP: they illuminate when the related fuel pump is drawing current (is functioning);

3.3.15.1. *LANES light failures*



If:
One lamp is ON, the other is OFF
One lamp is ON, the other is FLASHING
Both lamps are ON
Both lamps are FLASHING
LAND AS SOON AS POSSIBLE

If one lamp is flashing while the other is OFF the flight operations are limited for maximum 10 hours.

LANE A	LANE B	Action
OFF	Flashing	Limited flight operation
Flashing	OFF	Limited flight operation
OFF	ON	Land the aircraft
Flashing	Flashing	Land the aircraft
Flashing	ON	Land the aircraft
ON	OFF	Land the aircraft
ON	Flashing	Land the aircraft
ON	ON	Land the aircraft

ON = permanently on

3.3.15.2. *Engine vibrations*

If:
High level of vibration are encountered
(likely) Vibration are coupled with power loss
FLIGHT LIMITATIONS ARE FORBIDDEN **MAINTENANCE CHECK MUST BE PERFORMED**

3.3.15.3. *EMS generator failure*

If the A alternator (TO BE NOT CONFUSED WITH "A" LANE) stops its function or has a failure, the EMS switches automatically on alternator "B" in order to ensure the correct engine functions.

WARNING

Following this automatic switching, the aircraft battery is not more charged. Shut down everything not strictly needed to continue the flight.

In the extremely rare event that both alternators fail, the engine stops. In this case the back-up battery switch can be activated: from this moment the engine is functioning only on the aircraft battery limiting the engine operation to few minutes if an external generator is not installed. For this reason avoid to keep turned ON any non necessary avionic and/or system.

The back up battery lamp means that the related switch is into ON position.

3.3.15.4. *Exceeding coolant temp.*

Throttle	DECREASE
Land as soon as pratical	

NOTE

Register the event in the engine logbook indicating duration and pressure reached. Carry out unscheduled maintenance check according to the ROTAX AMM. Check the ECU log file.

3.3.15.5. *Exceeding oil temp.*

Throttle	DECREASE
Airspeed	DECREASE
If possible perform a climb in order to allow oil temperature to increase and consequently oil press decrease	
Oil temp	CHECK if DECREASES
Land as soon as pratical	

NOTE

Register the event in the engine logbook indicating duration and pressure reached. Carry out unscheduled maintenance check according to the ROTAX AMM. Check the ECU log file.

3.3.15.6. *Loss of oil press. - in flight*

Throttle	AS MIN. AS POSSIBLE
Land as soon as pratical	

NOTE

Check oil system and register the event in the engine logbook indicating duration and pressure reached. Carry out unscheduled maintenance check according to the ROTAX AMM. Check the ECU log file.

3.3.15.7. *Loss of oil press. - on ground*

Throttle	IDLE
Fuel Pump 1 & 2	BOTH OFF
Lane A & B	BOTH OFF
Master key	OFF
Fuel Valve	OFF
Parking Brake	APPLY

NOTE

Check oil quantity in the tank, Check the oil quality. Register the event in the engine logbook indicating duration and pressure reached. Carry out unscheduled maintenance check according to the ROTAX AMM. Check the ECU log file

3.3.15.8. ***Exceeding fuel pressure***

Throttle	AS MIN. AS POSSIBLE
If Fuel Press is too high	FUEL PUMP 2 OFF
If Fuel Press is too low and fuel pump 2 is OFF	FUEL PUMP 2 ON
Land as soon as possible	
Lane A & B	BOTH OFF

NOTE

Register the event in the engine logbook indicating duration and pressure reached. Carry out unscheduled maintenance check according to the ROTAX AMM. Check the ECU log file

3.3.15.9. *EMS voltage low*

Flight Operation	TO BE LIMITED if A or B Voltage is OK
Land as soon as possible	
Throttle	AS MIN. AS POSSIBLE
Land as soon as possible	

NOTE

Register the event in the engine logbook. Carry out unscheduled maintenance check according to the ROTAX AMM.

Check the ECU log file

3.3.15.10. *Sprag clutch dec. failure*

Engine	IMMEDIATELY SHUT DOWN
Throttle	IDLE
Lane A & B	BOTH OFF
Master key	OFF

NOTE

Register the event in the engine logbook. Carry out unscheduled maintenance check according to the ROTAX AMM.

Check the ECU log file

3.3.16. **Loss of TRIM control**

In the event of (PITCH) TRIM control loss, the pilot should be always able to control the aircraft until the landing. Depending on the last position assumed by the trim tab (shown inside the EMS display), the required action may be different:

3.3.16.1. ***NEUTRAL TRIM***

In this case, the aircraft is basically able to continue the flight in all the configurations of speed and flap. No action or special procedure is necessary.

3.3.16.2. ***NOSE UP RANGE TRIM***

Having the trim tab unserviceable with the "locked" position within the pitch up range means that the pilot should reduce the speed and actuate the flap in order to increase the comfort.

Pitch trim LOCK in nose up area	RECOGNIZED
Speed	REDUCE as necessary to maximize comfort
Flap	ACTUATE as necessary to maximize comfort
Land as soon as practical	

3.3.16.3. *NOSE DW RANGE TRIM*

Having the trim tab unserviceable with the "locked" position within the pitch dw range means that the pilot should retract flaps and increase speed. If sufficient runway is available, a flap extension not to FULL position is preferable.

Pitch trim LOCK in nose dw area	RECOGNIZED
Flap	RETRACT
Speed	INCREASE as necessary to maximize comfort
Land as soon as practical with flaps in the most convenient position	

3.3.17. **Loss of ALTITUDE indication**

TECNAM Astore, in the configuration shown in this manual, is allowed to fly only in VMC conditions. For this reason, the loss of altitude indication shall not have hazardous effects on the flight.

Last altitude	CHECK with ATC
Communicate the failure to the ATC and provide the FL from XTR (if installed)	
Alternative source of alt	Use the GPS*
Land as soon as practical	

*This GPS value does not correspond with the barometric one and is evaluated from satellite triangulation.

3.3.1. **Loss of AIRSPEED indication**

TECNAM Astore, in the configuration shown in this manual, is allowed to fly only in VMC conditions. Despite that, the loss of airspeed indication could have hazardous effects on the safety of flight, especially during the landing and low speed procedures. Tecnam suggests to train about the stall path response of the aircraft in order to have them always easily recognizable. Also, Tecnam provides as standard equipment an iPad with GPS functions. This could help in knowing the speed range always in consideration that the speed will be referenced to the ground.

Communicate the failure to the ATC and ask for chase plane availability or latest wind information on runway	
Autopilot (if installed)	OFF
Alternative source of speed	Use the GPS*
Speed corrections	Use the GPS with ATC wind data provided
Speeds	Try to have a positive margin on the speeds
Land as soon as practical	

*This GPS value correspond with Ground Speed, and does not take into account the wind direction and speed.

4. Section No. 4 - Normal Procedures

4.1. Introduction

This section provides checklists and procedures for all the normal operations referred to the TECNAM Astore equipped as per this POH Cover page. For different equipments, please refer to the related Supplement.

4.2. Upper cowling opening

In order to perform the engine daily inspections, the upper cowling is provided by two big gull-wing access doors secured by two cam-loc each. In order to open the upper cowling following is the procedure to be used.

Parking brake	ON
Master key	OFF
Cam-locs	UNLOCK (1/4 turn)
Engine cowling doors	OPEN

4.1. Upper cowling securing

Engine cowling doors	CLOSED
Cam-locs	LOCK (1/4 turn)*

***WARNING**

Butterfly or slot-head Cam-locks are locked when tabs (or slot) are horizontal and open when tabs (or slots) are vertical.

4.2. Pre-Flight Inspections

Before each flight, it is necessary to carry out a complete inspection of the aircraft starting with a cabin inspection followed by an external and engine inspection.

4.2.1. Cabin Inspection

POH	ONBOARD
Weight and balance	CHECK
Flight controls	CHECK FREEDOM
Baggage (if any)	FASTEN
Parking brake	SET
Friction lock	CHECK
Throttle	IDLE
Master key	ON
Flap travel	PERFORM FULL
Trim travel	PERFORM FULL
Stall warning (if present)	CHECK
NAV Lights	CHECK
Strobe Lights	CHECK
Landing Light	CHECK
Fuel tank level indication (inside EMS)	CHECK
Master key	OFF

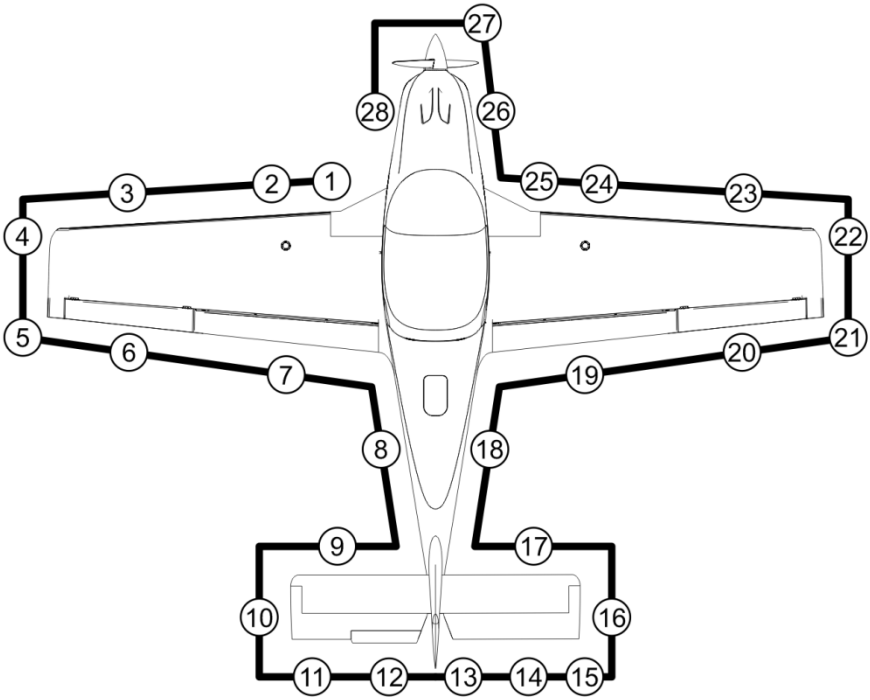
CAUTION

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

4.2.2. **External inspections - Walk-around**

External visual inspection (generally called "check") means that an inspection for any defect, crack, detachments, free play and unsafe or improper installation must be performed. For all the control surfaces visual inspection also involves check for freedom of movement, travel stops and safety of each pin or bolt.

The next image shows the walk around inspections to be carried out before each flight. Each number corresponds to one or more controls to be performed.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1	i. LH wing leading edge ii. LH cabin skin iii. LH main gear fairing iv. LH main gear brake and hose fitting v. LH main gear spring vi. LH tire	Check Check Check Check Check Check inflation if necessary (40psi)
2	i. LH Fuel filler cap ii. LH Inboard leading edge iii. LH Main spar iv. LH tank drain	Visual fuel level check Check Check rivets Perform drainage
3	i. LH Outboard leading edge ii. LH Main spar iii. Pitot/static tube iv. Pitot/static tube	Check Check rivets Remove cover Check Unobstructed
4	i. LH wing tip ii. LH nav/strobe lights	Check Check
5	i. LH Fuel vent	Check Unobstructed
6	i. LH aileron ii. LH rear spar - outboard	Check Check rivets
7	i. LH Flap ii. LH rear spar - inboard	Check Check rivets
8	i. Baggage door ii. Tailcone structure iii. Parachute cover iv. Inspection panel v. Ext. PWR recept. (if any)	Check Check Check Check Check CLOSED

9	i. ii. iii.	LH Stabilizer fittings LH stabilizer leading edge LH stabilizer structure	Check Check Check
10	i. ii. iii.	LH elevator tip LH elevator outboard hinge LH elev. trailing edge	Check Check Check
11	i. ii.	LH elevator central hinge LH elevator travel stops	Check Check
12	i. ii. iii. iv. v.	trim tab - gen. conditions trim tab hinge trim tab control plate trim tab control rod trim tab actuator cover plate	Check Check Check Check Check
13	i. ii. iii. iv. v. vi.	RH elevator central hinge Stabilizer rear spar fittings Rudder - gen. conditions Rudder hinges Rudder fairings Rudder control cables	Check Check rivets Check Check Check Check
14 15 16	i. ii. iii.	RH elevator tip RH elevator outboard hinge RH elev. trailing edge	Check Check Check
17	i. ii. iii.	RH Stabilizer fittings RH stabilizer leading edge RH stabilizer structure	Check Check Check
18	i.	Tailcone structure	Check
19	i.	RH Flap	Check

	ii.	RH rear spar - inboard	Check rivets
20	i. ii.	RH aileron RH rear spar - outboard	Check Check rivets
21	i.	RH Fuel vent	Check Unobstructed
22	i. ii.	RH wing tip RH nav/strobe lights	Check Check
23	i. ii.	RH Outboard leading edge RH Main spar	Check Check rivets
24	v. vi. vii. viii.	RH Fuel filler cap RH Inboard leading edge RH Main spar RH tank drain	Check Check Check rivets Perform drainage
25	vii. viii. ix. x. xi. xii. xiii.	RH wing leading edge RH cabin skin RH main gear fairing RH main gear brake and hose fitting RH main gear spring Quick drain check RH tire	Check Check Check Check for leaks Check Drain and check for water Check inflation if necessary (40psi)
26	i. ii. iii. iv. v. vi.	Nose gear strut Nose gear fairing Nose gear proper friction Nose gear wheel and tire Nose gear assembly Lower engine cowling fit-	Check for leaks Check Check force* Check inflation if necessary (32psi) Check Check

		ting vii. Lower cowling leaks	Check for leaks
27	i. ii.	Propeller and spinner Radiators (oil and water)	Check (see pag.1-13) Check for leaks
28	i. ii.	Upper cowling fittings Upper cowling structure	Check Check

*The force needed to rotate it when off from the ground must be 5 to 6kg (11 to 13lb) if pulled on the wheel axle direction.

intentionally left in blank

4.2.3. **External inspections - Engine**

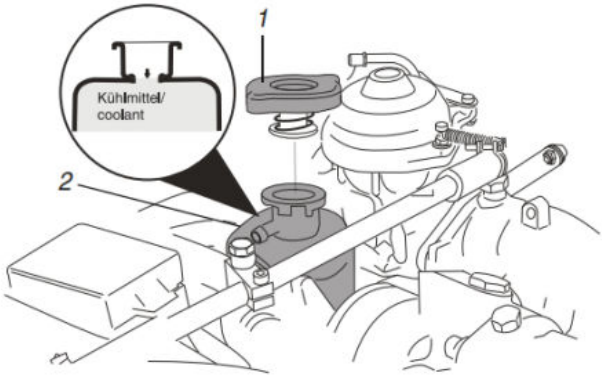
These checklists include the necessary inspections of the engine compartment. It is extremely important that everything recognized as unusual is deeply investigated before going in flight. What possible on ground will be no more in the air!

1	Open both LH and RH engine inspection doors		
WARNING Be sure that Master key, LANES and PUMPS are ALL OFF			
2	i. ii. iii.	General inspection Foreign objects Upper and lower cowlings	Perform Absent Check absence of any leak
3	i. ii. iii. iv.	Coolant radiator conditions Coolant hoses fittings and status Coolant reservoir (overflow) Coolant expansion tank	Check (also fittings) Check Check level* Check level**
4	i. ii. iii. iv. v. vi.	Propeller hand turn Oil tank cap Prop. hand turn (C.Clockw.) Oil tank level Oil radiator conditions Oil hoses fittings and status	Check compression Remove Rotate until oil breaths Check (replenish if necess.) Check (also fittings) Check
5	i. ii. iii. iv. v.	Fuel filter and fittings Throttle valve Fuse box conditions Drain hoses Air filter and probe	Check Check grease and freedom Check Check Check for secure fastening

6	i. Exhaust system ii. Exhaust springs iii. Muffler conditions iv. Heat exchanger	Check Check Check Check
7	i. Engine cowling electrical system ii. Air hoses and filter iii. Firewall components iv. Battery conditions	Check Check Check Check
8	i. Fuel hoses and fittings ii. Engine sensors & wiring	Check Check also for thermal damages
9	Close and secure both LH and RH engine inspection doors	

*Should be between MIN and MAX marks

**Open the expansion tank level only at first day inspection, with the engine cold. The tank level should be at least 2/3



4.3. CHECKLISTS

4.3.1. Before Engine Start

1	Seat position and belts	ADJUST (**WARNING***)
2	Flight controls	CHECK FREEDOM
3	Parking brake	ENGAGE
4	Throttle friction	ADJUST
5	Circuit breakers	CHECK ALL IN
6	Master key	ON
7	EMS switch	ON
8	Fuel Pump 1	ON
9	Start Power Switch	HOLD ON
10	Fuel Pump 1	Check run and green lamp ON
11	Start Power Switch	RELEASE
12	Fuel Pump 1	OFF
REPEAT THE PROCEDURE 8 TO 12 FOR FUEL PUMP 2		
13	Flap control	CHECK FULL TRAVEL
14	Flap control	SET TO T/O
15	Elevator trim	CHECK FULL TRAVEL
16	Elevator trim	SET ON THE NEUTRAL
17	Canopy (three locks)	CLOSE AND LOCK

18	Safety belts	FASTEN
19	Passenger's safety belts	FASTEN EVEN IF SOLO
20	Avionics switch	ON

***WARNING**

In-flight seat release can cause the loss of airplane control. Check that occupied seats are positively locked

4.3.2. **Engine Start**

1	Throttle	IDLE
2	Fuel selector	SELECT TANK
3	Master key	ON
4	Strobe lights	ON
5	EFIS/EMS	ON (wait complete software loading)
6	Propeller disc and area	CLEAR
7	LANE A & B	BOTH ON
8	Fuel Pump 1 & 2	BOTH ON
9	Start Power Switch	KEEP ON in this box
10	LANE A & B Lamps	Wait functional CHECK
11	Fuel Pump 1 & 2	Both lamps ON & noise
12	Prop area	CLEAR
13	Starter button	PUSH
14	rpm	2.000 - 2.400
15	LANE A & B Volt	At least 13V
16	Battery Volt	At least 13V
17	Start Power Switch	RELEASE
18	Oil pressure	CHECK in range within 10sec.
19	Fuel Pump 1	OFF and check n.2 works

20	Fuel Pump 1	ON
21	Fuel Pump 2	OFF and check n.1 works
22	Fuel Pump 2	ON
23	LANE A & B Lamps	CHECK BOTH OFF
24	Engine Parameters	Within Limits

WARNING

If oil pressure doesn't rise within 10 seconds, shut down engine.
The maximum oil pressure for cold conditions is 7 bar.

4.3.3. **Before TAXIING**

1	Altimeter	SET
2	Parking brake	OFF
3	Radio and Avionics (if any)	ON & SET

4.3.4. **TAXIING**

1	Toe brakes	CHECK functionality
2	Throttle	CHECK proper response
3	Main gear springs	CHECK proper response
4	Nose gear damping	CHECK proper response

4.3.5. **Before TAKEOFF**

1	Oil temperature	50-130°C	120-266F
2	Oil pressure	2.0-5.0bar	29-73psi
3	Fuel pressure	2.8-3.2bar	42-45psi
4	Max CHT	135°C	275F
5	Fuel valve	SELECT TANK	
6	Battery Charge	CHECK and AMPS > 0	
7	LANE A & B	CHECK > 13V	
8	Throttle	SET 4.000 engine rpm	
9	LANE A Switch	OFF	
10	Rpm loss	Max 180	
11	LANE A Switch	ON	
12	LANE B Switch	OFF	
13	Rpm loss	Max 180	
14	LANE B Switch	ON	
15	Throttle	3.000 rpm	
16	Fuel Valve	SELECT fullest tank	
17	Flap	SET T/O	
18	Elevator Trim	CHECK to NEUTRAL pos.	
19	Flight controls	CHECK FREEDOM	
20	Safety belts	CHECK FASTENED	
21	Canopy locks	CHECK	
22	Avionics (radio & xtr) if inst.	ON & SET	

4.3.6. **TAKEOFF and CLIMB**

1	Parking brake	OFF
2	Runway	ALIGN
3	Toe Brakes	ACTIVATE
4	NAV & Landing Lights (if inst.)	ON
5	Throttle	FULL (~5.100rpm)
6	Engine parameters	CHECK WITHIN LIMITS
7	Toe Brakes	RELEASE
8	Rotation speed	V_R = 39KIAS
9	Climb	ESTABLISH
10	T/O FLAPS V_x = 51KIAS CLEAN V_x = 57KIAS T/O FLAPS V_y = 62KIAS CLEAN V_y = 69KIAS	
11	Fuel pressure	CHECK (min 2.8bar/40psi)
12	Throttle	REDUCE TO 5.500rpm

4.3.7. **CRUISE**

1	Throttle*	BELOW 5.500rpm	
2	Oil temperature (NORMAL)	90-110°C	194-230F
3	Oil pressure	2.0-5.0bar	29-73psi
4	Fuel pressure	2.8-3.2bar	40-42psi
5	Max CHT	135°C	275F
6	Fuel level	MONITOR	

*Cruise settings are shown in Section 5 - Performances

4.3.8. **Before LANDING**

1	Fuel valve	SELECT FULLEST TANK
2	Landing light	ON
3	Flaps (on downwind leg)	T/O
4	Downwind speed	65KIAS
5	Base leg speed	60KIAS
6	Flaps (on final)	LAND
7	Final speed	55KIAS
8	Touchdown speed	41KIAS
9	Brakes	AS NECESSARY

4.3.9. **BALKED LANDING**

1	Throttle	FULL
2	Speed	55KIAS (flaps T/O)
3	Flaps	RETRACT
4	Speed	68KIAS (flaps RETR.)

4.3.10. **AFTER LANDING**

1	Flaps	RETRACT
2	Landing light	OFF

4.3.11. **Engine SHUT DOWN**

1	Parking brake	ENGAGE
2	Throttle	SET 2.400-3.000 for 1 min.
3	Fuel Pump 1 & 2	BOTH OFF
4	Lane B	OFF
5	Lane A	OFF
6	Nav. Lights	OFF
7	Strobe Lights	OFF
8	Avionics switch	OFF
9	EFIS/EMS switch	OFF
10	Fuel valve	OFF
11	Master key	OFF & REMOVE

4.3.12. **Post-Flight CHECKS**

1	Flight controls	LOCK using safety belts
2	Canopy	CLOSED and LOCKED
3	Wheel chocks and tie-down	ARRANGE (See Sect. No.8)
4	Parking brake	IF NECESSARY
5	Pitot cover	PLACE ON
6	Canopy cover	IF NECESSARY*

*When the a/c is parked outside, or if the a/c will not be used for days, it is strongly recommended to use the fuselage cover to protect wind-shields against dust

NOTE

always perform a last walk-around in order to check if something is missing such as lights or other

5. Section No. 5 - Performances

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

- "Flight test data" with conditions as prescribed by ASTM and bilateral agreements
- Aircraft and engine in good condition
- Average piloting techniques

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

- Airspeed
- External temperature
- Altitude
- Weight
- Type and condition of runway

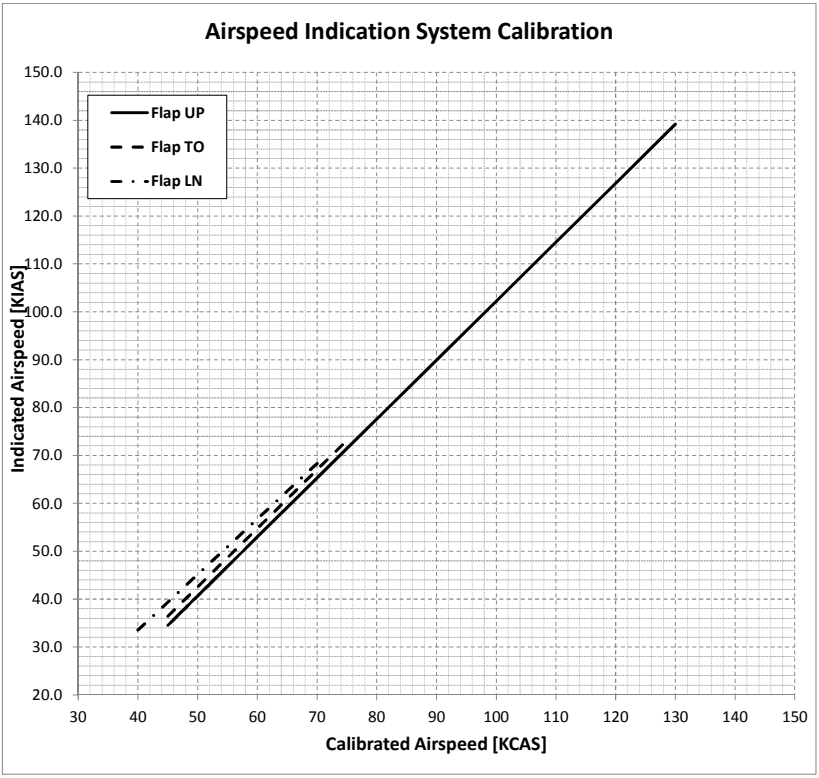
5.1. Use of Performance Charts

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.

5.2. Airspeed Indicator System Calibration

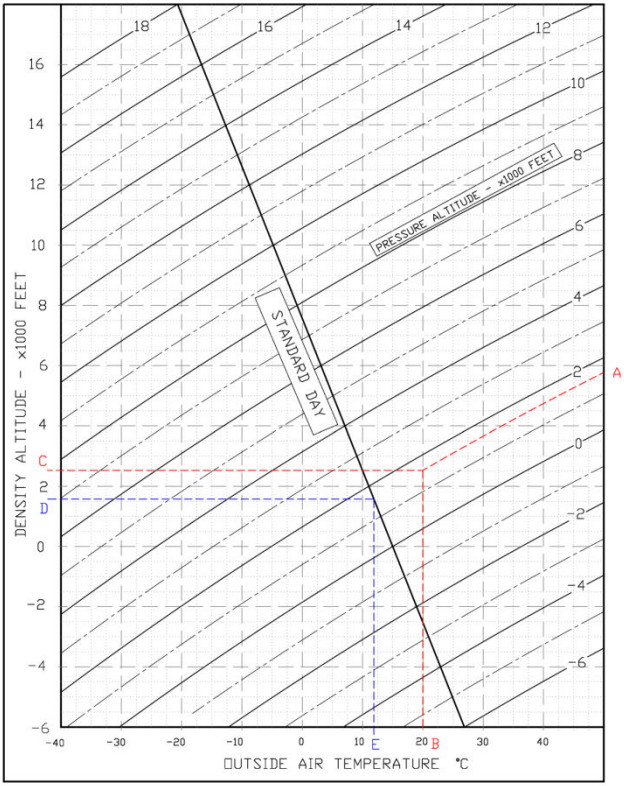
Graph shows indicated airspeed V_{IAS} as a function of calibrated airspeed V_{CAS}



Example:

Given	***Find***
KIAS *80.1* *Flap: UP*	KCAS *82.0*

5.3. ICAO Standard Atmosphere



Examples:

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

5.4. Stall Speed

Weight: *599kg /1320lb*
Throttle Levers: *IDLE*
CG: *Most Forward (19%)*
No ground effect

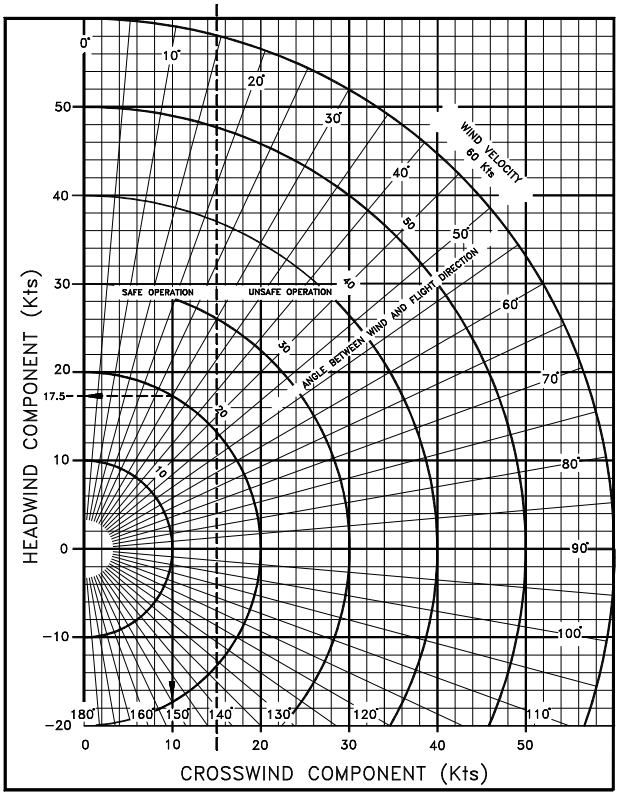
WEIGHT	BANK ANGLE	STALL SPEED					
		FLAPS 0°		FLAPS T/O		FLAPS FULL	
[kg/lb]	*[deg]*	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
599/1320 *(FWD C.G.)*	**0**	35	44	34	43	32	38
	15	36	46	35	44	32	39
	30	39	49	38	46	35	41
	45	45	54	44	51	40	46
	60	58	64	55	61	50	54

NOTE

Altitude loss during conventional stall recovery, as demonstrated during flight tests is approximately 200 ft with banking below 30°.

5.5. **Crosswind**

Maximum demonstrated crosswind is 20 Kts



Given

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

Wind speed = 20 Kts

Find

Headwind = 17.5 Ktss

Crosswind = 10 Kts

5.6. Takeoff distances

Weight = *599kg/1320lb*
Flaps: *T/O*
Speed at Lift-Off = *39 KIAS*
Speed Over *50ft* Obstacle = *50 KIAS*
Throttle Levers: *Full Forward*
Runway: *Grass*

Corrections
Headwind: - 5m for each kt (*16 ft/kt*)
Tailwind: + 15m for each kt (49 *ft/kt*)
Paved Runway: - *10%* to Ground Roll
Runway slope: + 7% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m]				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	Ground Roll	94	119	147	178	**135**
	At 50 ft AGL	280	348	425	510	**393**
1000	Ground Roll	103	130	160	194	**145**
	At 50 ft AGL	304	378	461	554	**420**
2000	Ground Roll	112	141	175	212	**156**
	At 50 ft AGL	330	411	501	601	**449**
3000	Ground Roll	123	154	191	231	**167**
	At 50 ft AGL	359	446	545	654	**481**
4000	Ground Roll	134	169	208	253	**180**
	At 50 ft AGL	390	486	592	711	**515**
5000	Ground Roll	147	185	228	276	**193**
	At 50 ft AGL	425	528	645	774	**551**
6000	Ground Roll	160	202	249	303	**208**
	At 50 ft AGL	463	575	702	843	**590**
7000	Ground Roll	176	221	273	331	**223**
	At 50 ft AGL	504	627	765	919	**633**
8000	Ground Roll	193	242	299	363	**241**
	At 50 ft AGL	550	684	834	1002	**679**
10000	Ground Roll	232	292	360	437	**280**
	At 50 ft AGL	655	815	994	1194	**782**

Weight = *550kg/1210lb*
Flaps: *T/O*
Speed at Lift-Off = *39 KIAS*
Speed Over *50ft* Obstacle = *50 KIAS*
Throttle Levers: *Full Forward*
Runway: *Grass*

Corrections
Headwind: - 5m for each kt (*16 ft/kt*)
Tailwind: + 15m for each kt (49 *ft/kt*)
Paved Runway: - *10%* to Ground Roll
Runway slope: + 7% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m]				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	Ground Roll	77	96	119	144	**110**
	At 50 ft AGL	230	286	349	418	**323**
1000	Ground Roll	83	105	130	157	**118**
	At 50 ft AGL	250	310	378	454	**345**
2000	Ground Roll	91	115	142	172	**126**
	At 50 ft AGL	271	337	411	494	**369**
3000	Ground Roll	100	125	155	188	**136**
	At 50 ft AGL	295	366	447	537	**395**
4000	Ground Roll	109	137	169	205	**146**
	At 50 ft AGL	321	399	486	584	**422**
5000	Ground Roll	119	150	185	224	**157**
	At 50 ft AGL	349	434	529	635	**452**
6000	Ground Roll	130	164	202	246	**169**
	At 50 ft AGL	380	472	576	692	**485**
7000	Ground Roll	143	180	222	269	**181**
	At 50 ft AGL	414	515	628	754	**520**
8000	Ground Roll	156	197	243	295	**195**
	At 50 ft AGL	451	561	685	822	**557**
10000	Ground Roll	188	237	292	355	**227**
	At 50 ft AGL	538	669	816	980	**642**

Weight = *500kg/1100lb*
Flaps: *T/O*
Speed at Lift-Off = *39 KIAS*
Speed Over *50ft* Obstacle = *50 KIAS*
Throttle Levers: *Full Forward*
Runway: *Grass*

Corrections
Headwind: - 5m for each kt (*16 ft/kt*)
Tailwind: + 15m for each kt (49 *ft/kt*)
Paved Runway: - *10%* to Ground Roll
Runway slope: + 7% to Ground Roll for each +1%

Pressure Altitude [ft]		Distance [m]				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	Ground Roll	61	77	95	115	**87**
	At 50 ft AGL	185	230	281	337	**260**
1000	Ground Roll	66	84	103	125	**94**
	At 50 ft AGL	201	250	305	366	**278**
2000	Ground Roll	73	91	113	137	**100**
	At 50 ft AGL	218	272	331	398	**297**
3000	Ground Roll	79	100	123	149	**108**
	At 50 ft AGL	237	295	360	432	**318**
4000	Ground Roll	87	109	135	163	**116**
	At 50 ft AGL	258	321	392	470	**340**
5000	Ground Roll	95	119	147	178	**125**
	At 50 ft AGL	281	349	426	512	**364**
6000	Ground Roll	104	130	161	195	**134**
	At 50 ft AGL	306	380	464	557	**390**
7000	Ground Roll	113	143	176	214	**144**
	At 50 ft AGL	333	415	506	607	**419**
8000	Ground Roll	124	157	193	234	**155**
	At 50 ft AGL	364	452	552	662	**449**
10000	Ground Roll	150	188	232	282	**180**
	At 50 ft AGL	433	539	657	789	**517**

5.7. Landing distances

Weight = *599kg/1320lb*
Flaps: *FULL*
Short Final Approach Speed = *48 KIAS*
Throttle Levers: *Idle*
Runway: *Grass*

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

Pressure Altitude [ft]		Distance [m]				
		Temperature [°C]				ISA
		-25	0	25	50	
S.L.	*Ground Roll*	176	193	211	229	**204**
	At 50 ft AGL	339	356	374	392	**367**
1000	*Ground Roll*	182	201	219	237	**210**
	At 50 ft AGL	345	364	382	400	**373**
2000	*Ground Roll*	189	208	227	246	**216**
	At 50 ft AGL	352	371	390	409	**379**
3000	*Ground Roll*	196	216	236	255	**223**
	At 50 ft AGL	359	379	399	418	**386**
4000	*Ground Roll*	203	224	244	265	**230**
	At 50 ft AGL	366	387	407	428	**393**
5000	*Ground Roll*	211	232	254	275	**237**
	At 50 ft AGL	374	395	417	438	**400**
6000	*Ground Roll*	219	241	263	286	**244**
	At 50 ft AGL	382	404	426	449	**407**
7000	*Ground Roll*	228	251	274	297	**252**
	At 50 ft AGL	391	414	437	460	**415**
8000	*Ground Roll*	237	260	284	308	**260**
	At 50 ft AGL	400	423	447	471	**423**
10000	*Ground Roll*	255	281	307	333	**276**
	At 50 ft AGL	418	444	470	496	**439**

5.1. Balked landing

Throttle Levers: Full Forward
Weight: 599kg/1320lb
Flaps: *T/O*
Speed: 55 KIAS

Pressure Altitude	Rate of Climb [ft/min] (angle of climb [deg])									
	Temperature [°C]								ISA	
[ft]	-25		0		25		50			
S.L.	1145	(12°)	955	(9°)	785	(7°)	632	(6°)	851	(8°)
1000	1072	(11°)	884	(8°)	716	(7°)	564	(5°)	794	(7°)
2000	1000	(10°)	813	(8°)	647	(6°)	496	(4°)	737	(7°)
3000	928	(9°)	743	(7°)	578	(5°)	428	(4°)	681	(6°)
4000	856	(8°)	673	(6°)	509	(4°)	361	(3°)	624	(6°)
5000	784	(7°)	602	(5°)	440	(4°)	293	(2°)	568	(5°)
6000	713	(6°)	532	(5°)	371	(3°)	226	(2°)	511	(4°)
7000	641	(6°)	462	(4°)	303	(2°)	159	(1°)	455	(4°)
8000	570	(5°)	392	(3°)	234	(2°)	92	(1°)	398	(3°)
10000	427	(4°)	253	(2°)	98	(1°)	-42	(0°)	285	(2°)

5.2. En-route Rate of Climb

Throttle Levers: Full Forward
Flaps: UP

Weight [kg/lb]	Pressure Altitude [ft]	Climb Speed V_Y [KIAS]	Rate of Climb [ft/min]				
			Temperature [°C]				ISA
			-25	0	25	50	
599kg 1320lb	S.L.	68	1125	960	813	680	870
	2000	68	1000	838	693	563	772
	4000	68	875	716	573	445	674
	6000	68	750	594	454	328	576
	8000	68	626	473	335	211	477
	10000	68	503	352	217	95	379
	12000	68	379	231	99	-21	281
	14000	68	256	111	-19	-136	183
550kg 1210lb	S.L.	68	1271	1094	935	792	996
	2000	68	1136	962	806	666	891
	4000	68	1002	830	677	539	785
	6000	68	868	699	549	413	680
	8000	68	734	569	421	288	574
	10000	68	601	439	293	163	468
	12000	68	468	309	166	38	363
	14000	68	336	180	40	-86	257
500kg 1100lb	S.L.	68	1443	1250	1078	922	1145
	2000	68	1296	1107	937	785	1030
	4000	68	1150	964	797	647	915
	6000	68	1004	821	658	510	800
	8000	68	859	679	518	373	685
	10000	68	714	537	380	237	570
	12000	68	570	396	241	102	455
	14000	68	426	256	104	-33	340

5.3. Cruise Performances

CAUTION *Engine speed over 5500 RPM is restricted to 5min.*

DATA COMPUTED - DEDUCTION OF RESERVE IS UNDER PILOT'S RESPONSIBILITY

Weight = *600 kg*

CORRECTIONS

	KTAS	Fuel Cons.	Endurance	Range	Specific Range
For each *+15*℃ of OAT	*-2%*	*-2.5%*	*+2%*	*+1%*	*+1%*
For each *-15*℃ of OAT	*+1%*	*+3%*	*-4%*	*-2%*	*-1%*
For *-100kg (45lb)* of weight	*+3.3%*	-	-	*+3%*	*+4%*

CRUISE PERFORMANCE

Pressure Altitude *[ft]*	OAT ISA *[deg C]*	Engine RPM	KTAS	Fuel Cons. *Gal/ hr*	Endurance *[hr:mm]*	Range *[nm]*	Specific Range *[nm/Gal]*
0	**15**	5800	120	7.0	4:10	494	17
		5500	114	5.7	5:00	574	20
		5300	109	4.9	5:50	640	22
		5100	104	4.2	6:50	711	25
		4800	97	3.4	8:30	824	29
		4600	92	3.0	9:40	885	31
		4400	87	2.7	10:40	922	32

		5800	121	6.6	4:20	529	19
		5500	113	5.4	5:20	602	21
		5300	108	4.6	6:10	669	23
2000	**11**	5100	103	4.0	7:10	740	26
		4800	96	3.2	8:50	853	30
		4600	91	2.9	10:00	907	31
		4400	86	2.6	11:00	940	33
		5800	120	6.2	4:40	557	19
		5500	113	5.1	5:40	636	22
		5300	108	4.4	6:30	704	25
4000	**7**	5100	103	3.8	7:30	774	27
		4800	95	3.1	9:10	872	30
		4600	90	2.8	10:10	923	32
		4400	85	2.6	11:10	951	33
		5500	112	4.9	5:50	662	23
		5300	107	4.2	6:50	732	25
6000	**3**	5100	102	3.6	7:50	803	28
		4800	94	3.0	9:30	899	31
		4600	89	2.7	10:30	940	33
		4400	84	2.5	11:30	963	33
		5500	111	4.6	6:10	691	24
		5300	106	4.0	7:10	754	26
8000	**-1**	5100	101	3.5	8:10	825	29
		4800	94	2.9	9:50	925	32
		4600	89	2.7	10:50	962	33
		4400	84	2.5	11:40	979	34
		5300	105	3.9	7:30	783	27
		5100	100	3.4	8:30	849	30
10000	**-5**	4800	93	2.9	10:00	935	33
		4600	88	2.6	11:00	966	34
		4400	83	2.5	11:40	975	34

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6. Section No. 6 - Weight and Balance

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

WARNING

Aircraft must be operated in accordance with the limits concerning the maximum takeoff weight and CG travel reported in Sect.2

WARNING

It is pilot's responsibility to check that the weight and CG are within the limits

6.1. Weighing Procedures

6.1.1. Preparation

- Carry out the weighing inside a closed hangar to avoid the wind to modify the scales reading;
- Remove from the cabin any foreign object;
- Make sure that POH and aircraft documents are on board;
- Align nose wheel;
- Make sure that there is only the not-usable fuel in the tanks (0.5lt);
- Make sure that all the operating fluids are to operating levels;
- Make sure that the seats are in the most FWD position;
- Retract the flaps;
- Engage the parking brake;
- Close the canopy;

- Place the scales under each wheel. Lift the aircraft by pushing from the bottom wing skin in correspondence with the rib;
- Level the aircraft. Level can be placed inside the baggage compartment.

6.1.2. **Levelling**

- Level the aircraft with the reference to the baggage compartment floor. You can monitor the spirit-level through the baggage compartment door;
- If needed, adjust the aircraft attitude deflating the nose tire until the aircraft is perfectly levelled.

6.1.3. **Weights Record**

- Record the weight shown on each scale;
- Repeat the weighing if necessary to be safe on the given value;

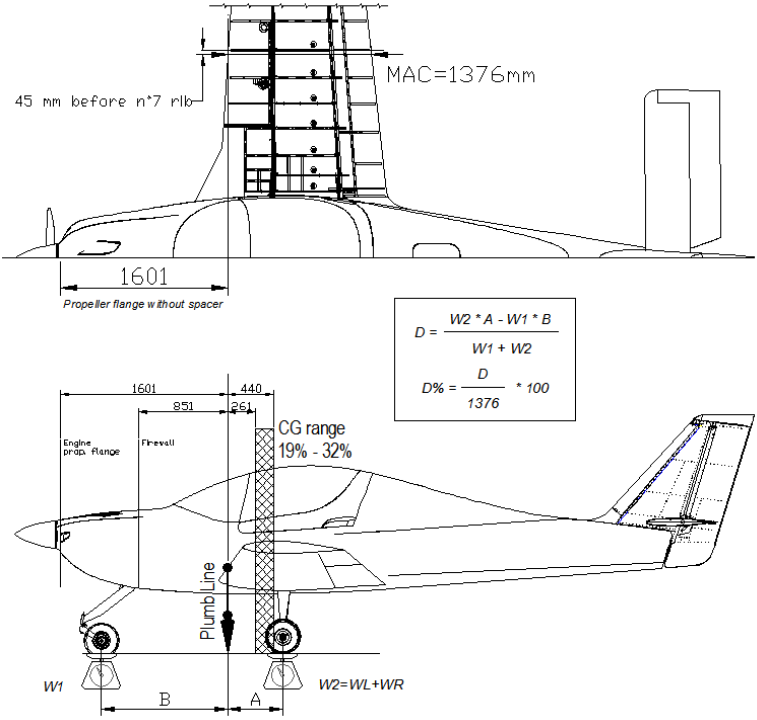
6.2. C.G. Location determination

- With the aircraft leveled, not necessarily during the weighing, drop a plumb bob tangent to the wing leading edge exactly 45mm before the Left and Right wing 7th rib as shown in the next picture;
- Stretch a taught line on the hangar floor between the LH and RH in order to have the possibility to measure the distances "A" and "B" as shown in the next picture;
- Record the "A" and "B" distances, which will be useful also for future weighing.

NOTE

Before the aircraft leaves the factory, and as soon as it is re-assembled to the local dealer, the weighing report is filled and the distances for the S/N are recorded

6.2.1. **Weighing scheme - general scheme [mt]**

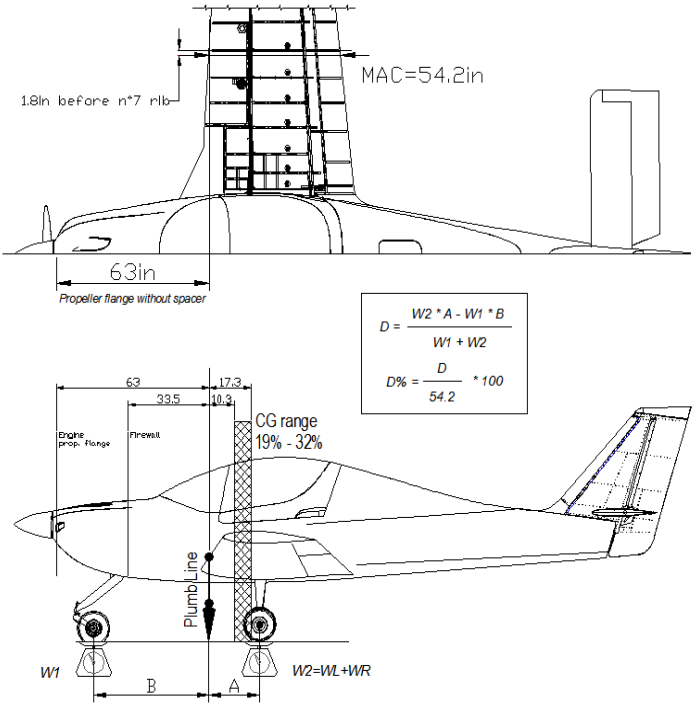


CAUTION

Always use CONSISTENT units to compute the W&B

[kg] for weights and [mt] for distances
or
[lb] for weights and [in] for distances

6.2.2. **Weighing scheme - general scheme [in]**



CAUTION

Always use CONSISTENT units to compute the W&B

[kg] for weights and [mt] for distances
or
[lb] for weights and [in] for distances

6.2.3. **Weighing report - S/N:_____**

Tecnam Astore	Weighing n._____	Date:___/___/_____	
Nose Wheel weight	$\mathbf{W_1}$=_____	Left dist. "A"	A_L=_____
LH Main wheel weight	W_L=_____	Right dist. "A"	A_R=_____
RH Main wheel weight	W_R=_____	$\frac{(A_L + A_R)}{2}$	A=_____
$W_2 = W_L + W_R$	$\mathbf{W_2}$=_____	Dist. "B"	B=_____
Empty weight $W_e = W_1 + W_2$	$\mathbf{W_e}$=_____	Empty weight	
$M_1 = W_1 \cdot B$	$\mathbf{M_1}$=_____		
$M_2 = W_2 \cdot A$	$\mathbf{M_2}$=_____		
$M = M_2 - M_1$	**M**=_____	Empty wt. moment(1)	
$D = \frac{M}{W_e}$	**D**=_____	$D\% = \frac{D}{MAC} \cdot 100$	**D**=____**%**
Maximum Take Off Weight (MTOW)		**600kg**	**1320lb**
Authorized Signature (see AMM)		_____	

(1) This Moment is computed around the MAC leading edge. In order to know the Moment around the datum (prop. flange without the spacer) the value is:

$$M_{datum} = (D + 1.601mt) \cdot W_e = \_\_\_\_\_ kgmt$$

$$M_{datum} = (D + 63in) \cdot W_e = \_\_\_\_\_ lbin$$

6.2.4. **Loading computation Chart**

Every Tecnam Astore is provided with an Apple iPad Mini with a pre-loaded app. One of its features is that the CoG position for each pay-load distribution, given the inputs data from the weighing report, can be easily displayed. By the way, a classic method is provided in the following table, which can be printed and used before each flight.

Loading Computation Chart (use **kg and mt** or **lb and in**)			
	Weight W_e	Arm	Moment M
Empty data			
Fuel [(1)]		0.255mt (10in)*	
Pil&Passenger		0.417mt (16in)*	
Baggage		1.396mt (55in)*	
Take Off Weight		**TOW**	
Total Moment			**MOM**
Distance (%MAC)	$\frac{MOM}{TOW} \cdot \frac{1}{MAC} \cdot 100$		_____%

[(1)] Fuel weight is 0.72kg/lt or 6lb/USGal

* Distances from MAC leading edge

WARNING

Verify that the TOW and CoG location are within the limits given in the Section no.2 - Limitations

6.2.5. **Payload moments**

The following tables show the moments in kgm and lbin for several values of each payload item. This simplifies the filling of table reported in the §6.2.4.

Pilot + Passenger			
kg	kgm	lb	lbin
20	8,3	**44**	705
30	12,5	**66**	1057
40	16,7	**88**	1410
50	20,9	**110**	1762
60	25,0	**132**	2115
70	29,2	**154**	2467
80	33,4	**176**	2819
90	37,5	**198**	3172
100	41,7	**220**	3524
110	45,9	**242**	3877
120	50,0	**264**	4229
130	54,2	**286**	4581
140	58,4	**308**	4934
150	62,6	**330**	5286
160	66,7	**352**	5639
170	70,9	**374**	5991
180	75,1	**396**	6344
190	79,2	**419**	6696
200	83,4	**441**	7048
210	87,6	**463**	7401
220	91,7	**485**	7753
230	95,9	**507**	8106
240	100,1	**529**	8458
250	104,3	**550**	8800

Fuel			
liters	kgm	USGal	lbin
10	1,8	**5**	300
20	3,7	**10**	600
30	5,5	**15**	900
40	7,3	**20**	1200
50	9,2	**25**	1500
60	11,0	**30**	1800
70	12,9	**29**	1740
80	14,7		
90	16,5		
100	18,4		
110	20,2		

Baggages			
kg	kgm	lb	lbin
5	7,0	**10**	550
10	14,0	**20**	1100
15	20,9	**30**	1650
20	27,9	**40**	2200
25	34,9	**50**	2750
30	41,9	**70**	3850
35	48,9	**77**	4235

6.2.6. **Equipment List**

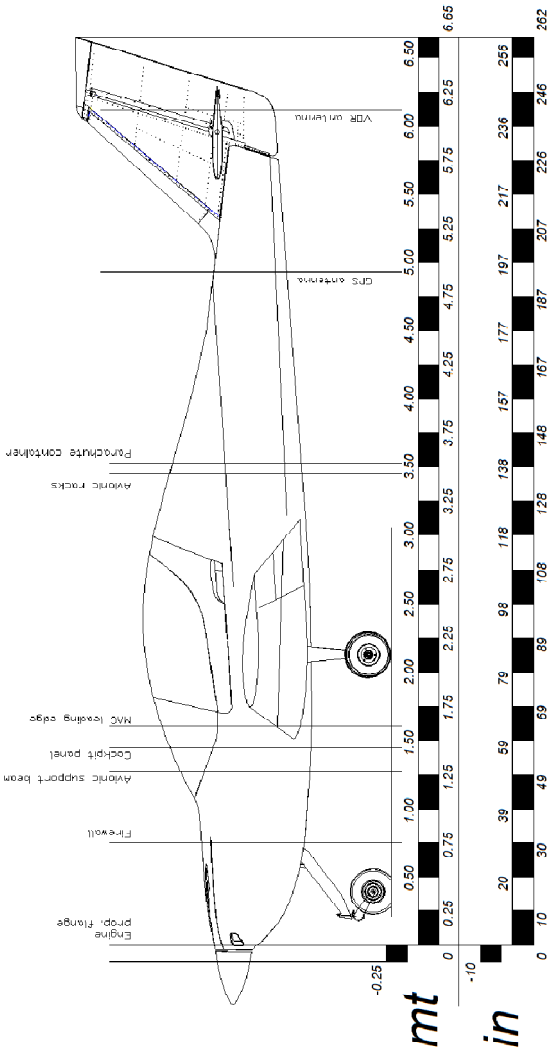
This paragraph shows the position and weight of main equipment components in order to make the knowledge of their respective position easier to determinate. In order to supply to the operator a comprehensive method to determine the position of other components not in this list, the following picture shows the aircraft side view with dimensions from the engine propeller flange. In order to verify the actual CoG and empty weight in reference with equipment list, the M_{datum} should be used because referenced to the propeller flange without spacer. All measures are positive going toward the tail, while the propeller/spinner and spacer are the only negative measures.

If some known optional is missing, this means that the relevant W&B information are given in the equipment Supplement (Suppl. in the Weight and Arm columns). Also, a table to record the weight and balancing changes is provided in order to be fulfilled every time a mass item affecting the weight and balance is added/removed.

S	= Standard equipment
S-M	= Standard equipment - it is forbidden to fly without this equipment under any conditions
O-VFRN	= Optional equipment - it is forbidden to fly without this equipment under VFR-N conditions
O	= Optional equipment

NOTE

Local CAA may require additional equipment as Mandatory to conduct flights such as ELT, Radio and Transponder units


VOR antenna
GPS antenna
Parachute container
Avionic racks
MAC leading edge
Cockpit panel
Avionic support beam
Firewall
Engine
prop. flange
mt
in

ITEM	Description	**S**tandard **O**ptional **M**andatory*	Weight [kg]	Arm [mt]
	21 - AIR CONDITIONING			
	Air cond. Flycool	**O**	Suppl.	Suppl.
	22 - AUTO FLIGHT			
	Dynon autopilot	**O**	Suppl.	Suppl.
	Trio Pro Pilot autopilot	**O**	Suppl.	Suppl.
	Garmin Autopilot	**O**	Suppl.	Suppl.
	23 - COMMUNICATIONS			
	GMA240 Audio Panel computer	**O**	0.68	1.32
	GMA340 Audio Panel computer	**O**	0.80	1.32
	GNC255A COM/NAV computer	**O**	1.60	1.32
	MD200 VOR indicator	**O**	0.64	1.35
	GTR200 COM computer	**O**	0.97	1.32
	GTR225A computer	**O**	1.40	1.32
	GTX327 mode C Transponder computer	**O**	1.50	1.32
	GTX328 mode S Transponder computer	**O**	1.90	1.32
	GTX330 mode S Transponder computer	**O**	1.90	1.32
	GPS796+Airgizmos	**O**	0.97	1.50
	Dynon SV-XPNDR-261 mode S (rack)	**O**	0.40	3.53
	SV-COM-C25 COM	**O**	0.16	1.35
	SV-INTERCOM-2S	**O**	0.20	1.32
	SV-ADSB-470 UAT Traffic and Weather Rec.	**O**	0.40	1.27
	ADSB antenna	**O**	0.10	3.00
	Speakers	**O**	0.15	3.34
	Microphone	**O**	0.10	1.94
	COM1 antenna	**O**	0.10	2.54
	XTR antenna	**O**	0.10	1.83
	GPS antenna	**O**	0.15	4.93
	VOR antenna	**O**	0.20	6.12
	24 - ELECTRICAL POWER			
	External alternator - 40A	**O**	3.50	0.09
	Battery - Spark500*	**O**	4.90	0.70
	Battery - Alliant X3	**S - M**	1.00	0.70
	External Ground Power Receptacle	**O**	0.40	2.67

	25 - EQUIPMENT/FURNISHINGS			
	Seat (LH or RH) - each	**S - M**	4.10	2.02
	Seat belt - each	**S - M**	1.00	2.20
	Baggage net (mandatory if carrying load)	**O**	0.60	2.97
	POH	**S - M**	0.40	2.63
	Ballistic Recovery System	**O**	13.0	2.53
	Hammer	**S**	0.30	2.68
	Armrest	**O**	0.60	2.13
	First aid box	**S**	0.6	2.13
	ELT 406Mhz (remote unit)	**O**	1.00	2.28
	26 - FIRE PROTECTION			
	Fire extinguisher	**S**	1.50	1.57
	32 - LANDING GEAR			
	Nose wheel fairing	**S**	1.50	0.39
	Main wheel fairing (each)	**S**	1.50	2.21
	NLG tire and tube (Airtrac)	**S - M**	2.0+0.5	0.39
	NLG tire and tube (Goodyear)	**O**	2.6+0.5	0.39
	MLG tire and tube (Airtrac - each T+T)	**S - M**	2.0+0.5	2.13
	MLG tire and tube (Goodyear - each T+T)	**O**	2.6+0.5	2.13
	33 - LIGHTS			
	Strobe & NAV Lights (both LH/RH) & switches	**O-VFRN**	0.25	1.98
	Landing light bulb & switch	**O-VFRN**	0.30	1.66
	Instrument lights, switch & dimmer	**O-VFRN**	0.30	1.37
	34 - NAVIGATION			
	Compass	**S - M**	0.30	1.37
	Airspeed indicator	**S - M**	0.40	1.37
	Altitude indicator	**S - M**	0.40	1.37
	Vertical Speed indicator	**S**	0.40	1.37
	Oblò EFIS	**O**	0.45	1.38
	Turn and bank indicator	**O**	1.40	1.33
	Chronometer	**O**	0.40	1.38
	OAT indicator	**O**	0.30	1.38
	Attitude - electric	**O - VFRN****	1.40	1.33
	Directional - electric	**O**	1.40	1.33
	Mini iPad Apple	**S**	0.36	1.49
	Dynon SV1000 display (each)	**O**	1.40	1.41
	Dynon SV700 display (each)	**O**	1.15	1.41

	GARMIN G3X display (each)	**O**	0.80	1.41
	61 - PROPELLER			
	Sensenich W68T2ET-70J	**S - M**	4.70	-0.12
	Sensenich 2A0R5R70EN	**O**	5.00	-0.12
	Sensenich 3B0R5R68C	**O**	4.35	-0.12
	Spinner plate	**S**	0.40	-0.06
	Spacer	**S - M**	1.50	-0.05
	Spinner	**S**	0.30	-0.16
	71 - POWERPLANT			
	Muffler heat exchanger	**S**	0.35	0.44
	77 - ENGINE INDICATING			
	MAP indicator	**O**	0.40	1.38
	EMS display (Dynon, Garmin or TL-Elektronics)	**S - M**	0.60	1.38
	78 - EXHAUST			
	Exhaust system incl. muffler	**S - M**	4.60	0.344
	79 - OIL			
	Thermostatic oil valve	**O**	0.80	0.355
	Oil cooler	**S - M**	0.80	0.277
	82 - WATER INJECTION			
	Thermostatic coolant valve	**O**	0.80	0.355
	Water cooler	**S - M**	1.00	0.131

*Spark 500 is mandatory if the aircraft is equipped with Rotax 912i Series. The i Series is in fact not able to adequately re-charge the Alliant 13.2V battery.

**The use of adequate attitude indicator is mandatory to fly under VFR-N conditions. Check your S/N equipment list in order to be sure that it includes a source for attitude indication (EFIS with ADAHRS or single attitude indicator instrument).
TECNAM do not consider the GPS data for attitude indication as adequate to replace a gyro or solid state gyroscope operated instrument.

6.2.7. **Change of equipment RECORD**

The following table, according with the chapter 6.2.6 requirements, is used to record any change, removal or installation of any component from/in the aircraft. Any of this change can be recorder in order to always store the aircraft configuration without the need to repeat the weighing and balancing, unless a new weighing is necessary.

Tecnam Astore aircraft				**S/N** _____							
Date	Item Added (IN) or Removed (OUT)		Description of item added/removed	Fill if ADDED (+)			Fill if REMOVED (-)			Final e.ty weight and Moment	
	IN	**OUT**		**Wt.**	**Arm**	**Mom.**	**Wt.**	**Arm**	**Mom.**	**Wt.**	**Mom.**
			As delivered								

Tecnam Astore aircraft				S/N _____							
Date	Item Added (IN) or Removed (OUT)		Description of item added/removed	Fill if ADDED (+)			Fill if REMOVED (-)			Final e.ty weight and Moment	
	IN	OUT		Wt.	Arm	Mom.	Wt.	Arm	Mom.	Wt.	Mom.
			As delivered								

NOTE

When an item is added, the moment is always positive unless the item is pertinent to the propeller. In this case, the removal of a propeller will result in a positive moment, while the installation of a new one results in a negative moment

7. Section No. 7 - Description of Airplane and Systems

7.1. General

The Tecnam Astore is a low wing, two-place, single-engine airplane equipped with tricycle landing gear. The all metal airframe structure is complemented by the selective use of an epoxy reinforced matrix of carbon/glass fiber for the upper radome and fairings.

The main landing gear consists of two 7075T6 light alloy springs which are hinged inside the fuselage in order to maximize the wheel deflection and energy absorption efficiency. These springs are supported by robust machined components which spread the load directly onto the main bulkheads. Two rawhide liners are inserted between each spring-leaf and the external machined beam. Two bolts secure the individual spring-leaf to the edge of the beam via a light alloy clamp while a single bolt secures the inboard end of the leaf-spring to the hinge and inner machined beam. The nose gear is free castering and is supported by an oleo-pneumatic shock absorber connected directly to the firewall. Differential toe brakes for steering are standard for both pilot and co-pilot with redundant brake master cylinders (4 in total).

The horizontal tail is made up of a stabilizer and elevator with tip balancing horns. All the control surfaces, except for the flaps and trim tab, are balanced, and all the surfaces, except for the rudder and fuselage aileron line, are controlled via push-pull rods. Standard engine for this manual is the Rotax 912iS2 but the 912ULS2 and turbocharged 914UL2 version are also available. The standard propeller is a two blade fixed pitch wooden-composite wrapped Sensenich, with compo-

site made propellers from the same brand also available in two and three bladed versions.

The total usable fuel is 29 Gal (109lt) while the entire fuel system runs below the cabin structure, protecting the occupants from the fuel lines, which consist of rigid hoses and AN fittings. The canopy forms an integral part of the upper radome sliding forward and aft with final closing achieved by pulling the canopy vertically down onto an automotive-type seal. Three latches and 4 pins secure the canopy to the radome ensuring the best sound proofing possible.

The Cabin offers newly designed seats and seat rails which are easily operated and adjustable fore and aft via a single handle with a reinforced area between the rails to make cabin access even easier. A roomy baggage compartment accommodates voluminous items with both external and internal access. A strong automotive seal is used on the baggage door and a courtesy lamp illuminates when this big door is opened. A newly designed and wide cockpit panel provides the largest choice of avionics. The avionics package always includes an iPad Mini with a built in application called "Tecnam Astore Owner app" containing a lot of useful information.

7.2. Airframe

The load carrying airframe is entirely made by light alloy with a wide use of 3D shaped sheet metal and machined components. The wing is attached via a carry through, made by a 2024T3 billet milled and bolted inside two main bulkheads. Firewall is directly riveted on the first frame via stainless steel rivets and is made by 0.4mm sheet. The tailcone is built also in light alloy and is secured to the cabin struture by 4 caps and riveted side/lower skins. The airframe includes the formed structure for the baggage door frame and the parachute ropes ones. These, when the parachute is installed, completely hide the ropes giving the airplane an unique shape. All the front cabin section is riveted with flush 3.2mm solid rivets, unless some main spars such as the lower ones which are riveted using protruding head rivets. The tailcone is riveted using pop rivets while the last bulckhead, carrying the loads coming from the tails, is riveted using 4mm solid rivets.

As written in the general description, the tails are made by light alloy and they are both made by fixed and movable surfaces, both balanced for elevator and rudder structures. All the hinges are made from machined 2024T3 series light alloy and rotate around ball bearings.

7.3. Flight controls

7.3.1. Elevator

The elevator control is made by push pull rods: a cabin rod connect directly the stick assembly with the intermediate lever while another rod connect the lever with the elevator. Both rods are made by 32mm light alloy tube with two ends made from billet which incorporate the ball bearing ends. The stick assembly is hinged on the third frame and is fully accessible and removable via dedicated access panels.

The movable surface is horn balanced at tips and rotates around 5 hinges with a central one incorporating also the control connection plate. The elevator is provided by a left side mounted, electrically operated trim tab with hat switch control on both left and right stick and a pilot/co-pilot selector switch.

7.3.2. **Rudder**

Rudder control is made by 2.5mm steel wire which connect the rudder pedals directly to the rudder, via 4 pulleys which deviate the path properly. A forward mounted rigid closing circuit allows the mechanical connection with LH and RH pedals. The control surface is entirely made by light alloy unless the lower part which is a carbon fiber reinforced matrix component. It rotates around two ball bearings ans is provided by a fixed-ground adjustable trim tab.

7.3.3. **Aileron**

Aileron control, as Tecnam use to make on all Tecnam models, is made by two separate loops: a cabin closed-circuit, which connects the control stick with the rear rod, made by 2.5mm steel wire, and a wing-located line made by two control rods. This allow an easier assembly of wings without rigging the cabin wires and simply connecting the wing rods with the cabin one via a couple of bolts.

7.3.4. **Flaps**

Flap surface is controlled by an electrically operated actuator which acts directly on a torque tube connecting the LH and RH flap surfaces. They are slotted-type and entirely made by light alloy. The flap control switch is located on the cockpit panel and is easily accessible from the pilot and co-pilot. The flap actuator is accessible via a dedicated access panel and is possible to regulate it acting on two end-travel

switches. The flap position transmitter is located directly on the flap torque tube and shows the flap position directly on the EFIS/EMS monitor.

7.4. Instrument panel

The instrument panel is a wide light alloy sheet metal incorporating the flight instruments, the EMS and the avionics bay. In the standard 912iS basic configuration, the instrument panel is provided by:

(0) Magnetic compass;

(1) Airspeed indicator;

(2) Altimeter;

(3) Digital EMS which incorporates:

- rpm indicator;
- hobbs recorder;
- oil press;
- oil temp;
- CHT;
- fuel press;
- voltmeter;
- elevator trim position indicator;
- flap position indicator;
- LH/RH fuel level indicator;

(4) Master key;

(5) Starter button;

(6) Start Power Switch;

(7/8) Lane A & B switches;

(9/10) Fuel Pump 1 & 2 switches;

(11) Back up battery switch;

(12) EFIS/EMS Master switch;

(13) Annunciator Panel;

(14) Flap switch;

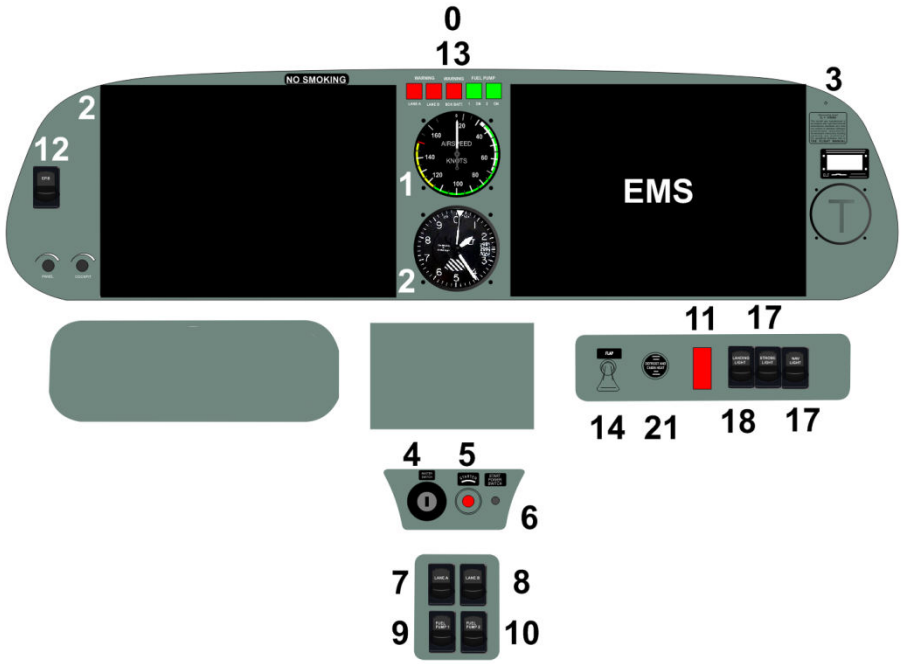
(17) Landing light/NAV lights switches;

(18) Strobe light switch;

(21) Cabin heat knob;

(not shown) iPad mini;

Refer to the relevant Supplement if additional equipment is installed. The following picture shows the basic panel configuration with 912iS engine interfaces:



7.5. **Engine and Propeller**

Standard engine of this POH is the fuel injected Rotax 912iS. The standard propeller is a two blade fixed pitch wooden-composite wrapped Sensenich. All the allowed propellers are installed using a spacer. The standard installation includes the cabin heat system and cold air intake for cabin. The engine cowling is provided by two gull-wing doors which can be opened via two camloc per side. For further description of engine and related systems, refer to the Aircraft Maintenance Manual.

7.6. Electrical system

The electrical system schematic for this POH equipment is shown in the picture below. The schematic also includes equipment which are managed via dedicated Supplement as they are optionally provided. Refer to the Section No.10 - Marking and Placards, to know more about the breaker panel and their related value and function.

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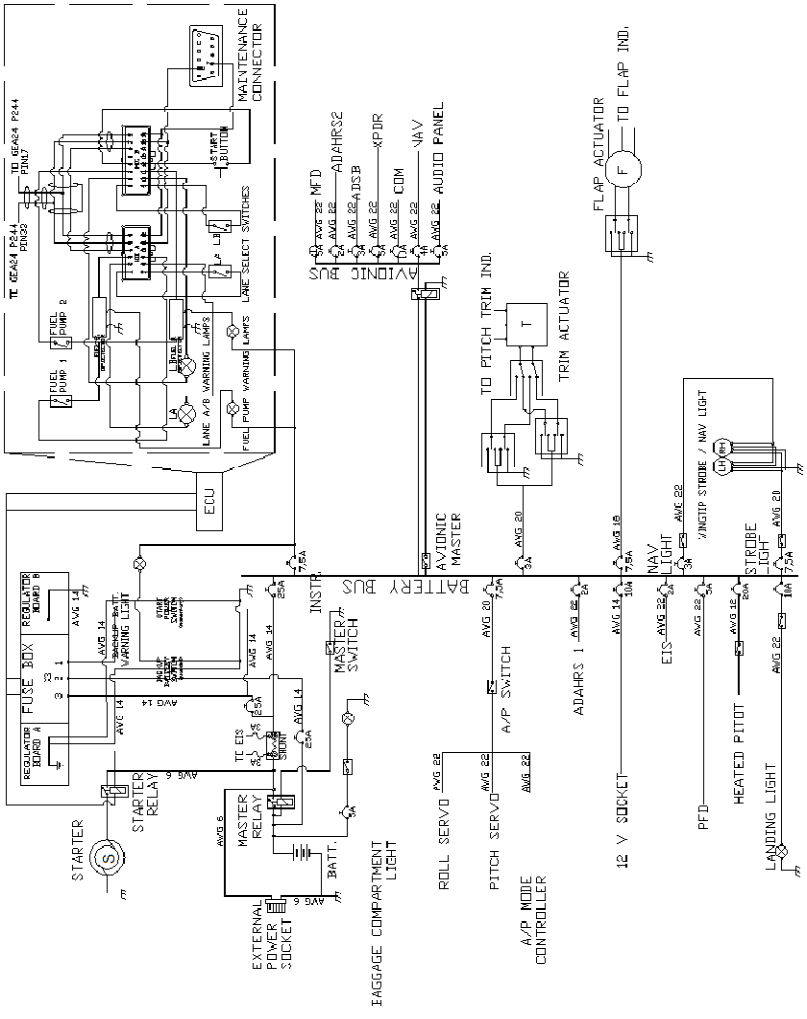

MAINTENANCE CONNECTOR
START SWITCH
LANE SELECT SWITCHES
FUEL PUMP 2
FUEL PUMP 1
LANE A/B WARNING LAMPS
FUEL PUMP WARNING LAMPS
ECU
MFD
ADAHRS2
ADSB
KPDR
COM
VAV
AUDIO PANEL
AVIONIC MASTER
INSTR.
BATTERY BUS
FLAP ACTUATOR
TO FLAP IND.
TO PITCH TRIM IND.
TRIM ACTUATOR
NAV LIGHT
STROBE LIGHT
A/P INSTP STROBE / NAV LIGHT
FUSE BOX
REGULATOR BOARD A
REGULATOR BOARD B
STARTER
STARTER RELAY
MASTER RELAY
MASTER SWITCH
BATT.
EXTERNAL POWER SOCKET
BAGGAGE COMPARTMENT LIGHT
ROLL SERVO
PITCH SERVO
A/P SWITCH
A/P MODE CONTROLLER
ADAHRS 1
12 V SOCKET
EIS
PFD
HEATED PITOT
LANDING LIGHT

8. Section No. 8 - Handling & Servicing

8.1. General

This section contains factory-recommended procedures for proper ground handling and routine care and servicing. It also identifies certain inspection and maintenance requirements. It is recommended to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered locally.

The customer/operator is responsible to monitor the mail address supplied and the Tecnam Login page for being updated about:

- Latest revisions of manuals;
- Issue of Notification Letter;
- Issue of Service Bulletins;
- Issue of Safety Alerts;

The direct link to the Tecnam login page is:

http://www.tecnam.com/Login.aspx

Modifications on the aircraft not approved by Tecnam via a Service Bulletin or Job Card, or not performed by people and figures identified by Tecnam, could reduce the safety of the flight and for this reason any operation not allowed by Tecnam, or Maintenance practices

not followed as per Tecnam Astore AMM, will void the warranty on the airplane.

8.2. Aircraft inspection intervals

Scheduled inspections must be performed in accordance with the instructions addressed on the Aircraft Maintenance Manual and performed by the authorized figures indicated. Independently from the aircraft flight hours, an annual inspection has to be performed (yearly).
All required inspections on the airframe and aircraft systems are shown in the aircraft maintenance manual. Be aware that copies in latest revisions of engine, propeller and avionics maintenance manual should be part of the "aircraft files".

WARNING

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

1. Emergency/Hard Landing
2. Damage of propeller
3. Engine fire
4. Lightning
5. Flap actuating overspeed (more than 80kIAS from 0 to T/O position, more than 75kIAS from T/O to LND position)
6. Any other damage on the airframe and systems

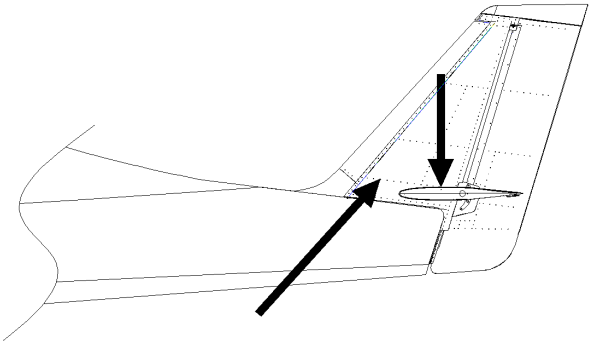
8.3. Aircraft changes or repairs

The AMM addresses any maintenance task to the proper level of certification such as owner, A&P, repairman and repair station. When

changes or repairs should be accomplished using a Job Card or Service Bulletin, the level of certification is addressed.

8.4. Towing

The easiest way to tow the aircraft is to pull it from the propeller root. The free castering nose wheel allow easy changes of direction during the aircraft towing. In order to allow maneuvers in small areas, such as inside an hangar, it is possible to push the aircraft down on the stabilizer root to lift the nose gear and rotate the aircraft pushing on the front fin spar as shown in the picture.



8.5. Parking and tie-down

Park the aircraft into the wind, engage the parking brake when chokes are not available. For prolongated parking time (more than one day), it is preferable to use chocks to avoid leaving the brake system in pressure. Ensure the control surfaces with lock pads and/or lock the stick using the safety belts. Make sure that everything is shutted-down (master switches OFF and key removed) before closing the canopy.

Cover the aircraft if possible, protect the pitot-static tube and proceed to the tie down, accomplished by the use of ropes engaged under the tie down points below the wing, tailcone and if suitable also nose gear strut.

8.6. Servicing

This chapter provides useful information concerning the approved fuel and oil grades and specifications. In order to comply with all fluids to be used on Tecnam Astore aircraft, the suitable fluids for Brake system oil and coolant are also provided.

8.6.1. Fuel grades

Read more on fuel grades on ROTAX website and relevant Service Instructions such as SI-912-016 in its latest revision. Maximum Ethanol content allowed is 10%.

Fuel Specification 912iS	
	Description
Anti knock properties	Min. RON95 (Min AKI* 91)
MOGAS Standard (EU)	EN 228 Super EN 228 Super plus
Aviation Standard	AVGAS 100LL (ASTM D910)

*AKI = (RON+MON)/2

8.6.2. **Oil grades**

Read more on oil grades on ROTAX website and relevant Service Instructions such as SI-912-016 in its latest revision.

Motor oil tested and released from BRP-Powertrain (for use with unleaded fuel or MOGAS) is:

Brand	Description	Specs	Viscosity	Code
SHELL	AeroShell Sport Plus 4	API SL	SAE 10W-40	2

Motor oil tested and released from BRP-Powertrain (for use with unleaded fuel or AVGAS) is:

Brand	Description	Specs	Viscosity	Code
SHELL	AeroShell Sport Plus 4	API SL	SAE 10W-40	2

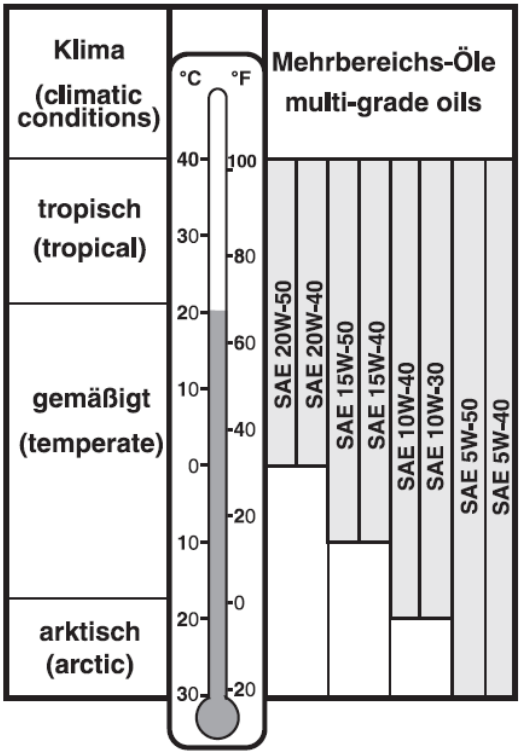
CAUTION

Some restrictions in terms of maintenance intervals are given if the engine is mainly operated with AVGAS. If the engine operates with AVGAS for more than 30% of its operating time, refer to the SI-912-016 and engine maintenance manual in order to know more on these additional maintenance intervals.

NOTE

Other oil brands and grades have been tested by ROTAX authorized distributors (not tested directly by ROTAX). In order to have the full list refer to the latest revision of SI-912-016 for both MOGAS and AVGAS suggested oil brands and grades.

The following viscosity table is a reference for the type of oil suitable on your ROTAX. Always refer to the ROTAX operator's and maintenance manual for complete information and always note that the following table is only a guideline: the oil pressure and temperature limitation should be always compliant to those shown in the Section no.2 of this POH and those reported in the ROTAX operator's manual.



8.6.3. **Coolant**

In principle, 2 different types of coolant are permitted:

- conventional coolant based on ethylene glycol with 50% water content;
- waterless coolant based on propylene glycol (not allowed for 912i Series)

Tecnam installation and test flight are performed using a mixture of Selenia Paraflu (80%) and distilled water (20%). Other coolant brands are recommended by ROTAX authorized distributors to be used mixed with 50% of distilled water:

Marke / brand	Bezeichnung / description
BASF®	Glysantin Protect Plus/G48
CASTROL®	Antifreeze All-Climate
CASTROL®	Antifreeze Anti-Boil
OMV®	OMV Coolant Plus
PETROL®	Antifreeze Concentrate / Antifreeze G 11
PRESTONE®	DEX-COOL extended life
PRESTONE®	50/50 preluded DEX-COOL extended life
SHELL®	DEX-COOL
SHELL®	Antifreeze Concentrate
TEXACO®	Havoline Extended Life Antifreeze /
VELVANA®	FRIDEX G49
YACCO®	LR-35

WARNING

Waterless coolant is not approved for use on 912iS series.

NOTE

In order to have the full list refer to the latest revision of SI-912-016

8.6.4. **Brake oil**

The allowed oil to be used in the braking system is:

MIL-H-5606

WARNING

DOT5-1. DOT3 and DOT4 must be avoided as they will cause immediate damage on the seals.

8.7. Cleaning and Care

8.7.1. General notes

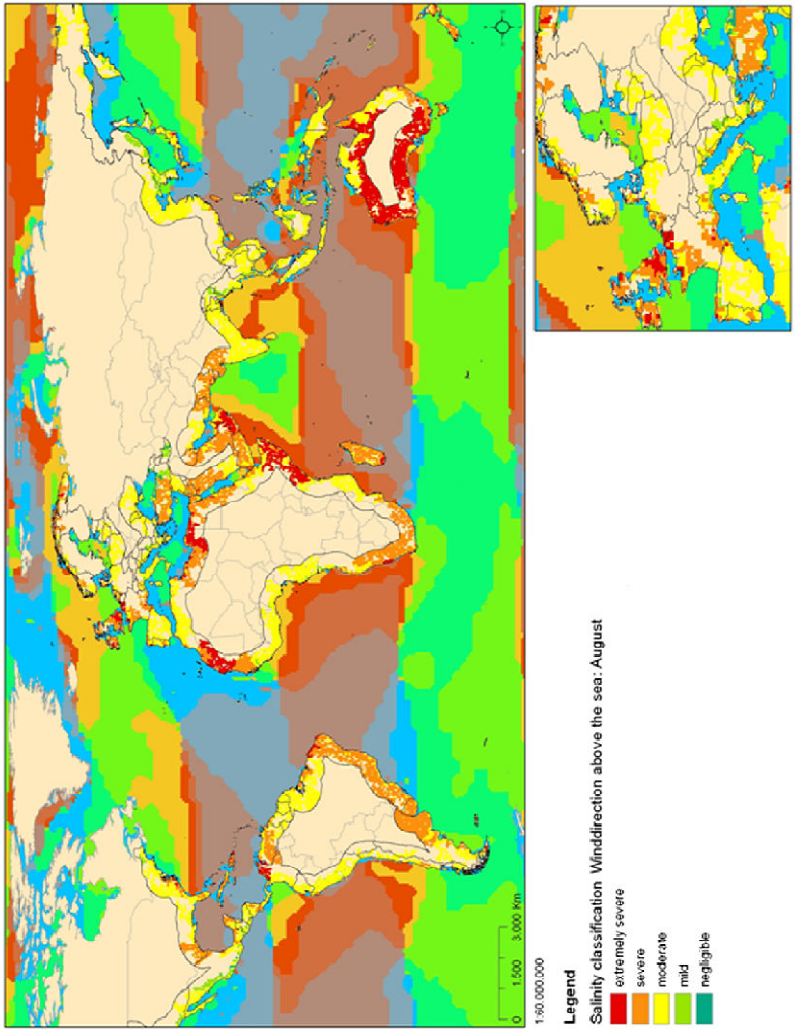
This chapter shows and describe how to have the correct care of your Tecnam Astore aircraft. Before illustrate how to clean the aircraft main parts, it is important to briefly describe how to take care of airframe against corrosion in some climates. Tecnam strongly recommend the use of:

ACF-50

This product is almost worldwide available and has an incredible effect against the corrosion accretion.

The Tecnam Service Bulletin N°19-LSA describes how to use the compound. In order to know more about the anti-corrosion treatment, refer to the relevant AMM sections.

The following world map (source SPIE digital library) can give an idea where special care against corrosion has to be taken into account.


Legend
Salinity classification Winddirection above the sea: August
extremely severe
severe
moderate
mild
negligible
1:60.000.000
0 1.500 3.000 Km

8.7.2. **Windows**

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

8.7.3. **External surfaces**

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

8.7.4. **Propeller**

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

8.7.5. **Engine**

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

8.7.6. **Internal surfaces**

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

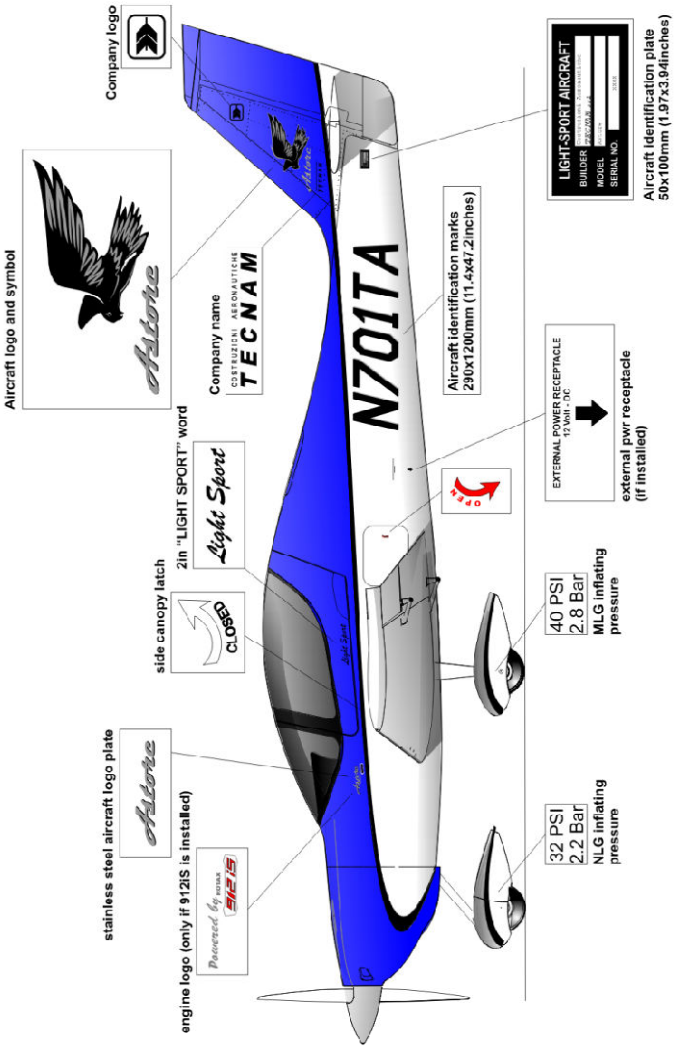
10. Section No. 10 - Marking and Placards

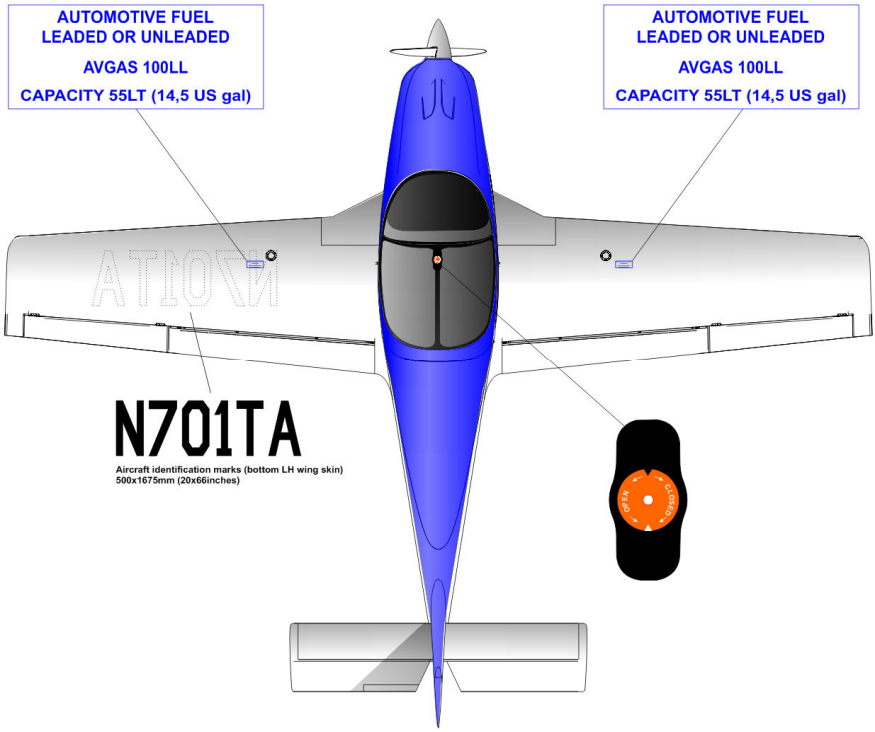
This section describes the placards and marking provided with the Tecnam Astore aircraft.

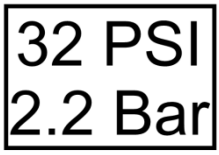
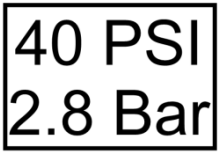
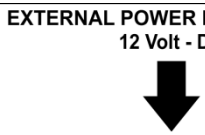
10.1. External marking

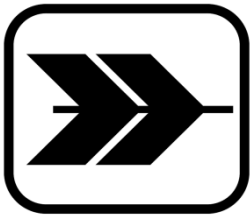
The following pictures show the external marking and placards. Refer to the relevant supplement if different equipment require additional markings (i.e. parachute system).

Also, a table indicates and describes all the marking dimensions and function.


Company logo
Aircraft logo and symbol
Company name
COSTRUZIONI AERONAUTICHE
TECNAM
2in "LIGHT SPORT" word
Light Sport
side canopy latch
CLOSED
stainless steel aircraft logo plate
engine logo (only if 912iS is installed)
N701TA
Aircraft identification marks
290x1200mm (11.4x47.2inches)
OPEN
EXTERNAL POWER RECEPTACLE
12 VDC
external pwr receptacle
(if installed)
LIGHT-SPORT AIRCRAFT
BUILDER
MODEL
SERIAL NO.
Aircraft identification plate
50x100mm (1.97x3.94inches)
40 PSI
2.8 Bar
MLG inflating
pressure
32 PSI
2.2 Bar
NLG inflating
pressure


AUTOMOTIVE FUEL
LEADED OR UNLEADED
AVGAS 100LL
CAPACITY 55LT (14,5 US gal)
AUTOMOTIVE FUEL
LEADED OR UNLEADED
AVGAS 100LL
CAPACITY 55LT (14,5 US gal)
N701TA
Aircraft identification marks (bottom LH wing skin)
500x1675mm (20x66inches)

	Nose Gear inflating pressure	17x12mm
	Main Gear inflating pressure	17x12mm
	"LIGHT SPORT"	55x250mm
	Aircraft logo	146x25mm
	Engine logo (only with 912iS)	96x26mm
	External power receptacle (only if installed)	107x40mm
	Baggage compartment key placard	25x35mm

	Aircraft logo (fin sticker)	395x220mm
	Company logo	120x100mm
COSTRUZIONI AERONAUTICHE TECNAM	Company name	160x30mm
	Aircraft identification plate (stainless steel)	100x50mm
N701TA	Aircraft marks	1200x290mm
	Canopy opening	90x190mm

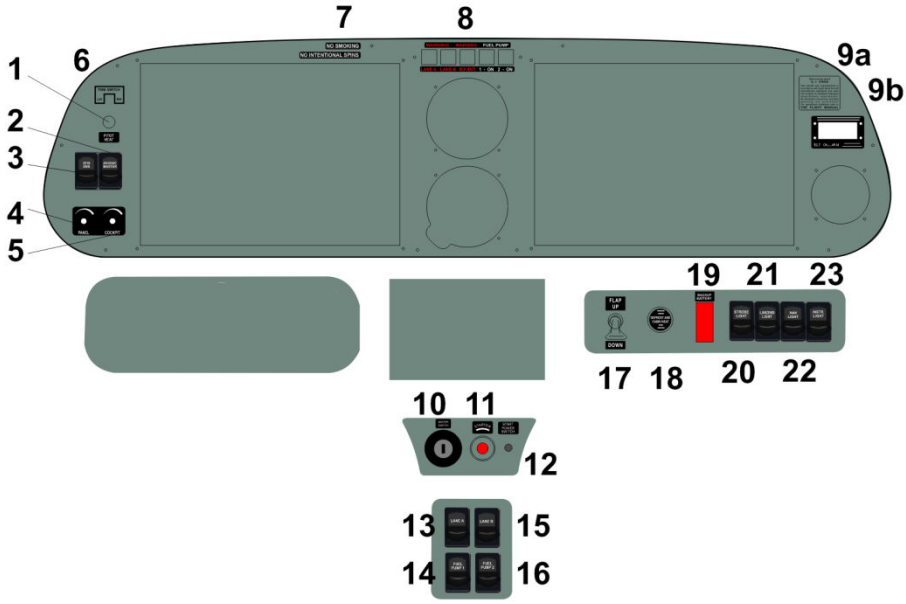
AUTOMOTIVE FUEL LEADED OR UNLEADED AVGAS 100LL CAPACITY 55LT (14,5 US gal)	Fuel tank capacity	100x40mm

10.2. **Internal marking and placards - 912iS**

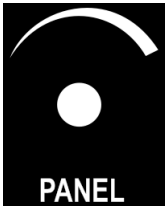
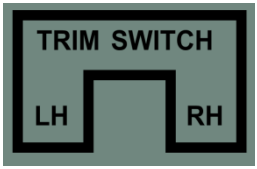
The following images show the internal placard and markings. The internal marking and placards may vary from the different versions and equipment. The following refer to the 912i Series engine installation.

NOTE

most of the switches are marked on their body. In the placards table each one is shown with the related function



1		Pitot heat (only if installed)
2		Avionic Master Switch

3		EFIS EMS Master Switch
4		Panel dimmer (if installed)
5		Cockpit light dimmer (if installed)
6		Trim selector switch
7		"NO SMOKING" "NO INTENTIONAL SPIN" placards

8		912i Series annunciator panel placards. See Sect. No 3 for operations and lamp colors
9a		Maneuvering speed Passenger warning
9b		ELT remote switch placard
10		Master switch (key)
11		Starter button
12		Start Power Switch

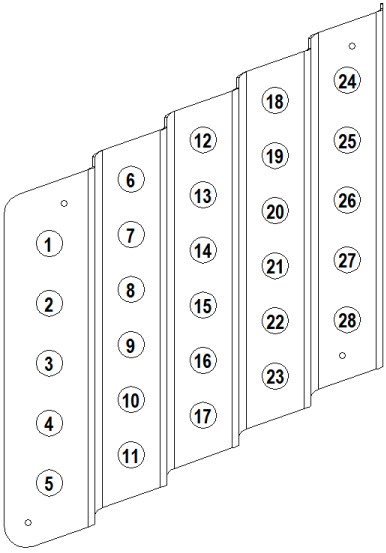
13		LANE A Switch
14		FUEL PUMP 1 Sw.
15		LANE B Switch
16		FUEL PUMP 2 Sw.
17		Flap Switch

18		Cabin heat knob
19		Back-up battery switch
20		Strobe Light Switch
21		Landing Light Switch
22		NAV Light Switch

23		Instr. Light Switch

10.3. **Breakers Panel Marking**

The following images and table show the circuit-breaker panel marking with the related value and function. The sequence assigned is following shown:



Note that the following table only show the breakers used for the basic 912iS configuration, refer to the relevant POH Supplement to know more about the additional equipment breaker position and value.

N°	Amps rating	description	N°	Amps rating	Description
1	25	Battery	**15**	AV.	Spare
2	25	Generator	**16**	10	12V Socket
3	7½	Instruments	**17**	AV.	Spare
4	5	Instr. Light	**18**	5	MFD
5	5	Bagg.Comp. Lt.	**19**	2	ADAHRS
6	7½	Flap	**20**	AV.	Spare
7	3	Trim	**21**	AV.	Spare
8	AV.	Spare	**22**	AV.	Spare
9	7½	Strobe Light	**23**	AV.	Spare
10	3	Nav Light	**24**	AV.	Spare
11	3	LND Light	**25**	AV.	Spare
12	5	PFD	**26**	AV.	Spare
13	2	ADARHS	**27**	AV.	Spare
14	2	EIS	**28**	AV.	Spare

10.4. Baggages compartment placard

As per Section No. 2, the baggage compartment is allowed for a maximum load of 77lb/35kg. This load is what Tecnam used to demonstrate the crash loads strength of cargo net and related hooks. The placard dimensions are 100x50mm.

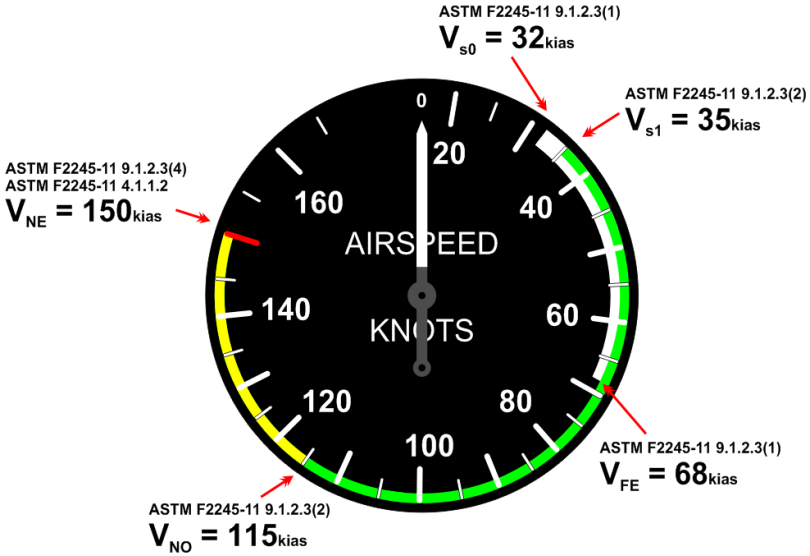
WARNING

It is pilot's responsibility to always check that the aircraft is properly balanced before going in-flight.

10.5. **Airspeed Indicator markings**

This paragraph show the ASI markings and dials. Refer to the Section No.2 - Limitations to be fully aware of all the instruments limits.

The Tecnam Astore is always provided by an analogue Airspeed Indicator, with an internal dial and markings according the ASTM F2245. The ASI dial is shown in the following picture:



The ASI markings are in IAS, refer to the Section No.2 - Limitations, for all the corresponding CAS speeds.

10.6. Engine cowling placards

The following placards are sticked inside the engine compartment:

1	COOLANT waterless not approved on 912iS	Placard on the overflow bottle clamp
2	8O% ANTIFREEZE + 20% WATER no waterless coolant	Coolant ratio
3	AUTOMOTIVE OIL APL "SF" OR "SG"	Oil specs placard (on the oil tank side)
4	SPECIFY HYDRAULIC OIL MIL H5606	Brake system oil (on the brake system tank)

9. Section No. 9 - Supplements

Aircraft S/N:_____	Marks:_____	Date:_____

TECNAM ASTORE SUPPLEMENT LIST						
Supp. No.	Title	Rev.	Date	APPLICABLE		Mark if installed
				YES	NO	
S1	Garmin G3X avionics package	01	03/25/14	•		
S2	Garmin GSA28 based autopilot with GMC305 mode controller	00	02/18/14	Required S1		
S3	Garmin GTX23 Mode S remote mounted tran-sponder	00	02/18/14	Required S1		
S4	Garmin ADS-B unit	00	02/18/14	Required S1+S3		
S5	Garmin GMA240 audio panel	00	02/18/14	•		
S6	Garmin GTR200 COM	00	02/18/14	•		
S7	GAP26 AOA	00	02/18/14	Required S1 for AOA indic.		
S8	ELT Artex ME406	00	02/25/14	•		

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Record of revisions

Any revision to the Supplements is recorded: a Record of Revisions is provided at the front of this Supplement List and the operator is advised to make sure that the record is kept up-to-date.

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.

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.

List of effective pages

The List of Supplements' Effective Pages (LOSEP), applicable to manuals of every operator, lists all the basic Supplement pages.

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

Supplement	Pages	Revision
S1	1 thru 13	01
S2	1 thru 11	00
S3	1 thru 7	00
S4	1 thru 6	00
S5	1 thru 7	00
S6	1 thru 8	00

Supplement	Pages	Revision
S7	1 thru 8	00
S8	1 thru 7	00

1.1. **Supplement S1 - Garmin G3X avionics suite**

SUPPLEMENT S1

GARMIN G3X AVIONICS SUITE

WARNING

This supplement must be inserted into the POH if the equipment described is installed onboard

Revision n. **01**

Date: **03/25/2014**

1.1.1. **S1 - 1 - General**

This Supplement shows the main features, characteristics and procedures to operate the Garmin G3X avionics suite. The operator must be fully aware of all the official documentation provided by GARMIN concerning the system.

WARNING

Download the Pilot's Guide and read it carefully before start operating the Garmin AFCS on your Tecnam Astore. Latest revision of Garmin Pilot's Guide (P/N 190-01115-00L) must be carried onboard.

G3X suite is available with 7 inches or 10 inches screens. The 7 inches version can be supplied with three screens and is soft-buttons operated, while the 10 inches is only available in dual screens configuration and is mixed touch screen-soft buttons and knob operated. This suite offer the most wide flight and engine management information provision, but also information like fuel management, flap and trim position and GPS based data are available. In this Supplement, only the most relevant information concerning the G3X suite are shown, while it is pilot's (operator's) responsibility to be fully aware of the system functions, operating limitations and also, but not less important, the pilot must be always aware of his own capability in using an high integrated-high information providing unit. For this reason, a deep training with experienced flight instructor is considered as mandatory before starting the use of a Tecnam Astore equipped with a G3X suite.

NOTE

Even if all the flight data are provided inside the G3X suite, and even if, according with ASTM F2245-11 Sect. A2 the data provided can be sufficient to fly the properly equipped Tecnam Astore at Night (where approved), Tecnam install a back-up analogue airspeed indicator and altimeter. The back-up of attitude and air data is also provided via a dual ADAHRS (GSU25) installation.

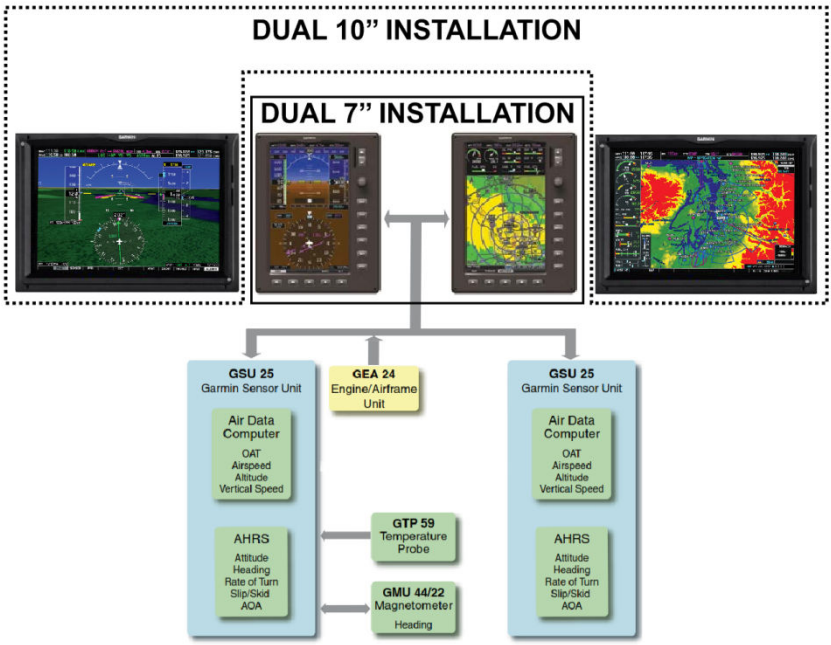
The system components are described in the Section S1-7, while in order to be fully aware of the system features it is mandatory to read the Garmin manuals available on the web at the link below:

http://www.garmin.com/en-US/explore/intheair/

NOTE

The system layout as installed on Tecnam Astore, basic G3X configuration is shown below. Refer to the relevant Supplement(s) in order to know more about the additional units such as radio, transponder, autopilot, ADS-B, heated pitot and so on, that can be interfaced with G3X.

Tecnam Astore G3X suite basic configuration layout



NOTE

when the G3X suite is installed, the aircraft is provided with an EFIS SWITCH. As soon as the MASTER and the EFIS switches are ON, the displays will load the software.

1.1.2. **S1 - 2 - Limitations**

The following limitation shall apply when the Tecnam Astore is equipped with Garmin G3X avionics suite, in addition to the standard POH Sect.2 and to those coming from the latest Garmin pilot's and installation documentation:

1) If installed, the G3X Terrain Proximity feature is NOT intended to be used as a primary reference for terrain avoidance and does not relieve the pilot from the responsibility of being aware of surroundings during flight;
2) During flight operations, carefully compare indications from the G3X to all available navigation sources, including the information from other NAVAIDs, visual sightings, charts, etc;
3) The displayed minimum safe altitudes (MSAs) are only advisory in nature and should not be relied upon as the sole source of obstacle and terrain avoidance information. Always refer to current aeronautical charts for appropriate minimum clearance altitudes;
4) Always use pressure altitude displayed by the G3X PFD when determining or selecting aircraft altitude;
5) Do not use outdated database information;
6) Do not use basemap (land and water data) information for primary navigation;
7) Do not use the approach information provided by the VFR navigation database residing within the G3X as a means of navigating any instrument approach;
8) The G3X Fuel Calculator and/or Fuel Range Rings are NOT intended to be relied upon as the primary fuel indicator(s), and does not relieve the pilot from the responsibility of proper flight planning;
9) Even if back-up instruments are fully operative, if error or system inoperative messages should appear, Tecnam recom-

mends to solve the issue before flying in order to avoid misreading of data coming from avionics and back-up instruments;

1.1.3. **S1 - 3 - Emergency procedures**

Refer to the standard POH Sect No.3 - Emergency procedures, to manage the overvoltage/generator failure. Note that, if the G3X suite is installed on your Tecnam Astore, the monitoring of LANE A Volt, LANE B Volt and battery charge voltage are displayed on the G3X MFD.

1.1.4. **S1 - 4 - Normal procedures**

When the Tecnam Astore is equipped with Garmin G3X avionic suite, in addition to the standard POH Sect.4, there is the EFIS/EMS switch to be turned ON to power the units.

NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin G3X avionic suite on your Tecnam Astore. Latest revision of Garmin Pilot's Guide (P/N 190-01115-00L) must be carried onboard.

1.1.5. **S1 - 5 - Performances**

Garmin AFCS employment does not affect the aircraft performances.

1.1.6. **S1 - 6 - Weight and Balance**

When installed, the Garmin a/p is composed by the following units/components (Arm in reference with the propeller flange without spacer:

Description	Weight [kg]	Arm [mt]	Moment
34 - NAVIGATION			
7" single display unit	0.85	1.41	1.20
10" single display unit	2.11	1.41	2.98
GSU 25 ADAHRS	0.35	2.85	1.00
GSU 25 ADAHRS - second unit	0.35	2.97	1.00
GEA 24 EIS	0.75	1.27	1.00
GTP 59 OAT probe	0.06	2.12	0.10
GMU 22 magnetometer	0.31	5.23	1.60
Wiring assembly, switches, breakers and rel. components	6.00	2.19	13.1

1.1.6.1.Equipment List

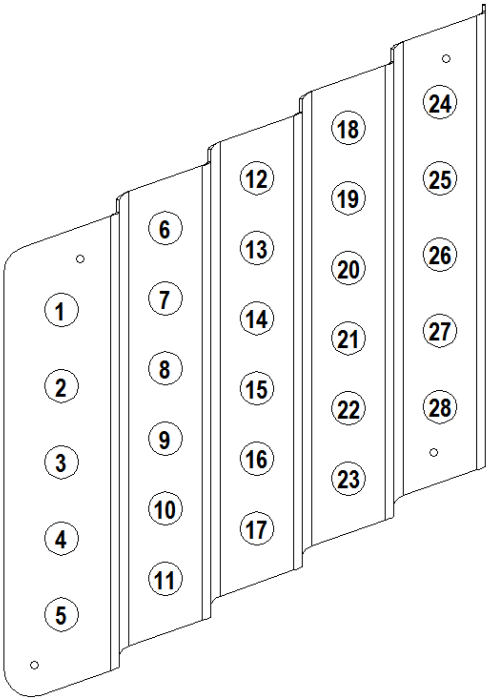
If the Garmin G3X avionics suite is installed, the related equipment list (and related equipment necessary to fly according LSA requirements, DAY and NIGHT conditions) is following illustrated:

ITEM	Description	**S**tandard **O**ptional **M**andatory*	Weight [kg]	Arm [mt]
	24 - ELECTRICAL POWER			
	External alternator - 40A	**O**	3.50	0.09
	Battery - Spark500*	**O**	4.90	0.70
	Battery - Alliant X3	**S - M**	1.00	0.70
	34 - NAVIGATION			
	Compass (pedestal mounted)	**S - M**	0.30	1.37
	Compass (as displayed inside the G3X)	**S**	0	0
	Airspeed indicator - analogue back up	**S - M**	0.40	1.37
	Altitude indicator - analogue back up	**S - M**	0.40	1.37
	GARMIN G3X EMS display information	**S - M**	0.80	1.41
	GARMIN G3X flight and attitude display information	**S - VFRN**	0.80	1.41
	77 - ENGINE INDICATING			
	MAP indicator	**O**	0.40	1.38
	Garmin G3X EMS display (replaces Dynon D-10 EMS)	**S - M**	0.80	1.41

*The Spark 500 battery is required when the aircraft is operated with 912iS engine

1.1.1. **S1 - 7 - System description**

When installed, the G3X avionic suite components require a completely dedicated electrical system with circuit breakers following illustrated:



N°	Amps rating	description	N°	Amps rating	Description
1	25	Battery	**15**	7.5	Autopilot
2	25	Generator	**16**	10	12V Socket
3	7½	Instruments	**17**	3	ADS-B
4	5	Instr. Light	**18**	5	MFD
5	5	Bagg.Comp. Lt.	**19**	2	ADAHRS
6	7½	Flap	**20**	10	COM
7	3	Trim	**21**	4	NAV
8	20	Pitot	**22**	5	AUDIO P.
9	7½	Strobe Light	**23**	5	XPDR
10	3	Nav Light	**24**	AV.	Spare
11	3	LND Light	**25**	AV.	Spare
12	5	PFD	**26**	AV.	Spare
13	2	ADARHS	**27**	AV.	Spare
14	2	EIS	**28**	AV.	Spare

Following the basic panel layout is shown when it is installed with ROTAX 912ULS:

N°	description	N°	Description
1	EFIS Master	**8**	Ignition key
2	PFD	**9**	Master-Gen switch
3	MFD	**10**	Flap switch
4	Light dimmers	**11**	Cabin heat knob
5	Back-up airspeed indicator	**12**	Landing Light
6	Available	**13**	Strobe Light
7	Altitude indicator	**14**	NAV Light
15	Fuel Pump switch		

Following the basic panel layout is shown when it is installed with ROTAX 912i Series engine:

N°	description	N°	Description	N°	Description
1	EFIS Master	**9**	Cabin heat knob	**17**	Start PWR switch
2	PFD	**10**	Back-up batt. Sw.	**18**	LANE A switch
3	912iS annunciator panel	**11**	Landing Light	**19**	LANE B switch
4	MFD	**12**	Strobe Light	**20**	FUEL P.1 switch
5	Back-up airspeed indicator	**13**	NAV Light	**21**	FUEL P.2 switch
6	Altitude indicator	**14**	Instrument ligt	**22**	//
7	Available	**15**	Master key	**23**	//
8	Flap switch	**16**	Starter button	**24**	//

1.1. **Supplement S2 - Garmin autopilot**

SUPPLEMENT S2

GARMIN AUTOMATIC FLIGHT CONTROL SYSTEM

WARNING

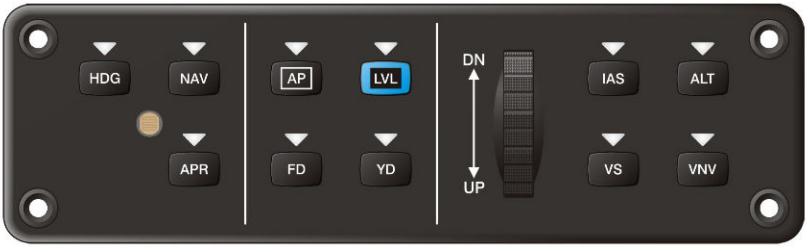
This supplement must be inserted into the POH if the equipment described is installed onboard

Revision n. **00**

Date: **02/18/2014**

1.1.1. **S2 - 1 - General**

This Supplement shows the main features, characteristics and procedures to operate the Garmin AFCS. The operator must be fully aware of all the official documentation provided by GARMIN concerning the autopilot system.



NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin AFCS on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

G3X suite can communicate with Garmin AFCS. On Tecnam Astore the GMC305 mode controlled is installed to provide the most flexible way to control the autopilot modes and functions. The GMC305 is installed on the lower LH panel section together with the a/p master switch.

Tecnam Astore installation provides the installation of pitch and roll servos. No yaw damper is required due to the high directional stability. Servos are connected to the control system via rigid rods. No pulleys or cable are installed so that the maintenance is easier and inspections immediate.

1.1.2. **S2 - 2 - Limitations**

The following limitation shall apply when the Tecnam Astore is equipped with Garmin AFCS, in addition to the standard POH Sect.2:

1) The AFCS can be operated in the 70-115kIAS airspeed range, according with the placard on the cockpit panel;
2) The autopilot must not be used for final approach procedure. In order to know more about the APR modes for LOC/ILS approaches refer to the latest Garmin Pilot's Guide;
3) During autopilot operations the pilot must remain seated on its place with safety belts secured, continuously monitoring the flight instruments;
4) The use of autopilot with flap extended more than T/O position is forbidden;
5) A/P MASTER SWITCH must be OFF during takeoff and final approach (decision height 200'AGL);
6) Autopilot must be operated during normal cruise and descent only above 1.000ft
7) Limitation placard:

8) Do not set parameters in terms of vertical speed which go above the climb rates shown in the Section no.5

1.1.3. **S2 - 3 - Emergency procedures**

The following emergency procedures shall apply when the Tecnam Astore is equipped with Garmin AFCS, in addition to the standard POH Sect.3:

CAUTION

In event of autopilot malfunction, or when the system is not performing as expected or commanded, take immediately the aircraft control disconnecting the autopilot which must be set inoperative until the failure has been identified and corrected

1.1.3.1.Failure to hold selected function

Control stick	GRASP firmly to override the a/p servos
A/P master switch	OFF
Aircraft control	Establish

NOTE

The elevator trim is completely separated from the autopilot control line, so it can be operated even if a/p master switch is OFF

1.1.4. **S2 - 4 - Normal procedures**

The following normal procedures shall apply when the Tecnam Astore is equipped with Garmin AFCS, in addition to the standard POH Sect.4:

NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin AFCS on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

WARNING

The vertical speed mode is used to establish and hold a PILOT selected vertical speed. It is the responsibility of the pilot to ensure that the vertical speed selection is within the operating limits of the aircraft's capabilities. Selection of a vertical speed beyond the capability of the aircraft can create a condition of reduced airspeed, and possibly lead to a stall condition.

1.1.5. **S2 - 5 - Performances**

Garmin AFCS employment does not affect the aircraft performances.

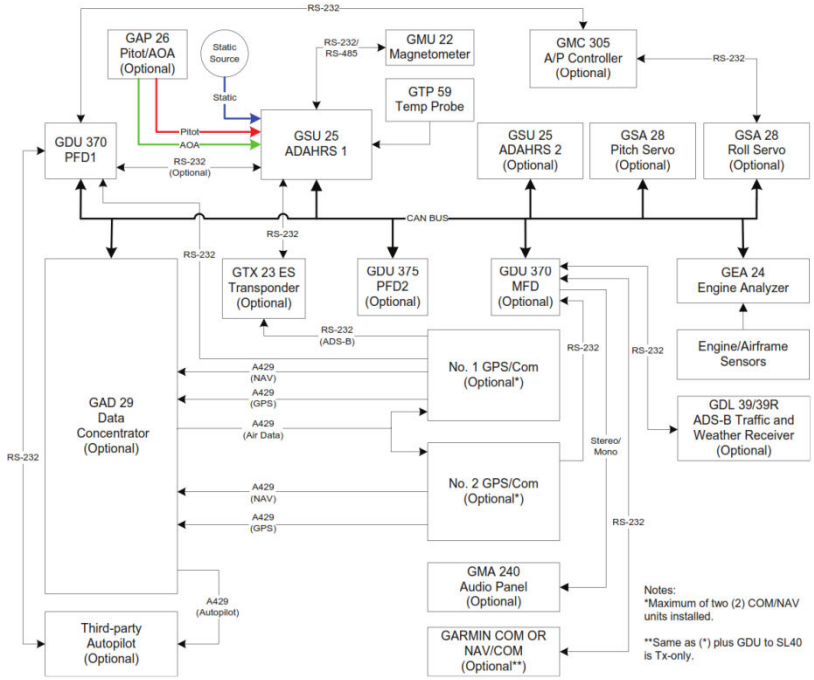
1.1.6. **S2 - 6 - Weight and Balance**

When installed, the Garmin a/p is composed by the following units/components (Arm in reference with the propeller flange without spacer:

Description	Weight [kg]	Arm [mt]	Moment
22 - AUTO FLIGHT			
Garmin Autopilot GMC305 Mode Controller	0.30	1.46	0.44
Garmin GSA28 elevator servo	0.70	3.47	2.43
Garmin GSA28 roll servo	0.70	2.40	1.68
Elevator servo control rod	0.15	3.62	0.54
Roll servo control rod	0.10	2.44	0.24
Wiring	2.00	2.16	4.40
TOTALS	**3.95**		**9.73**

1.1.1. **S2 - 7 - System description**

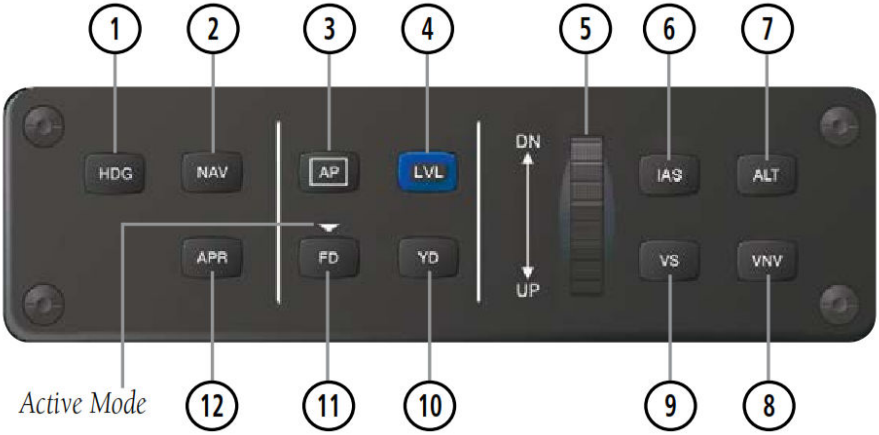
The Garmin autopilot logic schematic is following illustrated. As shown, the main autopilot components are the G3X displays (where the information is shown), the GMC305 mode controller, the elevator and roll servos. The Tecnam Astore also includes the interface components such as a/p master switch, control rods and related components.



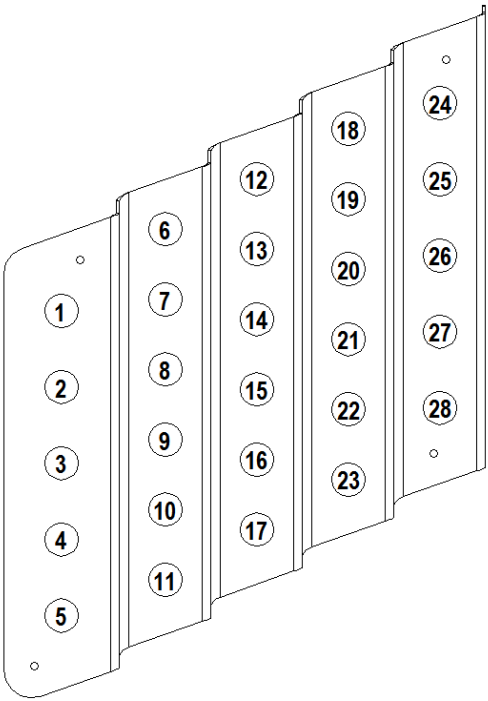
The Tecnam Astore is equipped with external AP DISC button (on the control stick), and with an AP MASTER switch. It is not provided with T/O - GO AROUND mode switch. This must be taken into account when performing the procedures described in the Garmin Pilot's guide. The main control button functions of GMC305 are:

1) Heading Select Mode;
2) Navigation Mode;
3) AP engage/disengage;
4) LEVEL mode;

5) Nose UP/DN wheel to adjust the mode reference in pitch hold, vertical speed, indicated airspeed, and altitude hold;
6) IAS Mode select/deselect;
7) ALT Mode select/deselect;
8) VNV Mode select/deselect;
9) VS Mode select/deselect;
10) YAW DAMPER - NOT ACTIVE;
11) Flight Director Mode select/deselect;
12) APR Mode select/deselect;



In addition to those circuit breakers used for G3X avionics suite, the autopilot installation requires an additional breaker located in the position 15 as shown below:



N°	Amps rating	description	N°	Amps rating	Description
1	25	Battery	**15**	5	Autopilot
2	25	Generator	**16**	10	12V Socket
3	7½	Instruments	**17**	AV.	Spare
4	5	Instr. Light	**18**	5	MFD
5	5	Bagg.Comp. Lt.	**19**	2	ADAHRS
6	7½	Flap	**20**	AV.	Spare
7	3	Trim	**21**	AV.	Spare
8	AV.	Spare	**22**	AV.	Spare
9	7½	Strobe Light	**23**	AV.	Spare
10	3	Nav Light	**24**	AV.	Spare
11	10	LND Light	**25**	AV.	Spare
12	5	PFD	**26**	AV.	Spare
13	2	ADARHS	**27**	AV.	Spare
14	2	EIS	**28**	AV.	Spare

1.1. **Supplement S3 - Garmin GTX23 Mode S xtr**

SUPPLEMENT S3

GARMIN GTX 23 MODE S REMOTELY MOUNTED TRANSPONDER

WARNING

This supplement must be inserted into the POH if the equipment described is installed onboard

Revision n. **00**

Date: **02/18/2014**

1.1.1. **S3 - 1 - General**

This Supplement shows the main features, characteristics and procedures to operate the Garmin GTX transponder. The operator must be fully aware of all the official documentation provided by GARMIN concerning the system.

NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin integrated transponder on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

G3X suite can communicate with Garmin GTX 23 remote transponder unit. The proper button allows to enter the standard xtr functions such as code insertion and mode.

1.1.2. **S3 - 2 - Limitations**

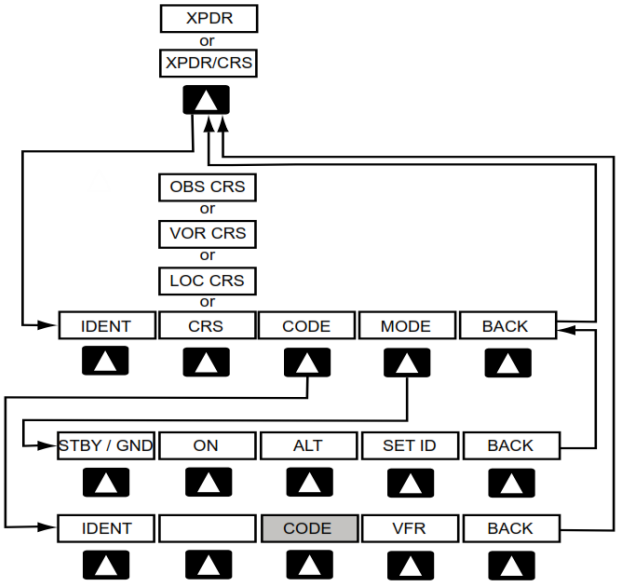
Garmin GTX 23 employment does not affect the aircraft limitations.

1.1.3. **S3 - 3 - Emergency procedures**

Garmin GTX 23 employment does not affect the aircraft emergency procedures. Refer to the current national requirement in terms of emergency codes and inoperative transponder conditions.

1.1.4. **S3 - 4 - Normal procedures**

When operating with G3X suite, the xtr employment is very easy and intuitive. It is only required to go through a "button flow" to set the xtr menu, the several functions as ident, crs, code, mode and "back", sub-functions regarding the operating mode and "code" sub-functions. Following a most clear flow schematic:



1.1.5. **S3 - 5 - Performances**

Garmin GTX 23 employment does not affect the aircraft performances.

1.1.6. **S3 - 6 - Weight and Balance**

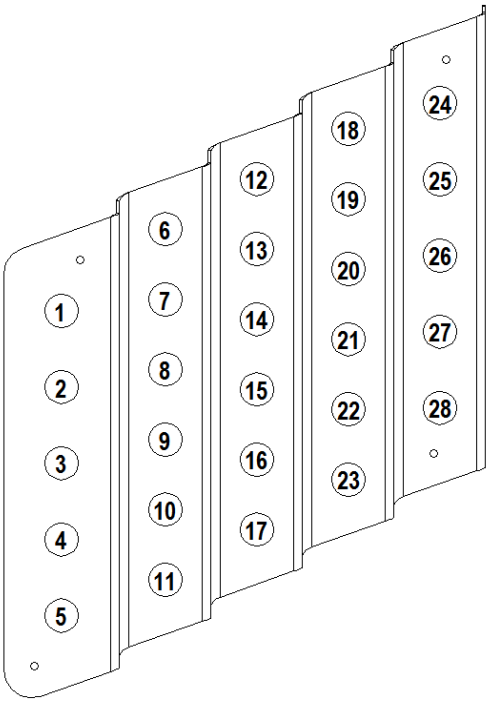
When installed, the Garmin GTX 23 remotely mounted transponder is composed by the following units/components (Arm in reference with the propeller flange without spacer:

Description	Weight [kg]	Arm [mt]	Moment
23 - COMMUNICATIONS			
Garmin GTX 23 remote unit	2.20	3.45	7.60
Wiring	2.00	2.16	4.30
Tranponder antenna	0.10	1.83	0.20
TOTALS	**4.30**		**12.10**

1.1.1. **S3 - 7 - System description**

The transponder system, when installed, is composed by the unit rack, the antenna and the G3X suite (control display). The remotely mounted unit (shown in the picture below), is connected to the rear cabin section, in correspondence with the parachute container structure. The access to the rack is possible after dismounting the rear baggage compartment vertical wall.

In addition to those circuit breakers used for G3X avionics suite, the GTX 23 Mode S transponder installation requires an additional breaker located in the position 23 as shown below:



N°	Amps rating	description	N°	Amps rating	Description
1	25	Battery	**15**	AV.	Spare
2	25	Generator	**16**	10	12V Socket
3	7½	Instruments	**17**	AV.	Spare
4	5	Instr. Light	**18**	5	MFD
5	5	Bagg.Comp. Lt.	**19**	2	ADAHRS
6	7½	Flap	**20**	AV.	Spare
7	3	Trim	**21**	AV.	Spare
8	AV.	Spare	**22**	AV.	Spare
9	7½	Strobe Light	**23**	5	XPDR
10	3	Nav Light	**24**	AV.	Spare
11	10	LND Light	**25**	AV.	Spare
12	5	PFD	**26**	AV.	Spare
13	2	ADARHS	**27**	AV.	Spare
14	2	EIS	**28**	AV.	Spare

1.1. **Supplement S4 - Garmin ADS-B unit**

SUPPLEMENT S4

GARMIN ADS-B UNIT

WARNING

This supplement must be inserted into the POH if the equipment described is installed onboard

Revision n. **00**

Date: **02/18/2014**

1.1.1. **S4 - 1 - General**

This Supplement shows the main features, characteristics and procedures to operate the Garmin ADS-B (Automatic Dependent Surveillance-Broadcast) unit on Tecnam Astore aircraft.

NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin ADS-B unit on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

1.1.2. **S4 - 2 - Limitations**

Garmin ADS-B probe employment does not affect the aircraft limitations.

NOTE

The ADS-B unit and related capabilities are not available for all countries worldwide, but only where the ground stations network operates. Check the service availability before operating the system.

WARNING

Do not use data link weather information for maneuvering in, near, or around areas of hazardous weather. Information contained within data link weather products may not accurately depict current weather conditions.

WARNING

Do not rely solely upon the display of traffic information for collision avoidance maneuvering. The traffic display does not provide collision avoidance resolution advisories and does not under any circumstances or conditions relieve the pilot's responsibility to see and avoid other aircraft.

1.1.3. **S4 - 3 - Emergency procedures**

Garmin ADS-B probe employment does not affect the aircraft emergency procedures.

1.1.4. **S4 - 4 - Normal procedures**

When installed (together with a Mode S transponder), configured and activated, the ADS-B unit is able to receive signals of other traffic and weather stations (where the service is available). Also, the system provides the uplink of the aircraft position and altitude to the other airplanes.

NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin ADS-B on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

1.1.5. **S4 - 5 - Performances**

Garmin ADS-B probe employment does not affect the aircraft performances.

1.1.6. **S4 - 6 - Weight and Balance**

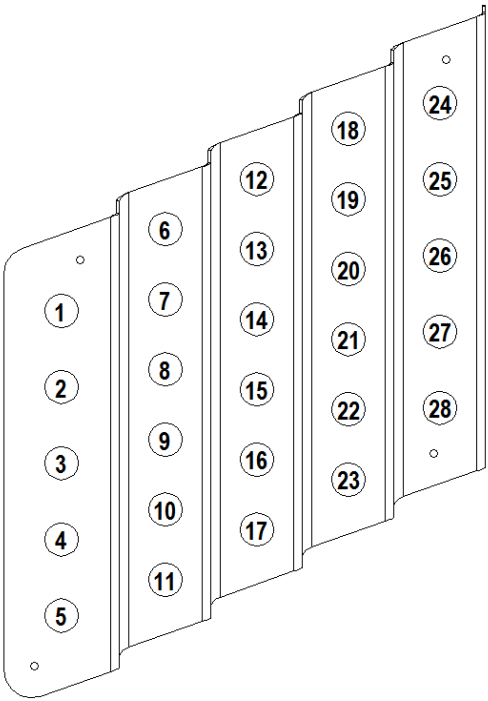
Garmin ADS-B system consists in a GDL-39R, remotely mounted unit, which interfaces with G3X screen(s). The unit weight and position is shown below:

Description	Weight [kg]	Arm [mt]	Moment
34 - NAVIGATION			
GDL 39R unit	0.25	1.27	0.32
ADS-B antenna	0.10	3.00	0.30
ADS-B wiring	0.60	1.40	0.84
TOTALS	**0.95**		**1.46**

1.1.7. **S4 - 7 - System description**

The remote-mountable version of the product, the GDL 39R, provides subscription-free U.S. weather and traffic information, complete with TargetTrend™ relative motion and SURF technologies, to your experimental or light sport aircraft's G3X flight display. It can also simultaneously connect to two other devices – like a Garmin aviation portable or mobile device running Garmin Pilot – using a wireless Bluetooth® connection.

In addition to those circuit breakers used for G3X avionics suite and GTX 23 Mode S Transponder, the ADS-B installation requires an additional breaker located in the position 17 as shown below:



N°	Amps rating	description	N°	Amps rating	Description
1	25	Battery	**15**	AV.	Spare
2	25	Generator	**16**	10	12V Socket
3	7½	Instruments	**17**	3	ADS-B
4	5	Instr. Light	**18**	5	MFD
5	5	Bagg.Comp. Lt.	**19**	2	ADAHRS
6	7½	Flap	**20**	AV.	Spare
7	3	Trim	**21**	AV.	Spare
8	AV.	Spare	**22**	AV.	Spare
9	7½	Strobe Light	**23**	5	XPDR
10	3	Nav Light	**24**	AV.	Spare
11	10	LND Light	**25**	AV.	Spare
12	5	PFD	**26**	AV.	Spare
13	2	ADARHS	**27**	AV.	Spare
14	2	EIS	**28**	AV.	Spare

1.1. **Supplement S5 - Garmin GMA240 audio panel**

SUPPLEMENT S5

GARMIN GMA 240 AUDIO PANEL

WARNING

This supplement must be inserted into the POH if the equipment described is installed onboard

Revision n. **00**

Date: **02/18/2014**

1.1.1. **S5 - 1 - General**

This Supplement shows the main features, characteristics and procedures to operate the Garmin GMA240 Audio Panel. The operator must be fully aware of all the official documentation provided by GARMIN concerning the autopilot system.

NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin GMA240 on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

The Garmin GMA 240 is a headphones only audio control panel. Pushbutton keys control audio selection of COM, NAV, telephone (TEL - not active on Tecnam Astore), and intercom. Two AUX inputs are available for additional avionics or audio devices. LED annunciators indicate when a key function is selected. Annunciator brightness is adjusted automatically by photocell dimming. LED-illuminated key brightness is adjusted by the radio dimming bus control. In case power is interrupted or the unit is turned off, a fail-safe circuit connects the Pilot's headset, microphone, and PTT directly to COM 1 and the fail-safe alert audio, such as an autopilot disconnect tone. In addition to

radio squelch circuitry, MASQTM (Master Avionics Squelch) processing further reduces ambient noise from the avionics inputs.

When installed, the GMA240 is activated/shut-down by the AVIONIC MASTER SWITCH.

1.1.2. **S5 - 2 - Limitations**

Garmin GMA 240 employment does not affect the aircraft limitations.

1.1.3. **S5 - 3 - Emergency procedures**

Garmin GMA 240 employment does not affect the aircraft emergency procedures.

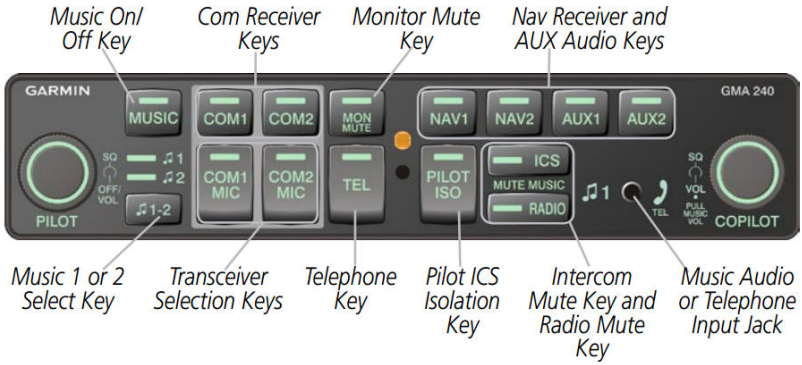
1.1.4. **S5 - 4 - Normal procedures**

The following normal procedures shall apply when the Tecnam Astore is equipped with Garmin GMA 240, in addition to the standard POH Sect.4:

NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin AFCS on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

The basic functions and soft buttons are shown in the picture below. As soon as selected, each function is illuminated with a self-dimming LED.



1.1.5. **S5 - 5 - Performances**

Garmin GMA 240 employment does not affect the aircraft performances.

1.1.6. **S5 - 6 - Weight and Balance**

When installed, the Garmin GMA 240 is composed by the following units/components (Arm in reference with the propeller flange without spacer:

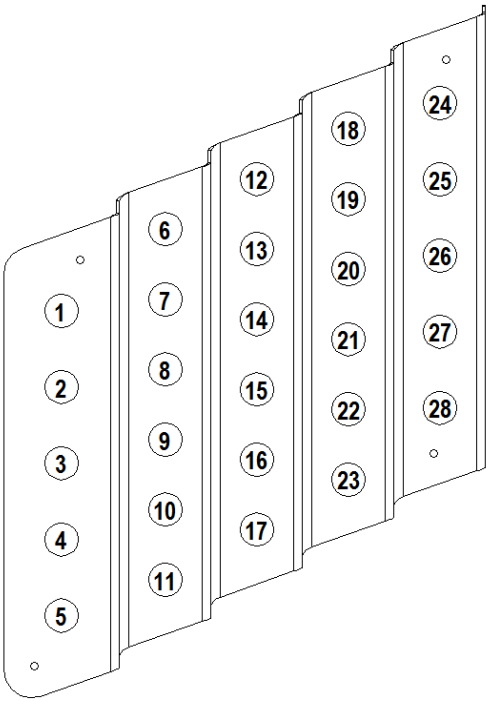
Description	Weight [kg]	Arm [mt]	Moment
23 - COMMUNICATIONS			
Garmin GMA 240 audio panel & mounting rack	0.68	1.32	0.90
Wiring	1.30	1.30	1.70
TOTALS	**1.98**		**2.60**

1.1.1. **S5 - 7 - System description**

The Garmin GMA 240 Audio Panel is not a TSO-certified product and has received no FAA approval or endorsement.

The GMA 240 meets the needs of aircraft owners and operators who require reliability and versatility in the essential audio switching function. LED-illuminated push-button simplicity and intuitive panel layout allow audio selection of both NAV and COM audio. Large, single-button activation of the COM microphone and audio for two COM transceivers simplifies cockpit workload. Photocell dimming circuitry automatically adjusts the brightness of the annunciators to a level appropriate for ambient cockpit light. The brightness of the backlighting is controlled by the aircraft lighting bus. A fail-safe circuit connects the pilot's headset and microphone directly to COM1 and a fail-safe warning audio input in the event that power is interrupted or the unit is turned off. Additionally, the GMA 240 includes a four-position intercom (ICS) with electronic cabin noise deemphasis, two stereo music inputs, and independent pilot and copilot/passenger volume controls. To further simplify the cockpit workload, the intercom provides for pilot isolation. One hundred percent solid state circuitry and extensive use of surface mount technology are employed.

In addition to those circuit breakers used for the standard Tecnam Astore package, the GMA 240 audio panel installation requires an additional breaker located in the position 22 as shown below:



N°	Amps rating	description	N°	Amps rating	Description
1	25	Battery	**15**	AV.	Spare
2	25	Generator	**16**	10	12V Socket
3	7½	Instruments	**17**	AV.	Spare
4	5	Instr. Light	**18**	AV.	Spare
5	5	Bagg.Comp. Lt.	**19**	AV.	Spare
6	7½	Flap	**20**	AV.	Spare
7	3	Trim	**21**	AV.	Spare
8	AV.	Spare	**22**	5	Audio Panel
9	7½	Strobe Light	**23**	AV.	Spare
10	3	Nav Light	**24**	AV.	Spare
11	10	LND Light	**25**	AV.	Spare
12	AV.	Spare	**26**	AV.	Spare
13	AV.	Spare	**27**	AV.	Spare
14	AV.	Spare	**28**	AV.	Spare

1.1. **Supplement S6 - Garmin GTR200 COM**

SUPPLEMENT S6

GARMIN GTR200 COM

WARNING

This supplement must be inserted into the POH if the equipment described is installed onboard

Revision n. **00**

Date: **02/18/2014**

1.1.1. **S6 - 1 - General**

This Supplement shows the main features, characteristics and procedures to operate the Garmin GTR 200 VHF communications transceiver. The GTR 200 operates in the aviation voice band, from 118.000 to 136.975 MHz, in 25 kHz steps.

NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin GTR 200 on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

1.1.2. **S6 - 2 - Limitations**

Garmin GTR 200 VHF COM employment does not affect the aircraft limitations.

1.1.3. **S6 - 3 - Emergency procedures**

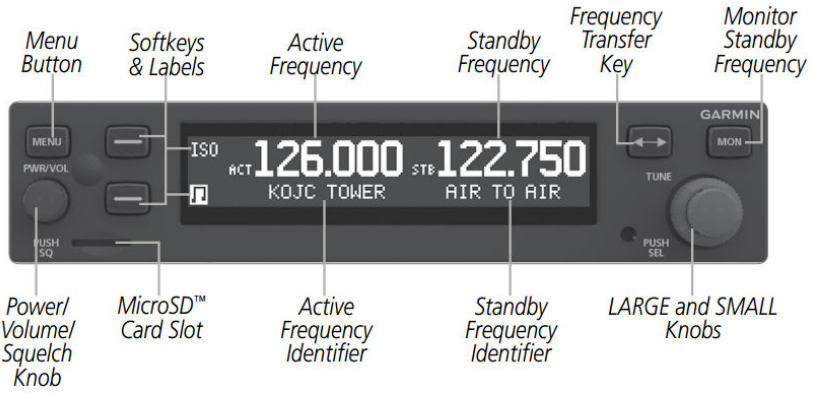
Garmin GTR 200 VHF COM employment does not affect the aircraft emergency procedures.

NOTE

Press and hold for about 3 seconds the Freq. Transfer key (red rounded in the picture below) to set the emergency 121.500MHz frequency.

1.1.4. **S6 - 4 - Normal procedures**

The basic functions, display and soft buttons functions are shown in the picture below:



The LH displayed frequency is the active one. Below it, the ICAO identifier code is displayed too if applicable;

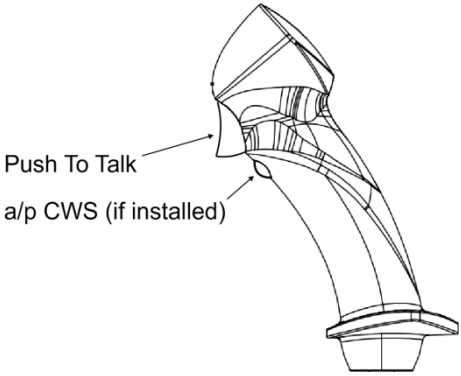
The RH displayed frequency is the standby one. Below it, the ICAO identifier code is displayed too if applicable;

The LH rotating knob allows to Power ON the equipment, increase and decrease the volume and, when radio is active, allows to toggle automatic squelch control ON/OFF simply pushing the knob.

The Frequency Transfer Key allows to switch between the active and standby frequency. Press and hold for approximately 3" and the emergency frequency will be the active one.

The Monitor Standby Frequency allows to listen also the standby frequency communications even if the transmission is only possible on the active one.

When the Garmin GTR 200 COM is installed, the Avionic Master switch power it. Also, the stick mounted pushbutton allows both pilot and co-pilot the PTT (Push To Talk) function.



NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin GTR 200 on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

1.1.5. **S6 - 5 - Performances**

Garmin GTR 200 VHF COM employment does not affect the aircraft performances.

1.1.6. **S6 - 6 - Weight and Balance**

When installed, the Garmin GTR 200 COM VHF radio is composed by the following units/components (Arm in reference with the propeller flange without spacer:

Description	Weight [kg]	Arm [mt]	Moment
23 - COMMUNICATIONS			
Garmin GTR 200 unit and rack	0.97	1.32	1.28
Wiring	2.00	2.16	4.30
VHF antenna	0.10	2.54	0.25
TOTALS	**3.07**		**5.83**

1.1.7. **S6 - 7 - System description**

The Garmin GTR 200 VHF COM is a communications transceiver. The GTR 200 operates in the aviation voice band, from 118.000 to 136.975 MHz, in 25 kHz steps. The Transmission power is 10Watt.

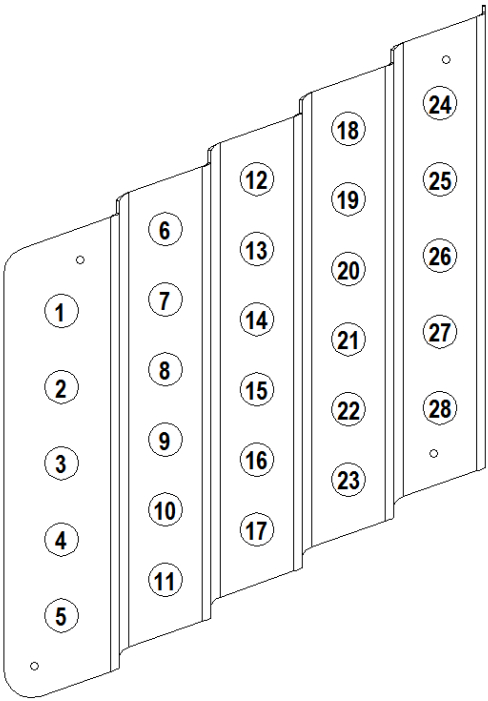
NOTE

An aircraft radio station license is not required when operating in U.S. airspace, but may be required when operating internationally.

NOTE

Download the Pilot's Guide and read it carefully before start operating (or cleaning) the Garmin GTR 200 on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

In addition to those circuit breakers used for the standard Tecnam Astore package, the GTR 200 audio panel installation requires an additional breaker located in the position 20 as shown below:



N°	Amps rating	description	N°	Amps rating	Description
1	25	Battery	**15**	AV.	Spare
2	25	Generator	**16**	10	12V Socket
3	7½	Instruments	**17**	AV.	Spare
4	5	Instr. Light	**18**	AV.	Spare
5	5	Bagg.Comp. Lt.	**19**	AV.	Spare
6	7½	Flap	**20**	10	COM 1
7	3	Trim	**21**	AV.	Spare
8	AV.	Spare	**22**	AV.	Spare
9	7½	Strobe Light	**23**	AV.	Spare
10	3	Nav Light	**24**	AV.	Spare
11	10	LND Light	**25**	AV.	Spare
12	AV.	Spare	**26**	AV.	Spare
13	AV.	Spare	**27**	AV.	Spare
14	AV.	Spare	**28**	AV.	Spare

1.1. **Supplement S7 - Garmin AOA Probe**

SUPPLEMENT S7

GARMIN GAP 26 AOA & PITOT PROBE

WARNING

This supplement must be inserted into the POH if the equipment described is installed onboard

Revision n. **00**

Date: **02/18/2014**

1.1.1. **S7 - 1 - General**

This Supplement shows the main features, characteristics and procedures to operate the Garmin GAP 26 heated pitot/AOA indicator probe. When operated, GAP 26 draws the following current from the aircraft electrical system:

Temperature	-40°C	0°C	50°C	100°C	175°C
Amps	12 A	9.25 A	7.3 A	5.85 A	4.36 A

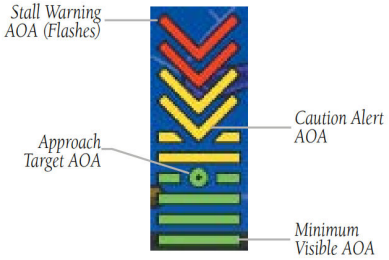
The AOA function can be achieved only if the GSU25 unit is installed, that's why Tecnam Astore only install the SAP 26 probe when Garmin G3X avionic suite is onboard.

NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin AOA indicator on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

NOTE

Tecnam Flight Test dept. carry out the calibration of AOA. By the way, the correct calibration procedure is also reported in the Garmin Pilot's Guide.



1.1.2. **S7 - 2 - Limitations**

The following limitation shall apply when the Tecnam Astore is equipped with Garmin GAP 26 probe, in addition to the standard POH Sect.2:

1) Avoid to heat the pitot probe when the engine rpm is below 4.000;

WARNING

Even if the GAP 26 heated pitot is installed

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

1.1.3. S7 - 3 - Emergency procedures

The following emergency procedures shall apply when the Tecnam Astore is equipped with Garmin GAP 26 probe, in addition to the standard POH Sect.3:

1.1.3.1.Inadvertent ICING encounter

WARNING

Immediately get away from icing conditions considering a suitable path to return to the last non-icing area.

Carb Heat (if present)	ON
Pitot Heat Switch	ON
Pitot Heat (if present)	ON
Throttle	INCREASE
Cabin heat	ON
Landing	PERFORM with FLAPS 0°
Approach and touch down	INCREASED AIRSPEED NECESSARY

CAUTION

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

1.1.4. **S7 - 4 - Normal procedures**

The following normal procedures shall apply when the Tecnam Astore is equipped with Garmin GAP 26 probe, in addition to the standard POH Sect.4:

NOTE

Download the Pilot's Guide and read it carefully before start operating the Garmin AFCS on your Tecnam Astore. Latest revision of Garmin Pilot's Guide must be carried onboard.

1) Before take-off, with engine rpm=4.000, perform a functionality check of PITOT HEAT and check if there is a current draw from Amperometer;

1.1.5. **S7 - 5 - Performances**

Garmin AOA probe employment does not affect the aircraft performances.

1.1.6. **S7 - 6 - Weight and Balance**

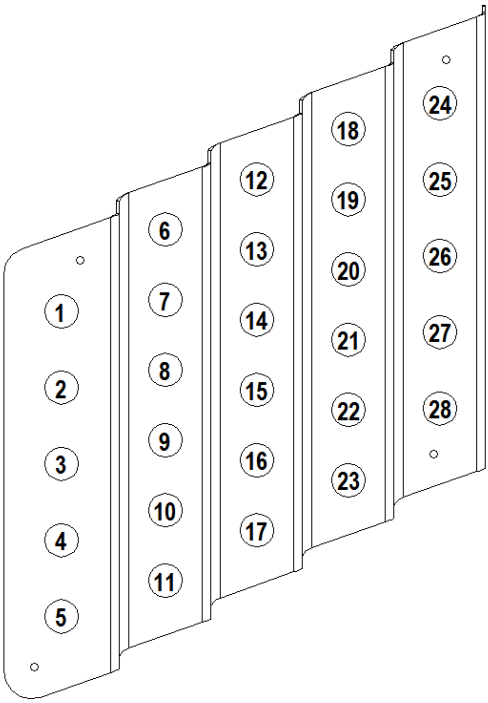
When installed, the Garmin AOA probe is composed by the following units/components (Arm in reference with the propeller flange without spacer:

Description	Weight [kg]	Arm [mt]	Moment
34 - NAVIGATION			
Garmin GAP 26 pitot probe	0.20	1.83	0.37

1.1.7. **S7 - 7 - System description**

The GAP 26 Pitot/AOA (Angle of Attack) probe is an air data probe intended for use in non FAA certified aircraft, including light sport and home-built aircraft. This air data probe is intended to be used as part of the G3X system. The function of the GAP 26 is to provide pitot and AOA pressures to the GSU 25 for the purpose of displaying airspeed and AOA to the pilot as part of the G3X system. The GAP 26 does not provide a static pressure source to the GSU 25, this continues to be provided by the aircraft standard static system. The version of the GAP 26 installed on Tecnam Astore is the -10 (heated, for ice protection).

In addition to those circuit breakers used for the standard Tecnam Astore package, the GAP 26 Heated pitot installation requires an additional breaker located in the position 8 as shown below. Note that, if the GAP 26 is used to show also the AOA, the G3X avionic suite is mandatory:



N°	Amps rating	description	N°	Amps rating	Description
1	25	Battery	**15**	AV.	Spare
2	25	Generator	**16**	10	12V Socket
3	7½	Instruments	**17**	AV.	Spare
4	5	Instr. Light	**18**	AV.	Spare
5	5	Bagg.Comp. Lt.	**19**	AV.	Spare
6	7½	Flap	**20**	AV.	Spare
7	3	Trim	**21**	AV.	Spare
8	20	Pitot Heat	**22**	AV.	Spare
9	7½	Strobe Light	**23**	AV.	Spare
10	3	Nav Light	**24**	AV.	Spare
11	10	LND Light	**25**	AV.	Spare
12	AV.	Spare	**26**	AV.	Spare
13	AV.	Spare	**27**	AV.	Spare
14	AV.	Spare	**28**	AV.	Spare

1.1. **Supplement S8 - ELT ME407**

SUPPLEMENT S8

ARTEX ME406 ELT

Automatic Fixed Emergency Locator Transmitter

WARNING

This supplement must be inserted into the POH if the equipment described is installed onboard

Revision n. **00**

Date: **02/25/2014**

1.1.1. **S8 - 1 - General**

This Supplement shows the main features, characteristics and procedures to operate the Artex ME406 ELT.

NOTE

Download the Operations Guide and read it carefully before start operating ME406 ELT on your Tecnam Astore.

The ME406 is a type AF (Automatic Fixed) beacon, which transmits on 121.5 and 406 MHz. The ME406 ELT is enclosed in an impact resistant plastic casing and mounts on a tray made of similar material. The product identification label on each ELT specifies the transmitting frequencies of the individual ELT. Allocation of frequencies, based on beacon population per specified frequency band, is controlled by COSPAS-SARSAT.

The ELT automatically activates during a crash and transmits the standard sweep tone on 121.5 MHz. Approximately every 50 seconds, for up to 520 milliseconds (long message protocol), the 406 MHz transmitter turns on. During that time, an encoded digital message is sent to the COSPAS-SARSAT Search and Rescue (SAR) satellite system.

The information contained in the message includes:

- Serial number assigned to the ELT by the beacon manufacturer or the national beacon registration authority;
- Aircraft identification or registration number;
- Country of registration and country code;

The 406 MHz transmitter will operate for 24 hours and then shuts down automatically. The 121.5 MHz transmitter will continue to operate until the batteries are exhausted, which is at least 50 hours.

The 406 MHz transmitter produces a much more accurate position, typically 3 kilometers as compared with 15 to 20 kilometers for 121.5 MHz transmitters.

The ELT transmits a digital message that allows search and rescue authorities to contact the owner/operator of the aircraft through information contained in a database. Information contained in the database include:

- Type of aircraft and aircraft registration number - Tecnam pre-loaded in the factory;
- Owner address and telephone number;
- Alternate emergency contact.

After the ELT is activated and the 406 MHz signal is detected by the SAR satellite system and a position is calculated, the 121.5 MHz transmissions are used to home in on the crash site.

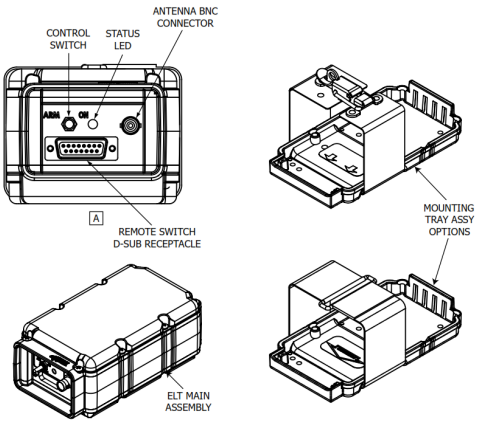
NOTE

Effective February 1, 2009, COSPAS-SARSAT has terminated satellite processing of distress signals from 121.5 MHz beacons.

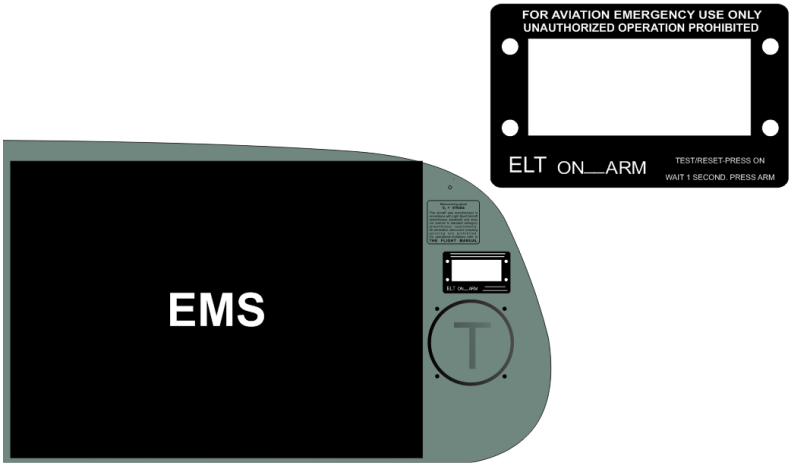
Aircraft communications transceivers are not capable of receiving 406 MHz transmissions; therefore, the only methods of monitoring the ELT are:

- The blinking cockpit remote switch LED;
- 121.5 MHz transmissions, which can be monitored using the aircraft communications transceiver or an AM radio tuned to 121.5 MHz

The ME406 Series ELT main assembly is housed in a high impact, fire resistant, polycarbonate plastic case and mounted in a tray made of similar material.



The cockpit-mounted remote switch assembly is comprised of an ELT status LED and control switch, and allows an operator to manually turn the ELT on (i.e., activate) for testing and reset (i.e., deactivate) the ELT.



NOTE

The ELT CANNOT be disarmed or disabled from the cockpit. Cockpit operation is limited to deactivating or manually activating the ELT.

When the ELT is activated, the presence of the emergency sweep tone and the flashing cockpit remote switch panel LED indicates an active, normal functioning ELT. The cockpit panel LED must immediately begin to flash continuously upon ELT activation.

1.1.2. **S8 - 2 - Limitations**

ELT ME406 installation does not affect the aircraft limitations.

1.1.3. **S8 - 3 - Emergency procedures**

The following emergency procedures shall apply when the Tecnam Astore is equipped with ME406 ELT, in addition to the standard POH Sect.3:

NOTE

As long as the cockpit remote switch and the ELT local switch are in the ARM (off) positions respectively, the ELT will automatically activate on impact

1.1.3.1.Manual activation

CAUTION

The ELT may be manually activated by placing either the remote switch or the ELT local switch in the “ON” position

1.1.4. **S8 - 4 - Normal procedures**

The following normal procedures shall apply when the Tecnam Astore is equipped with ME406 ELT, in addition to the standard POH Sect.4:

NOTE

Download the Operations Guide and read it carefully before start operating ME406 ELT on your Tecnam Astore.

NORMAL SWITCH POSITION

The cockpit remote switch is in the "**ARM**" position

The local switch on the ELT is in the "**ARM**" position

1.1.5. **S8 - 5 - Performances**

ELT ME406 installation does not affect the aircraft performances.

1.1.6. **S8 - 6 - Weight and Balance**

When installed, the ELT ME406 is composed by the following units/components (Arm in reference with the propeller flange without spacer:

Description	Weight [kg]	Arm [mt]	Moment
25 - EQUIPMENT			
Artex ME406 ELT unit	1.00	2.28	2.28