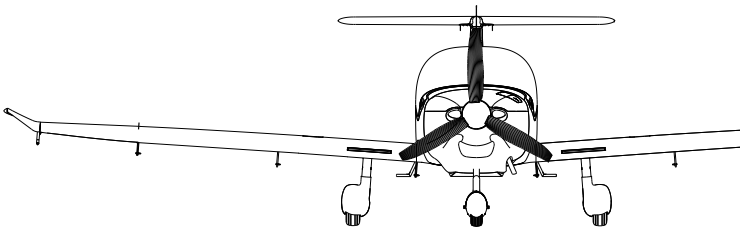
Elixir Aircraft

ELIXIR

Single EFIS

Airplane Flight Manual & Pilot's Operating Handbook.



Elixir Aircraft

Airplane Registration Marks..... _____

Airplane Serial Number..... _____

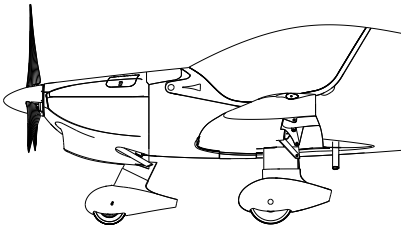
Model..... *Elixir*

Type Certificate No..... *EASA.A.633*

This manual includes the information that the conditions of certification require to provide to the pilot.

IT MUST BE ON BOARD THE AIRPLANE ALL THE TIME.
THE AIRPLANE MUST BE OPERATED ACCORDING TO THE INFORMATIONS AND LIMITATIONS CONTAINED IN THE HANDBOOK

LXR-AI-Rec-Manual-Aeroplane Flight Manual – Single EFIS - 0000189 - Ed02 Rev04



0 Handbook Management

0.1 Record of revisions

Updates are classified as “Editions” and “Revisions”.
An Edition (Ed.) is a change of the AFM, with an impact on the approved chapters. Any new Edition is EASA approved and mandatory.
A Revision (Rev.) is an update of the AFM, providing additional information, on non-approved chapters. Update your aeroplane documentation with new revisions at your own discretion
The Revision number is re-set to 01 at soon as a new Edition is released.

Rev. N°	Revised pages	EASA Approval date	Description of Revision
Ed.01 Rev.01	all	17/03/2022	Initial release
Ed.02 Rev.01	all	07/03/2023 MAJOR CHANGE APPROVAL n°10081409	NVFR capacity Control deflection tolerance clarification Section 9 Supplements reorganisation
Ed.02 Rev.02	all	08/12/2023 MINOR CHANGE APPROVAL n°10083461	All document - General layout and cosmetic improvements §1.5.2 Sizes on 3 view drawing added §7.3.2 GDU460 Screen update §7.10 Refueling procedure improved with pictures §7.11.1 “Simplified electrical distribution architecture” added §7.11.8 Blow fuse picture removed §8.4 Tie-down instruction improved with picture
Ed.02 Rev.03	Section 0 Section 2	13/06/2024 MINOR CHANGE APPROVAL n°10084236 REV.1	Revision table update Manufacturer identification plate modification.
Ed.02 Rev.04	Section 0 to Section 8 inclusive Section 10	08/10/2025 MAJOR CHANGE APPROVAL N°10088293	Minor rewording. Layout and cosmetic improvements. Section 3 - Emergency Procedures reorganized. Modification of Single Lever Power Control. AMPS gauge changed to ALT AMPS gauge. Addition of a battery charger connector. Including EASA SIB 2023-10.

0.2 List of Sections in Force

Section N°	Issue	Rev.	Date
Section 0	02	04	October 08, 2025
Section 1	02	04	October 08, 2025
Section 2	02	04	October 08, 2025
Section 3	02	04	October 08, 2025
Section 4	02	04	October 08, 2025
Section 5	02	04	October 08, 2025
Section 6	02	04	October 08, 2025
Section 7	02	04	October 08, 2025
Section 8	02	04	October 08, 2025
Section 9	02	02	October 25, 2023
Section 10	02	04	October 08, 2025

0.3 AFM sections overview

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1 General information

1.1 Introduction

This Pilot's Operating Handbook (POH) has been prepared to provide pilots with information required for the safe and efficient operation of the Elixir aircraft. This manual includes the information required by CS23 to be furnished to the pilot. It also contains supplemental information provided by the aircraft manufacturer.

As the pilot you must be thoroughly familiar with the content of this Handbook.

You must operate the airplane within the Limitations specified in this Handbook, in Section 2 and including supplements in Section 9.

The Normal Procedures section of this handbook (Section 4) was designed to provide guidance for day-to-day operation of this airplane. The procedure given are the result of flight testing, certification requirements, and input from pilots with a variety of operational experience. Become fully familiar with the procedures, perform all the required checks, and operate the airplane within the limitations and as outlined in the procedures.

1.2 Certification basis

The airplane is certified according to EASA Certification Specifications for Normal-Category Aeroplanes CS23 Amendment 5 dated 29/03/2017.
Type Certificate number : EASA.A.633.

1.3 Warnings, Cautions and Notes

The following definitions apply to warnings, cautions and notes in the POH

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.

1.4 Symbols, Abbreviations & Terminology

1.4.1 General Airspeed Terminology and Symbols

CAS	Calibrated Air Speed. (Indicated airspeed corrected for instrument and static/total pressure probe position errors).
GS	Ground Speed.
IAS	Indicated Airspeed (shown on the airspeed indicator).
TAS	True Airspeed.
V_A	Maneuvering Speed.
V_{FE}	Maximum Flaps Extended Speed.
V_{NE}	Never Exceed Speed.
V_{NO}	Maximum Structural Cruising Speed (not be exceeded, except in smooth air, only with caution).
$V_{S"x"}$	Stalling Speed in the configuration "x".
V_{S0}	Stalling Speed in landing configuration.
V_X	Best Angle-of-Climb speed.
V_Y	Best Rate-of-Climb speed.
V_Z	Rate of climb.

1.4.2 Meteorological Terminology

ISA	International Standard Atmosphere.
OAT	Outside Air Temperature is the free air static temperature. It is expressed in either degrees Celsius or degrees Fahrenheit.
Standard Temperature	ISA Standard Temperature is 15°C at sea level pressure altitude and decrease by 2°C for each 1000 ft of altitude.
"ISA ±xx °C"	Deviation from standard temperature: actual OAT is xx° above or below ISA standard.
VMC	Visual Meteorological Conditions.

1.4.3 Systems and Instruments

AP	Autopilot
ADAHRS	Air Data and Attitude/Heading Reference System
ADC	Air Data Computer
ADI	Attitude Indicator
AHRS	Attitude and Heading Reference System
ALT	Altimeter
AOA	Angle Of Attack
ASI	Airspeed Indicator
COMM	Communication transceiver
ECU	Engine Control Unit
EFIS	Electronic Flight Information System
EGT	Exhaust gas temperature
EIS	Engine Indication System
EMS	Engine Monitoring System
GPS	Global Position System
HSI	Horizontal Situation Indicator
LDG	Flaps in Landing position
MFD	Multi-Function Display
PFD	Primary Flight Display
SCU	System Control Unit
T/O	Flaps in Take-Off position
VSI	Vertical Speed Indicator

1.4.4 Airplane Performance and Flight planning terminology

Demonstrated crosswind	Velocity of the crosswind component for which adequate control of the airplane during take-off and landing was demonstrated during certification tests (this is not a limitation).
Landing distance	The distance from 15 m height to full stop.
Landing run	The distance from touch down to full stop.
MSL	Mean sea level.
Take off distance	The distance from brakes release to a 15 m height.
Take off run	The distance from brakes release to lift off.
Usable Fuel	The fuel available for flight planning.
Unusable Fuel	The fuel quantity that cannot be safely used in flight.

1.4.5 Weight and Balance

Arm	Arm is the horizontal distance from the reference datum to the center of Gravity (C.G.) of an item.
CG	Center of Gravity is the point at which an airplane, or equipment would balance if suspended.
Moment	Moment is the product of the weight of an item by its arm.
MTOW	Maximum Take-off Weight.
Reference Datum	Reference Datum is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.
FWD	Forward, towards the propeller.
AFT	Towards the tail.
Standard Empty Weight	Standard empty weight is the weight of a standard airplane, including unusable fuel, full operating fluids, and full engine oil.
Basic Empty Weight	Basic empty weight is the standard empty weight plus the weight of optional equipment.

1.4.6 Units of measurements

Units of measurement are SI units by default. Conversion is made to Imperial units and are provided for convenience, in *italic characters* and / or between brackets.

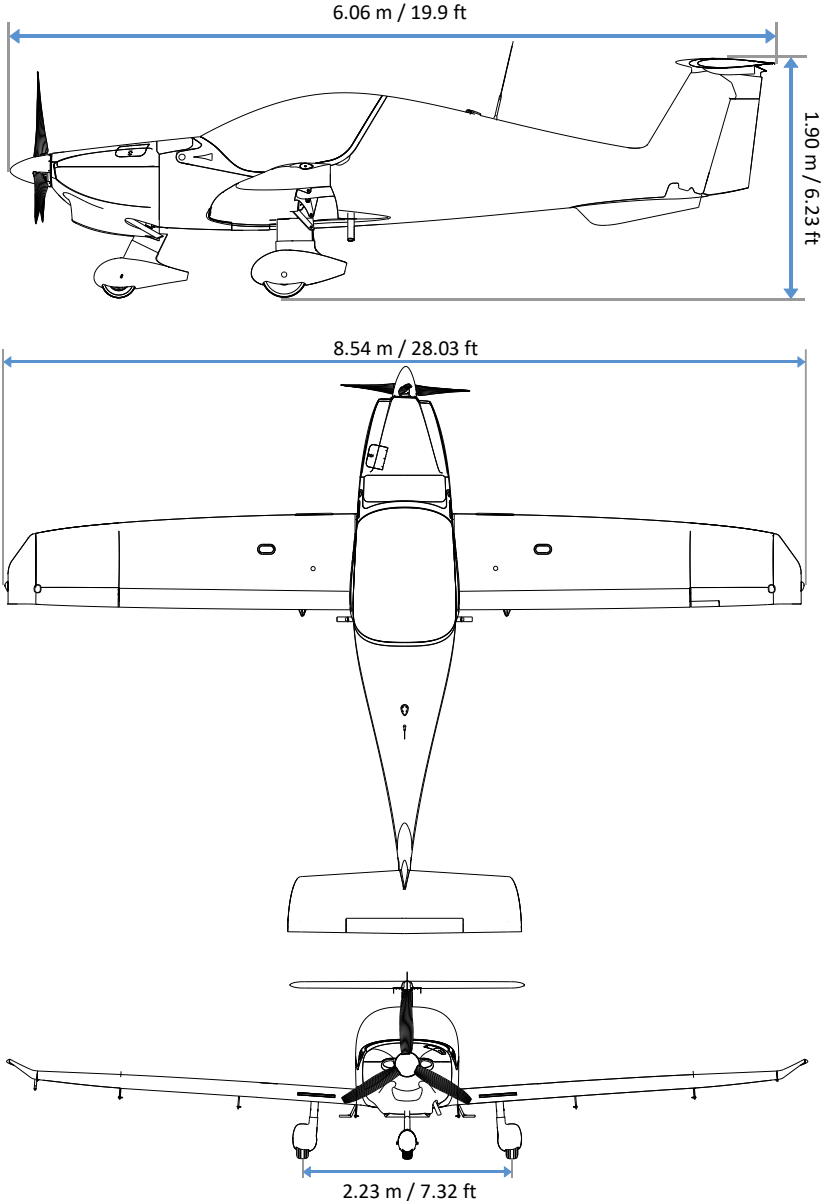
A	Electrical current - Amperes	
bar	Pressure - Bars	$1\ \text{bar} = 14.5037\ \text{psi}$
°C	Temperature - degrees Celsius	$°C = (°F - 32)/1.8$
°F	Temperature - degrees Fahrenheit	$°F = (°C \times 1.8) + 32$
ft	Distance - Foot or feet	$1\ \text{ft} = 12\ \text{in} = 0.3048\ \text{m} = 304.8\ \text{mm}$
fpm	Speed - feet per minute	$100\ fpm = 0.5\ m/s$
US gal	Volume – US gallon	$1\ US\ gal = 0.83\ UK\ gal = 3.785\ L$
hp	Power - Horse Power	$1\ hp = 0.7457\ kW$
in	Distance - inches	$1\ in = 25.4\ mm$
kg	Mass - Kilograms	$1\ kg = 2.205\ lb$
km	Distance - Kilometres	$1\ km = 1000\ m = 0.54\ NM = 0.621\ SM$
km/h	Speed - kilometres per hour	$1\ km/h = 0.54\ knots = 0.621\ mph = 0.278\ m/s$
knot	Speed - Nautical Miles per hour	$1\ knot = 1.151\ mph = 1.852\ km/h = 0.514\ m/s$
kW	Power - kilo-Watts	$1\ kW = 1.341\ hp$
L	Volume - Litres	$1\ L = 0.264\ US\ gal$
lb	Mass - Pounds	$1\ lb = 0.454\ kg$
Lbf	Force - Pound-force	$1\ lbf = 4.448\ N$
m	Distance - Metres	$1\ m = 1000\ mm = 3.28\ ft = 39.37\ in$
mm	Distance - Millimetres	$1\ mm = 0.03937\ in$
mph	Airspeed - statute miles per hour	$1\ mph = 0.87\ knots = 1.609\ km/h$
m/s	Vertical speed - meters per second	$1\ m/s = 196.8\ fpm = 1.944\ knots = 3.6\ km/h$
N	Force - Newtons	$1\ N = 0.225\ lbf$
NM	Distance - Nautical Miles	$1\ NM = 1852\ m$
psi	Pressure – pound force per square inch	$1\ psi = 0.0689\ bar$
RPM	Rotational speed - Revolution per minute	
s or sec	Time - Second	
SM	Distance - Statute Mile	$1\ SM = 1.609\ km$
V	Electrical voltage - Volt	

1.5 Aircraft Description and Dimensions

Elixir is a single-engine, all composite, low-wing monoplane of monocoque structure with two side-by-side seats. The airplane is equipped with a fixed tricycle undercarriage with steering nose wheel.

1.5.1 Airplane manufacturer

1.5.2 Three view Drawings



1.5.3 Main airplane dimensions, control surface deflections

	Metric	Imperial
WING		
Wing span	8.54 m	28.03 ft
Mean Aerodynamic Chord	0.947 m	3.107 ft
Wing surface area	7.9 m²	85 ft²
Wing loading	79.7 kg/m²	16.3 pound/foot²
Aspect ratio	9.1	
Dihedral	3.5° (measured at flap hinge line)	
FUSELAGE		
Overall length	6.06 m	19.9 ft
Cockpit width	1.10 m	3.61 ft
Overall height	1.90 m	6.23 ft
EMPENNAGE		
Horizontal stabilizer span	2.5 m	8.2 ft
Horizontal stabilizer surface area	1.546 m²	16.64 ft²
Vertical stabilizer span	1.03 m	3.34 ft
Vertical stabilizer surface area	0.8 m²	8.6 ft²
Rudder surface area	0.3 m²	3.2 ft²
LANDING GEAR		
Wheel track	2.23 m	7.32 ft
Wheelbase	1.32 m	4.33 ft
CONTROL SURFACE TRAVEL LIMITS		
Ailerons	21°(±1°) trailing edge up, 14° (±1°) down	
Aileron trim tab	17° (+3°/-0°) trailing edge up, 17° (+3°/-0°) down	
Stabilizer	8.5° (±0.5°) trailing edge up 6.5 (±0.5°) down.	
Tab gearing ratio	1.7	
Trim tab	Up (full nose down trim): 0° = aligned with elevator airfoil (±1°) Down (full nose up trim): +17° below elevator airfoil (±1°) Measured with elevator in neutral position.	
Rudder	Must reach the built-in, non-adjustable control stops on both sides (indicative value: +/-18°).	
Flaps	0°(-0°/+1°) Cruise 15° (±1°) Take Off 37° (+0°/-1°) Landing	

2 Limitations

2.1 Introduction

The aeroplane must be operated in accordance with the limitations provided below.

2.2 Airspeed

IAS = CAS + 2 km/h *(+1.1 kt)* in any aircraft configuration over the whole flight envelope.

> Note
> In case of inconsistency, the indication provided by the analogue (E)TSO certified anemometer prevails.

Speed	km/h		knots		Remarks
	CAS	IAS	CAS	IAS	
Never Exceed Speed V_{NE}	288	290	*155*	*156*	Do not exceed this speed in any operation.
Maximum Structural Cruising Speed V_{NO}	242	244	*130*	*131*	Do not exceed this speed except in smooth air and then only with caution.
Manoeuvring Speed V_A	222	224	*120*	*121*	Do not make full or abrupt control movements above this speed. Limit load factor may be exceeded.
Maximum Flap Extended Speed V_{FE}	162	164	*87*	*88*	(Flaps T/O / LDG) Do not exceed this speed with flaps extended.

2.3 Airspeed Indicator Markings

Marking	IAS km/h	*IAS kt*	Significance
White arc	85 – 164	*46 - 88*	*Positive Flap Operating Range*. (Lower limit is maximum weight V_{SO} in landing configuration. Upper limit is maximum speed permissible with flaps extended positive).
Green arc	113 - 244	*60 - 131*	*Normal Operating Range*. Lower limit is maximum weight VS1 at most forward c.g. with flaps retracted. Upper limit is maximum structural cruising speed.
Yellow arc	244 – 290	*131 - 156*	Manoeuvres must be conducted with caution and only in smooth air.
Red line	290	*156*	Maximum speed for all operations.
Yellow line	224	*121*	Maneuvering speed Va.

The analog ETSO instrument and the G3X must be marked, both in the same unit.

2.4 Engine

Engine Manufacturer ..... BRP-Rotax GmbH & Co KG

Engine Model Number ..... *Rotax 912 iSc3 Sport*

2.4.1 Engine limits

Take-off Power ..... *73.5 kW (100 HP) at 5 800 RPM (max 5 min)*

Maximum Continuous Power ..... *72 kW (97.9 HP) at 5 500 RPM*

Max engine RPM ..... *Take off: 5 800 RPM for max 5 minutes. Continuous: 5 500 RPM*

Minimum idle RPM ..... *1 400 RPM*

Exhaust gas temperature ..... *Max 950°C - 1 742°F*

2.4.2 Oil pressure and temperature

Pressure

Minimum	*0.8 bar - 12 psi < 3 500 RPM*
Maximum	*7 bar - 101 psi* *(Admissible for a short period at cold start).*
Normal	*2 to 5 bar – 29 to 72 psi*

Temperature

Minimum	*50°C - 120°F*
Maximum	*130°C - 266°F*
Normal	*Approx. 90 to 110°C - 190 to 230 °F*

2.4.3 Coolant temperature

Maximum temperature	*118°C - 245°F*

2.4.4 Fuel pressure

Pressure

Minimum	*2.5 bar - 36 psi*
Maximum	*3.8 bar - 55 psi*

2.4.5 OAT for engine start and operation

Maximum	50 °C - *122°F*
Minimum	-20 °C - *-4°F* *(At engine start: Oil temperature).*

2.5 Propeller

Propeller Manufacturer	*MT-propeller*
Propeller Model Number	*MTV-34-1-A/156-203*
Propeller Diameter	*1,560 m - 61.4 in*

Mandatory settings:

Governor max RPM (in flight)	5 800 RPM	+0/-50 RPM
Hub fine pitch stop setting for ground run at full Throttle (ISA, no wind)	5 400 RPM	±50 RPM

2.6 Engine Instruments Markings

Instrument	Dial range	Red	Yellow arc	Green arc	Yellow arc	Red
		MINIMUM LIMIT	CAUTION RANGE	NORMAL OPERATING	CAUTION RANGE	MAXIMUM LIMIT
TACHOMETER.	0 - 6 000 RPM		1 400 - 2 000 RPM	2 000 - 5 500 RPM	5 500 - 5 800 RPM	> 5 800 RPM
MANIFOLD PRESSURE.	0 - 32 in.Hg			10 - 30 in.hg		
EXHAUST GAS TEMP.	500 - 1 100°C *932 - 2 012°F*			500 - 900°C *932 - 1 652°F*	900 - 950 °C *1 652 - 1 742°F*	> 950°C *> 1 742°F*
OIL TEMP.	40 - 140°C *104 - 284°F*		40 - 50°C *104 - 122°F*	50 - 110°C *122 - 230°F*	110 - 130°C *230 -- 266°F*	> 130°C *> 266°F*
OIL PRESSURE.	0 - 8 bar *0 - 145 PSI*	< 0.8 bar *< 11 PSI*	0.8 – 2 bar *11 - 29 PSI*	2 - 5 bar *29 - 72 PSI*	5 - 7 bar *72 - 101 PSI*	> 7 bar *> 101 PSI*
COOLANT TEMP.	40 - 140°C *104 - 284°F*		40 - 50°C *104 - 122°F*	50 - 110°C *122 - 230°F*	110 - 118°C *230 - 244°F*	> 118°C *> 244°F*
FUEL PRESSURE.	0 - 5 bar *0 - 72 PSI*	< 2.5 bar *< 36 PSI*	2.5 - 2.8 bar *36 - 41 PSI*	2.8 - 3.2 bar *41 - 46 PSI*	3.2 - 3.5 bar *46 - 51 PSI*	> 3.5 bar *> 51 PSI*
Essential Bus Voltage “Volts 1”.	8 - 16 V	< 12.5 V	12.5 - 13.0 V	13.0 - 14.6V	14.6 - 15.2 V	> 15.2 V
Engine ECU Bus B voltage “Volts B”.	8 - 16 V	< 9V	9 – 12V	12 - 15V		> 15V
Alternator current “ALT AMPS”	0 – 40 A	<4 A	4 – 5 A	5 - 30 A	30 - 35 A	> 35 A
FUEL QTY.	0 – 100 L *0 - 26.4 US gal*		0 - 5 L *0 - 1.3 US gal*	5 - 100 L *1.3 - 26.4 US gal*		
AIRFRAME °C.	-20 - +100°C *-4 - +212°F*			-20°C - 54°C *-4°F - 130°F*	54°C - 100°C *130°F - 212°F*	

2.7 Weight

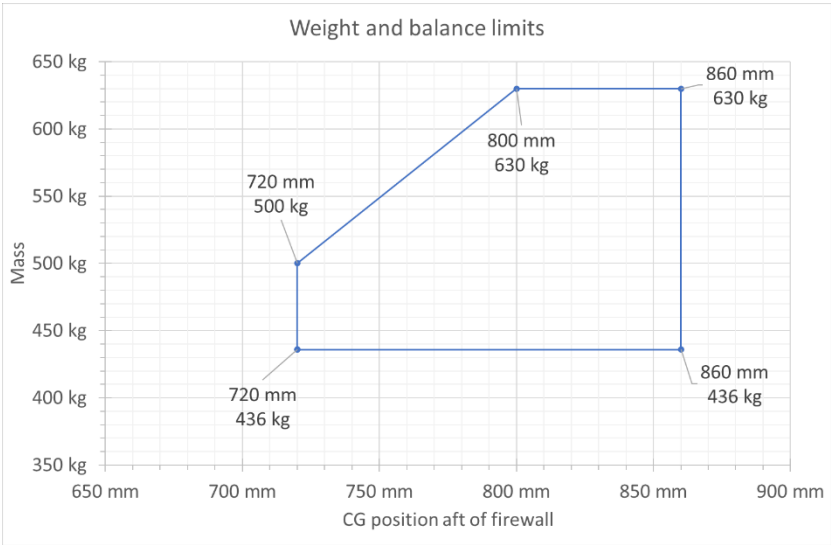
Maximum take-off weight ..... *630 kg - 1 389 lb*

Maximum landing weight ..... *630 kg - 1 389 lb*

Maximum weight in baggage compartment ..... *25 kg - 55 lb*
Properly secured.

2.8 Centre of Gravity

Max fwd at 500 kg - *1 102 lb*	Max fwd at 630 kg - *1 389 lb*	Max aft at 630 kg - *1 389 lb*
720 mm - *28.35 in* from firewall	800 mm - *31.50 in* from firewall	860 mm - *33.87 in* from firewall



Conversion chart				
Distance	mm	720	800	860
	in	*28.35*	*31.50*	*33.86*
Mass	kg	436	500	630
	lb	*961*	*1 102*	*1 389*

2.9 Manoeuvring Load Factor

Maximum positive limit load factor	*+ 4 g*
Maximum negative limit load factor	*- 2 g*
Maximum positive limit load factor with flap extended	*+2 g*
Maximum negative limit load factor with flaps extended	*0 g*

Caution
Engine limitation
Negative load factor manoeuvres limited to -0.5g for max 5 seconds - Refer to engine operators manual.

2.10 Flight Crew

Number of seats	*2*
Minimum crew	*1*

2.11 Kind of Operations

The aircraft is approved for day and night VFR operation only, away from thunderstorm clouds.

WARNING
IFR flights, aerobatic manoeuvres and intentional spins are prohibited.
Avoid flying in the vicinity of thunderstorm clouds.
Avoid icing conditions.

2.12 Fuel

2.12.1 Quantities

Total fuel quantity	104 L – *27.5 US gal*
Unusable fuel	4 L – *1.05 US gal*
Total usable fuel	100 L – *26.4 US gal*

2.12.2 Approved Fuel Grades

Engine and aircraft components are compatible with:

- Unleaded Mogas 95 / 98 / E5 (not approved for flights above FL120).
- Unleaded AVGAS UL91 / UL 94.
- AVGAS 100 LL (with limitations regarding engine maintenance).

WARNING
Fuels containing more than 5% ethanol / methanol (E10, E85) are not approved.

Caution
AVGAS 100LL places greater stress on the valve seats due to its high lead content and forms increased deposits in the combustion chamber and lead sediment in the oil system. Check the latest Rotax Maintenance Manual for specific maintenance instructions.

Note
Fuel gauges are factory-calibrated with Mogas 98. Use of any other fuel may reduce the indicated value up to 25%.

2.12.3 Tank filling precautions

Ground the aircraft via the exhaust pipe, when filling the tank at a pump in order to electrically discharge the aircraft and not to create an electric arc between the pistol and the cap.
Please refer to § 7.11.2 for detailed fuelling instructions.

2.13 Oil

2.13.1 Quantities

Oil volume: about 3.5 L - *0.9 US gal*

Minimum	.....	Lower mark of oil dipstick.
Maximum	.....	Upper mark of oil dipstick.

See pre-flight check procedures for oil level check

WARNING

The oil level should be in the upper half and should never fall below the "MIN" mark. Prior to long flights oil should be added so that the oil level reaches the "MAX" mark.

FLAMMABLE FLUID: Always clean oil spilled in the engine compartment before flight.

Note

Oil quantity from min to max level: 0.45 L *(0.1 US gal)*

2.13.2 Approved Oil Grades :

Obey the latest edition of Rotax service instruction SI-912 i-001 to select the correct oil. AeroShell Oil Sport Plus 4 recommended.

2.14 Engine Coolant

2.14.1 Quantities

Coolant Volume: about 2.5 L. - *0.66 US gal.*
Expansion tank must be full, level in Overflow bottle between “min” and “max” (cold engine).

2.14.2 Approved Coolant specifications :

Only 50%-50% Water / Ethylene-Glycol mix authorised.
Coolants to Volkswagen specifications -30°C G12, G12+, G12++, G13 are a suitable example.
Refer to the latest edition of Rotax service instruction SI-912 i-001 for recommended 50%-50% Water-Ethylene-Glycol brand. (in case of doubt, contact Elixir Aircraft).

WARNING
Waterless coolant is not allowed. Coolants with less than 40% or more than 60% ethylene glycol are not allowed. Potentially FLAMMABLE FLUID: Always clean coolant spilled in the engine compartment before flight.

2.15 Systems & Equipment

2.15.1 Garmin G3X Touch

The Garmin G3X Touch GPS is not a class A navigation aid, it is provided for information purposes only. Only use in VMC with ground or sea in sight. Do NOT use the Garmin G3X Touch as a primary source for navigation, terrain separation, weather information, or approach information.
For safety reasons, G3X Touch operational procedures must be learned on the ground.

WARNING
Changing the G3X setup made by the manufacturer is prohibited to pilot's / owners and unauthorised maintenance personnel. If you think you have inadvertently entered in the configuration pages seek advice from Elixir Aircraft.

Caution
The display uses a lens coated with a special anti-reflective coating that is very sensitive to skin oil, waxes, and abrasive cleaners. CLEANER CONTAINING AMMONIAL WILL HARM THE ANTI-REFLECTIVE COATING. It's very important to clean the lens using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coating.

2.15.2 Transponder GTX335R

The transponder GTX335R, as equipped on the Elixir, is not capable of ADSB-OUT (it is not connected to any certified GPS source). ADSB OUT function is deactivated.
The transponder installation is certified for Mode S ELS (Elementary Surveillance) and Mode S EHS (Enhanced Surveillance) in accordance with CS-ACNS book 1 subpart D section 2 and 3.

2.15.3 Ballistic recovery parachute

The ballistic recovery parachute must be installed, and in airworthy condition (canopy repacking, rocket replacement time limits: see aircraft maintenance manual). The aeroplane is not airworthy if the parachute is removed or not serviced in due time. A one-way ferry flight to a maintenance facility can be permitted. (However, do not hesitate to attempt to use the parachute even if it is out of date, should this happen).

2.16 Other limitations

2.16.1 Primary airframe structure temperature

AIRFRAME °C

Maximum ..... 54 °C

The airplane must not be flown if the primary structure temperature is above 54°C.
For any primary structure surfaces directly exposed to sunlight, the pilot must check that the primary structure is cool enough before take-off. A temperature sensor is installed on the critical part of the structure and displayed on the G3X as "AIRFRAME °C". If the airframe temperature rises above 54°C, a MASTER CAUTION is raised on the annunciator panel and the CAS Message AIRFRAME TEM is displayed. (See §3.25.11)
Do not take off until temperature has cooled down below 54°C.

2.16.2 Service ceiling

Flight level

Maximum ..... 16 000 ft MSL

WARNING
Altitude limited to 12 000 ft MSL when using Unleaded Mogas 95 / 98 / E5 fuel.

2.16.3 Outside Air Temperature

OAT

Minimum ..... -20°C / *-4°F*

2.16.4 Starting attempts

Activate the starter for 10 sec max. Only without interruption, followed by a cooling time of 2 min. Do not operate the starter if the engine is running.

2.16.5 Smoking

SMOKING IS PROHIBITED

2.16.6 Headset

All crew members are required to wear headsets at all times during flight.
Headsets must be donned prior to takeoff.

2.17 Limitation placards

This section provides limitation and information placards, and their location on the aircraft.
Remark: For further placards refer to Maintenance Manual.

Instrument panel.

Rear luggage bulkhead.

Right luggage bulkhead.

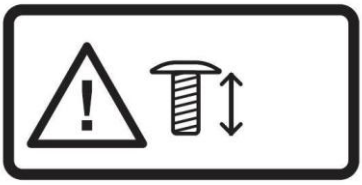
Luggage bulkhead.

Manufacturer's identification plate on rear bulkhead (example).

Wing trailing edge.

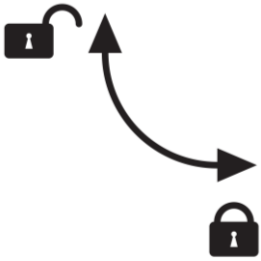
Flap vane.

Main flap.

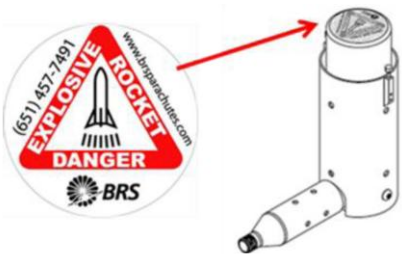


Fin trailing edge cover and control stick fixations.

Both wingtips, aileron trim tab, elevator tab.



Next to the handle inside the canopy.

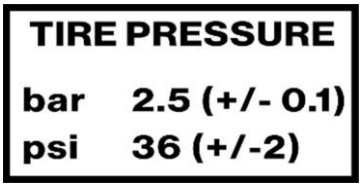


On top of the parachute rocket.

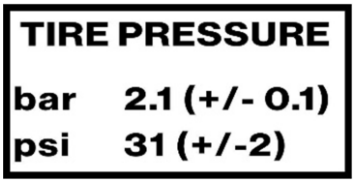
Both sides of the fuselage.

On the parachute egress panel.

On the parachute bag.

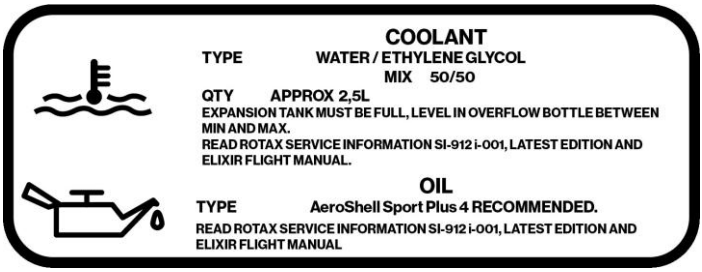


Nose wheel.

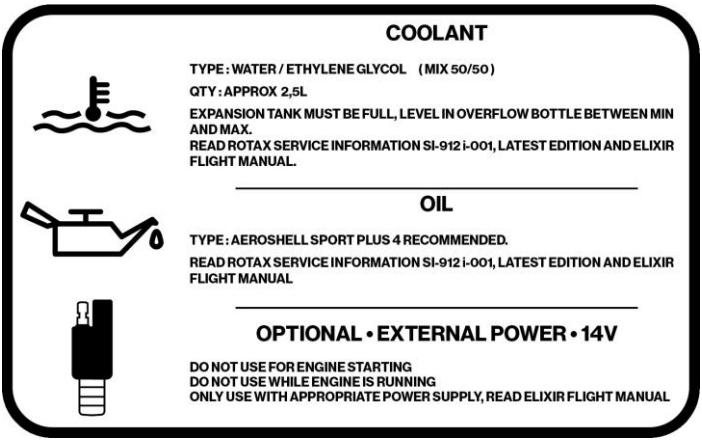


Main wheels.

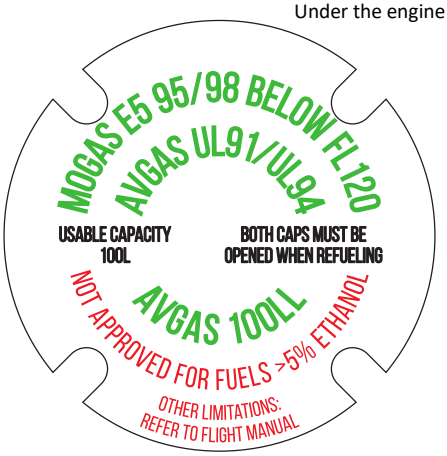
If the Optional External Power Supply is not installed, both labels below can be used.



If the Optional External Power Supply is installed. The label below is mandatory.



Under the engine cowling hatch.



Next to both fuel caps.

Static ports (both sides).

Intentionally left blank.

3 Emergency Procedures

3.1 Introduction

This section describes operations and procedures for emergency situations that could possibly occur during airplane operation.
Emergencies caused by aircraft or engine malfunction are extremely rare if proper pre-flight inspections and maintenance are practiced.

Some items are identified with a rectangular enclosure. They are Memory Items. They must be learned and practiced on ground.
Below, an example of memory items:

1.	Memory procedures ----------	*Learned before flight.*
2.	Memory procedures ----------	*Practiced before flight.*

In case of emergency the pilot should remember the following priorities:

1 FLY the aircraft,

2 IDENTIFY the problem,

3 Apply applicable PROCEDURES,

4 REPORT situation, time and conditions permitting.

Note
In the following, the instructions to "Perform an EMERGENCY LANDING", "land AS SOON AS POSSIBLE" or "Land At the Nearest Suitable Airfield" have the following meanings

- Perform EMERGENCY LANDING: you are in a critical situation! Land on the nearest reasonably large and smooth surface. Damage to the aircraft may occur.

- Land AS SOON AS POSSIBLE: you are in a situation that may become critical in the short term. Direct to the closest airfield and land immediately, declare emergency to air traffic control. This does not mean to land in a field.

- Land At the Nearest Suitable Airfield: you are not in a critical situation. Choose the nearest airfield where you would find local support, follow standard procedures and follow air traffic control instructions. Keep monitoring parameters with care.

3.2 Airspeeds for Emergency Operation

Note
The IAS indication provided by the analogue (E)TSO certified anemometer prevails.

Best glide	*- 140 km/h – 76 kt* *- Flaps UP.* *- Glide ratio is approx. 10:1*
Engine failure after take-off minimum speed	*- 130 km/h – 70 kt* *- Flaps T/O*
Precautionary landing with engine power	*- 110 km/h – 60 kt* *- Flaps LDG*
EMERGENCY LANDING without engine power	*- 110 km/h – 60 kt* *- Flaps LDG*

3.3 Engine failures

3.3.1 Engine failure during take-off run

1.	Throttle	*IDLE*
2.	Brakes	*Apply as required*

When controlled:

3.	FUEL shut-off valve	*OFF*
4.	Engine Key Switch StartAssist	*OFF*
5.	MASTER Switch	*OFF*

3.3.2 Loss of engine power in flight

3.3.2.1 If level flight remains possible

1.	**AIRSPEED**	***Minimum 140 km/h - 76 kt for level flight with flap up.***
2.	Fuel Shut-off valve	*Check OPEN*
3.	Engine Key Switch StartAssist	*Check RUN*
4.	LANE switch	*Check BOTH / select best option*
5.	Throttle	*Position for adequate power*
6.	Land	*AS SOON AS POSSIBLE*

Caution
Be prepared for a complete engine failure and an Emergency Landing (§3.9).

3.3.2.2 Complete engine failure, or level flight not possible

1.	**Maintain a safe AIRSPEED (Best glide = 140 km/h – 76 kt).**	
2.	Fuel Shut-off valve	*Check OPEN*
3.	Engine Key Switch StartAssist	*Check RUN*

4. Search a suitable landing site and prepare for an Emergency Landing (§3.9).

5.	Engine restart procedure	*Apply (§3.4)*

3.3.3 Powerplant vibrations

1. Engine Key Switch StartAssist ..... *Check RUN*
2. LANE Switch ..... *Check BOTH / select best option*
3. Land ..... *AS SOON AS POSSIBLE*

If deterrent vibrations

1. Engine Key Switch StartAssist ..... *OFF*
2. Search a suitable landing site and prepare for an Emergency Landing (§3.9).

3.3.4 Single Lever Power Control malfunction

3.3.4.1 RPM oscillations (propeller governor anomaly)

1.	Throttle.....	*Try a slightly different throttle position*
If no effect		
2.	GVNR Switch.....	*Disengage*
3.	GVNR Switch.....	*Re-engage **once***
If oscillations re-appear		
4.	GVNR Switch.....	*Disengage*
5.	Throttle.....	*Adjust throttle to maintain safe flight conditions.*

Caution
Anticipate reduced climb rate on takeoff or go around. Elixir Aircraft demonstrated 4° - 7% minimum positive climb angle at 4 700 RPM, max weight, sea level, in all flaps configuration with full throttle.

Note
The GVNR Governor Disconnect Switch is up when engaged, and down when disengaged.

Note
When the GVNR Switch is OFF, the signal to the propeller governor is disconnected. The RPM will slowly decrease until reaching the governor minimum RPM mechanical stop, regardless of engine parameter or throttle position variations.
In any case, the governor mechanical stops are adjusted so that the engine speed command is mechanically contained between 4 700 RPM and 5 800 RPM.
Therefore, regardless of RPM management system behavior, the aircraft is always protected against:
- Engine overspeed
- Powerplant underpower / over torque

3.3.4.2 RPM remains constant or slowly decreases regardless of throttle inputs

Possible cause:
Failure of the propeller governor electric actuator.

1. GVNR Switch ..... *Check ON*

If no effect

2. Throttle..... *Adjust throttle to maintain safe flight conditions.*

Caution
Anticipate reduced climb rate on take-off or go around. Elixir Aircraft demonstrated 4° - 7% minimum positive climb angle at 4 700 RPM, max weight, sea level, in all flaps configuration with full throttle.

Note
When the propeller governor servomotor is disconnected, the RPM will slowly decrease until reaching the governor minimum RPM mechanical stop, regardless of engine parameter or throttle position variations.
In any case, the governor mechanical stops are adjusted so that the engine speed command is mechanically contained between 4 700 RPM and 5 800 RPM.
Therefore, regardless of RPM management system behavior, the aircraft is always protected against:
- Engine overspeed.
- Powerplant underpower / over torque.

3.4 Engine restart in flight

3.4.1 Propeller windmilling

1.	**Maintain a safe airspeed and monitor height above ground**	
2.	MASTER Switch	*Check ON*
3.	Throttle position	*Approx. 50%*
4.	FUEL shut-off valve	*Check OPEN*
5.	EMGY PWR switch	*Switch ON*
6.	Engine Key Switch StartAssist	*Check RUN*

If engine restarts

7.	EMGY PWR switch	*Switch OFF*

If engine tends to fail again

8.	EMGY PWR switch	*Switch ON IMMEDIATELY*
9.	GENERATOR FAULT procedures	*Apply (§3.21* GENERATOR FAULT procedures*)*

If engine does not restart

10.	Engine Key Switch StartAssist	*OFF*
11.	EMERGENCY LANDING	*Prepare (§3.9)*

3.4.2 Propeller stopped

Same procedure as above, except:

6.	Engine Key Switch StartAssist	*START then* *RUN after engine restart*

Note
In case of an engine failure (without engine seizure), the propeller stops when airspeed falls below approx. 110 km/h – *60 kt*.
The aircraft's speed must be increased above approx. 200 km/h – *108 kt* to obtain the propeller rotation.

3.5 Smoke and fire (Engine)

3.5.1 On ground

STOP the aircraft

1.	FUEL shut-off valve	*OFF*
2.	Throttle	*MAX*

After engine stops

3.	Engine Key Switch StartAssist	*OFF*
4.	MASTER Switch	*OFF*
5.	CABIN HEATER	*OFF*

LEAVE THE AIRCRAFT

Note
If a fire extinguisher is available, it can be discharged in the LH upper air intake or cowling exhaust openings.

3.5.2 In flight

1.	FUEL shut-off valve	*OFF*
2.	Engine Key Switch StartAssist	*OFF*
3.	Throttle	*IDLE*
4.	CABIN HEATER	*OFF*
5.	Cabin Ventilation	*Close if smoke entering through ventilation outlet- Open if no smoke entering through outlet and smoke evacuation needed.*
6.	EMERGENCY LANDING	*Prepare (§3.9)*

WARNING
Never attempt an engine restart.

Caution
Using the BRS in case of fire may not be the safest solution. Fire could propagate to the parachute suspension bridles or to the parachute itself during descent.
Use the BRS if absolutely no safe landing area is available.

3.6 Smoke and fire (Cabin / Electrical)

3.6.1 On ground

Stop the aircraft

1.	MASTER Switch	*OFF*
2.	Engine Key Switch StartAssist	*OFF*
3.	FUEL shut off valve	*OFF*
4.	Canopy	*OPEN*

LEAVE THE AIRCRAFT

Note
If a fire extinguisher is available, it can be discharged on the burning equipment if identified.

3.6.2 In flight

If equipment identified

1.	Faulty equipment	*Switch OFF as practical*

If equipment not identified

2.	MASTER Switch	*OFF*
3.	Ventilation	*OPEN*
4.	Fire extinguisher	*Use if absolutely needed.*
5.	Land	*AS SOON AS POSSIBLE.*

All electrical equipment will be lost (including flaps and trims).

Reduced flaps landing: increase approach speed:

Flaps UP	IAS = 140 km/h – *76 kt*
Flaps T/O	IAS = 125 km/h – *68 kt*

Note
Normal engine operation.
The governor is deactivated (Same result as §3.3.4).

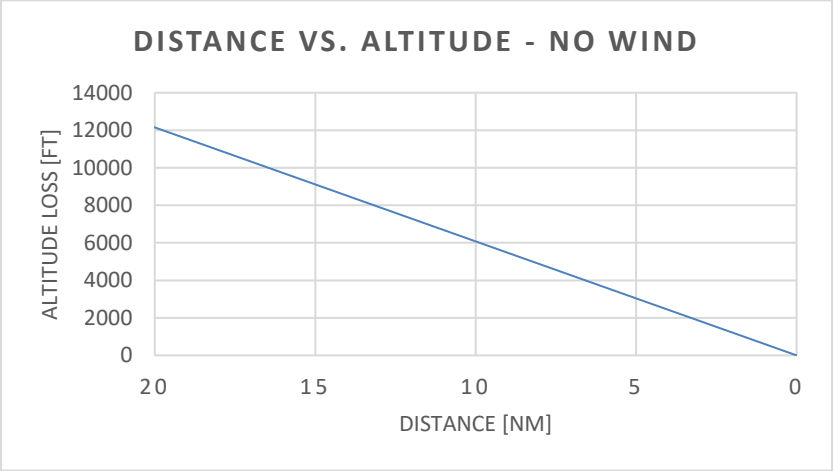
3.7 Emergency descent

1.	Autopilot	*Disengage*
2.	Throttle	*IDLE*
3.	Airspeed	*VNE*

Caution
Do not descend above Vno in severe turbulence.

3.8 Glide

Wing flaps position	*UP*
Airspeed	*140 km/h – 76 kt*
Glide Ratio	*10 : 1*



3.9 Emergency Landing

Descent		
1.	**AIRSPEED**	***Best glide 140 km/h - 76 kt with flaps UP.***
2.	Emergency landing area	*Select a suitable area. Determine wind direction.*
3.	Seat belts	*Fasten, Tighten*
4.	Flaps	*As required – Adjust speed. ****
If time permitting:		
5.	VHF	*Apply standard emergency procedures.*
6.	XPDR	*Apply standard emergency procedures. ****
7.	ELT	*ON*
On final		
8.	Flaps	*LDG (When landing site secured). ****
9.	LDG Lights	*ON for Night VFR flight. ****
10.	Airspeed	*110 km/h – 60 kt*
Just before touch-down		
11.	FUEL shut-off valve	*OFF*
12.	Engine Key Switch StartAssist	*OFF*
13.	MASTER Switch	*OFF*
14.	EMGY PWR switch	*OFF **
After touch down		
15.	Elevator	*Keep pulling AFT.*

WARNING

Do not unlock the canopy before touch down. The forward hinged canopy would partially open and may perturb airflow on the T-tail.

Note

* Not applicable if EMGY PWR is activated.

3.10 Landing With Flat tire

3.10.1 Nose Gear

1. Land in the middle of the runway.
2. Hold the nosewheel off the ground as long as possible.
3. Do not taxi.
4. Normally shut-down the aircraft ..... *§4.14*

3.10.2 Main Gear

1. Land on the side of the runway corresponding to the good tire.
2. Maintain directional control with the brakes and rudder.
3. Do not taxi.
4. Normally shut-down the aircraft ..... *§4.14*

3.11 Landing With Failed Brakes

3.11.1 One brake failure

1. Land on the side of the runway corresponding to the inoperative brake.
2. Maintain directional control with the rudder and working brake.
3. Do not taxi.
4. Follow the normal procedures to shut-down the aircraft ..... *§4.14*

3.11.2 Both brakes failure

1. Divert to the longest, widest runway with the most direct headwind.
2. Touch down at runway start to maximize available runway length.
3. Maintain directional control with the rudder.
4. Fuel shut-off valve ..... *CLOSE*
5. Engine Key Switch StartAssist ..... *OFF*
6. EMGY PWR switch ..... *OFF*
7. Do not taxi.

Caution
Be prepared to evacuate the aircraft quickly in the event of fire.

3.12 Spin recovery

WARNING
Intentional spins are prohibited

No extensive spin tests were performed during certification.
The following generic spin recovery procedure should be applied:

1.	Rudder	*FULL OPPOSITE to the rotation side.*
	Elevator	*Neutral / Forward*
2.	Ailerons	*Neutral*
3.	Throttle	*Idle*
After rotation stops		
4.	Flaps (if extended)	*UP*
5.	Rudder	*Neutral*
6.	Elevator	*Pull up gently (avoid a secondary stall).*

3.13 Loss of primary flight controls

In the unlikely event of one of the primary flight control system failure, apply the following emergency procedures:

3.13.1 Elevator

Control the aircraft pitch attitude and speed with the elevator trim. Anticipate your actions and expect some latency.
Make a standard approach and landing. At forward CG is preferable to use T/O flaps position for landing as trim authority will be increased.
Avoid large bank angles and steep approaches, avoid sudden power variations.

3.13.2 Aileron

Control the bank angle with appropriate rudder inputs. Avoid large sideslips (< 1 ball). In addition, use the aileron trim. Anticipate your actions and expect some latency.

3.13.3 Rudder

When possible, avoid airfields with strong crosswind for landing.

3.14 Trim runaway (elevator and/or ailerons)

1.	TRIMS circuit breaker ----	*PULL out*
2.	Airspeed ----------	*Reduce speed as practical to reduce pilot forces on stick.*
3.	Land----------	*At Nearest Suitable Airfield.*

Caution
Both elevator and aileron trims are lost.

Notes
The airplane remains controllable.

3.15 Flaps runaway

3.15.1 Unintended flap deployment

1.	FLAPS circuit breaker	*PULL out.*

If speed above V_{FE}

2.	Throttle.....	*Reduce to IDLE.*
3.	Elevator.....	*- PULL smoothly to reduce speed.* *- Avoid high G-loads.*
4.	Airspeed.....	*Maintain below V_{FE}.*

If / When speed below V_{FE}

5.	Airspeed.....	*Maintain below V_{FE}.*
6.	Land.....	*At Nearest Suitable Airfield.*

Look outside to visually evaluate actual flap position, and adapt approach speed:

-Flaps between UP and T/O ..... *IAS = 140 km/h – 76 kt*

-Flaps between T/O and LDG ..... *IAS = 125 km/h – 68 kt*

-Flaps at LDG..... *IAS = 110km/h – 60 kt*

In both cases, landing run increased by approx:
100 m – *328 ft.*

3.15.2 Unintended flap retraction

3.15.2.1 During take-off

1.	AIRSPEED	*Min 130 km/h – 70 kt.*
2.	FLAPS circuit breaker	*PULL out.*
3.	Airspeed	*Maintain below V_{FE}.*
4.	Climb	*Continue climb to safe altitude.*
5.	Return for landing	*Standard approach pattern.*

Look outside to visually evaluate actual flap position, and adapt approach speed:

-Flaps between UP and T/O ..... *IAS = 140 km/h – 76 kt*

-Flaps between T/O and LDG ..... *IAS = 125 km/h – 68 kt*

In both cases, landing run increased by approx:
100 m – *328 ft.*

3.15.2.2 During approach

1.	GO AROUND	
2.	Throttle	*FULL forward.*
3.	AIRSPEED	*Min 130 km/h – 70 kt.*
4.	FLAPS circuit breaker	*PULL out.*
5.	Climb	*To a safe altitude*
6.	Return for landing	*Standard approach pattern.*

Look out to visually evaluate actual flap position, and adapt approach speed:

-Flaps between UP and T/O ..... *IAS = 140 km/h – 76 kt*

-Flaps between T/O and LDG ..... *IAS = 125 km/h – 68 kt*

In both cases, landing run increased by approx:
100 m – *328 ft.*

3.16 Inadvertent canopy opening

3.16.1 During the take-off run

Abort Take-Off

1.	Throttle	*IDLE.*
2.	Brakes	*Apply as required.*

3.16.2 During take-off

Continue the take-off.

Do not try to close the canopy.

1.	Airspeed	*Max. 130 km/h – 70 kt.*
2.	Flaps	*Leave initially in T/O position.*
3.	Return for landing	
4.	Standard landing procedure	*Increase landing speed +10km/h – 5 kt.*

WARNING

Priority is to maintain airplane controllability.

3.16.3 In-flight

Do not try to close the canopy.

1. Airspeed ..... *Max. 130 km/h – 70 kt.*
2. Return for landing ....
3. Standard landing procedure ..... *Increase landing speed +10km/h – 5 kt.*

Caution
The canopy may be partially open and may generate turbulence on the T-Tail. Keep enough speed and perform a "flat" final approach to limit the elevator deflection needed for flare.
In flight avoid side slips.

Note
When operating with two pilots, the flying pilot may temporarily transfer control to the second pilot under safe flight conditions – such as low traffic, stable flight, no maneuvering, and non-critical weather – to allow the flying pilot to secure the canopy handle.

After landing, inspect the canopy hinges and locking mechanism.

3.17 Loss of Reference

3.17.1 Inadvertent IMC

1. Bank angle ..... *Level*
2. Aircraft ..... *Perform a 180° standard turn*
3. Heating Pitot ..... *ON*

WARNING
Flight in IMC is not approved.

3.18 Inconsistent Indicated Airspeed

Cause:

In cold and/or wet weather conditions, or after a quick descent, or inadvertent icing conditions.

Procedure:

1. Pitot heat ..... *Switch ON.*
2. Indicated airspeed ..... *Monitor*

3.19 Unreliable Air Data

WARNING
Use this methods only if both air data are unreliable.

1.	Heated Pitot	*ON*
2.	Contact Air Traffic Control	*"Erroneous data may be transmitted by ADC"*

If problem remains

3.	Pitch and power	*Use known settings.*

Use Ground Speed on GTN 750XI

4.	Contact Air Traffic Control	*Request wind force and direction*
5.	Read ground speed on navigators	-----
6.	Deduct aircraft air speed	-----

3.20 OV Circuit Breaker Popped-Out

Cause:

Overvoltage detected.

Procedure:

1. OV circuit breaker ..... *Re-engage **one** time*
2. Essential bus voltage "Volts 1" ..... *Monitor*

If voltage > 14.6 V

3. OV circuit breaker ..... *PULL to disengage*
4. GENERATOR FAULT procedures ..... *Apply (§3.21).*

WARNING

If the breaker disengages again, NEVER try to re-engage it and NEVER hold it engaged. Risk of electric device damage and fire!

Note

The engine will keep running normally.

3.21 GENERATOR FAULT procedures

3.21.1 EMGY PWR Status

If the EMGY PWR switch in OFF 

1. Goto ..... *§3.21.2* - EMGY PWR is OFF below

If the EMGY PWR switch in ON 

2. Goto ..... *§3.21.3* - EMGY PWR is ON below

> Note
> When the EMGY PWR is activated, EMGY PWR amber light is activated (§3.23.11).

3.21.2 EMGY PWR is OFF

The battery is no longer charging. It supplies energy to on board electric systems. Engine electric systems do not rely on the battery: Engine should run normally.

1. Non-essential equipment ..... *Switch OFF*
   - Garmin GNC 355A ..... *Switch OFF – Use GTN 750XI*
   - Map light ..... *Switch OFF*
   - USB ..... *Disconnect*
   - Landing lights ..... *Switch OFF – Switch On 10 min before landing*
2. Essential bus voltage "Volt1" ..... *Monitor*
3. Land ..... *At the Nearest Suitable Airfield*

Note
An 80% charged battery (≈13.2v) allows **1h10 min** of flight with the standard electrical loads in night cruise. Landing lights can be switched ON for 10 minutes.

If Volts 1 decreases rapidly and/or falls below 12.5 V

1. Land ..... *AS SOON AS POSSIBLE.*

Caution
Be prepared for total loss of electrical systems including flaps and trims.

3.21.3 EMGY PWR is ON

This should only occur in case of **dual generator failure**. The **battery is not charging** anymore and supplies electric power to both on board equipment AND engine systems. Only essential equipment remains powered. Following equipment are no longer powered:

Transponder	Pedal adjustment	Fuel level quantity	Flaps
USB	Landing lights	Flashlights	Trims
Nav Lights	Map light	AOA indicator	

Procedure:

1. Pilot in command ..... *Control the airplane.*
2. Garmin GNC 355A ..... *Switch ON, Set*
3. Essential bus voltage 'Volt1" ..... *Monitor*
4. Engine ECU bus voltage "Volts B" *Monitor*
5. Land ..... *AS SOON AS POSSIBLE.*

Note
The communication between pilot and co-pilot is deactivated.
An 80% charged battery (≈13.2v) allows **58 min** of flight in EMGY PWR mode.

If Volts 1 and/or Volts B decrease rapidly and/or fall below 12.5 V

6. Land ..... *AS SOON AS POSSIBLE.*

WARNING
The battery is not charging anymore, and charge status is critical.
Be prepared for an engine failure and total loss of electrical systems including flaps and trims.
Be prepared for a power-off Emergency Landing (§3.9) with no trims, no flaps.

3.22 Ballistic Rescue System Activation

If the parachute is determined to be the only alternative available for saving the aircraft occupants, deploy the system without delay.

1.	**BRS Handle**	***PULL with both hands.***
2.	Engine Key Switch StartAssist	*OFF*
3.	FUEL shut off valve	*OFF*
4.	MASTER Switch	*OFF*
5.	ELT	*ON*
6.	Seat belts	 *Fasten, tighten*
7.	Position before impact	 *Emergency position*

Note
See §7.10 for detailed information on BRS

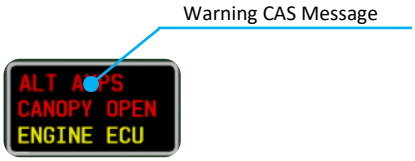
3.23 Warnings Lights

The following warning lights can be displayed on the annunciator panel.

3.23.1 MASTER WARN

Cause:

A Warning message is displayed on the MFD.
WARNING (red): Requires immediate attention.
There may be several warnings displayed.



Procedure:

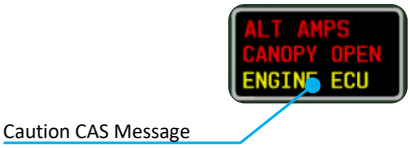
Apply corresponding procedure in the §3.24 Red CAS Message

3.23.2 MASTER CAUTION

Cause:

A Caution message is displayed on MFD.

CAUTION (amber): Requires pilot awareness and possible corrective action.



Procedure:

Apply corresponding procedure in the §3.25. Amber CAS Message.

3.23.3 CANOPY

Cause:

The canopy is open.

Procedure:

- **On ground:**
  Close the canopy before flight.

- **During take-off run:**
  Follow §3.16.1, Inadvertent canopy opening.

- **In flight:**

Do not try to close the canopy. Airspeed ..... *Max. 130 km/h – 70 kt.*

Then follow procedure for inadvertent canopy opening §3.16.2 During take-off or §3.16.3 In-flight.

3.23.4 Both Lanes (A and B) Steady ON

Cause:

If both LANE A and LANE B are steady ON, it indicates a Major Default in the engine ECU on the Lane A and the Lane B. The engine management is uncertain, the system relies on default values and tries to maintain operation. The engine may become inoperative any time (from loss of engine power control to complete in-flight shut down).

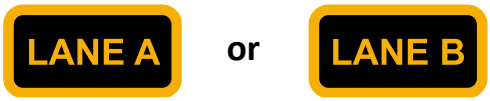
Procedure:

- **On ground:**
  Cancel flight.

- **In flight:**
  - Do not try to recycle any Lane (keep on position "BOTH").
  - Keep parameters steady as far as practicable.
  - Land AS SOON AS POSSIBLE.

Caution
Loss of engine power in flight shutdown possible. Be prepared for an Emergency Landing (§3.9).

3.23.5 One Lane (A or B) Steady ON



Cause:

One steady light LANE A or LANE B indicates a Major Default in the engine ECU Lane A or B. The other Lane will take control of the engine management. Full engine performance is available, but possibly in a degraded mode with increased fuel consumption. In the case of any additional failure the engine may become inoperative (no backup).

Procedure:

- **On ground:**
  Cancel flight.

- **In flight:**
  Land At Nearest Suitable Airfield.

Caution
Eco mode unavailable. Fuel consumption increased. Check fuel flow and re-evaluate fuel range.

Note
Full engine performance is available.

3.23.6 Both Lanes (A and B) FLASHING

Cause:

Both flashing lights indicate a minor default in each engine ECU Lane A and B. Full engine performance and nominal engine modes remain available, no immediate hazard. But as both Lanes are concerned, in the case of any additional failure the engine may become inoperative (no backup).

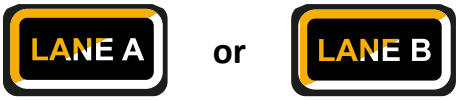
The CAS message ENGINE ECU is also displayed on the PFD (§7.13.6.2)

Procedure:

- **On ground:**
  Cancel flight.

- **In flight:**
  Land At Nearest Suitable Airfield.

3.23.7 One Lane (A or B) FLASHING



Cause:

One flashing light LANE A or LANE B indicates a minor default in the engine ECU Lane A or B. Full engine performance and nominal engine modes remain available.

The CAS message ENGINE ECU is also displayed on the PFD (§7.13.6.2)

Procedure:

- **On ground:**
  One-way flight to maintenance facilities allowed.

- **In flight**:
  No immediate action required.

3.23.8 FUEL LEVEL

Cause:

Usable fuel less than 5 Liters – *1.3 US gal* (at cruise pitch attitude).

> Note
> The fuel level warning light is equipped with it's own sensor.
> The CAS Message FUEL QTY (§.3.25.6) is connected to a different sensor.
> As the systems are not linked, one light may appear but not the other.

Procedure:

1.	Fuel consumption	*Reduce to 10 Liters per hour - 2.6 US gal per hour or less as practical.*
2.	Slips and high pitch angles	*Avoid as practical.*
3.	Land	*AS SOON AS POSSIBLE.*

> Note
> Approx. 30 minutes endurance available for an average fuel flow of 10 liters per hour – *2.6 US gal per hour*

3.23.9 FLAP DEFAULT

Cause:

Overload detected in the flap control system.

Procedure:

- Flaps may be inoperative or blocked in intermediate position.
- Monitor speed if flaps extended.
- Monitor Flaps position (on the MFD and real position on the wing)
- Reduced flaps landing: Increase approach speed:

Flaps UP ..... IAS = 140 km/h – *76 kt*

Flaps T/O ..... IAS = 125 km/h – *68 kt*

In both cases, landing distance is increased by 100 meters.

3.23.10 BATTERY DEFAULT

or

Cause:

Fault detected by the internal Battery Management System.

Procedure:

The table below shows the most common fault conditions in flight and associated procedures:

Status	Volts 1	Cause	Procedure
Short Flashing (2s On / 2s Off)	Any voltage	High battery temp. *>75°C - 167°f*	No immediate action required.
Slow Flashing (5s On / 5s Off)	< 12.8	Battery over-discharged Or generator failure	Check OV circuit breaker ENGAGED
Slow Flashing (5s On / 5s Off)	12.8V-14.6V	Cell to cell charge level imbalance	No immediate action required.
Slow Flashing (5s On / 5s Off)	> 15.2V	Over-voltage	PULL OUT OV circuit breaker
Steady On	Any voltage	BMS electronic issue	No immediate action required.

Note
Do not dispatch aircraft.
Report battery problem to maintenance personnel when back on the ground.

3.23.11 EMGY PWR

Cause:

EMERGENCY POWER MODE is active (the EMGY switch is ON).

Procedure:

- If not switched on intentionally, switch OFF.
- If switched on purpose: apply GENERATOR FAULT procedure.

3.23.12 START PWR

Cause:

Engine electric systems supplied by the battery.

Procedure:

- **On Ground:**

  Before start with LANES ON ..... *Normal status.*

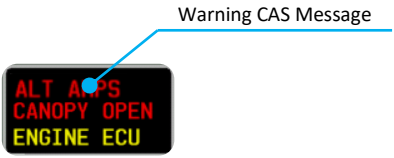
  After start and RPM > 1 500 ..... *Shut down the engine.*

- **In flight:**

  Abnormal status, without immediate consequence.
  No immediate action required.

3.24 Red CAS Message

WARNING (red): Requires immediate attention.
One or more parameters are within the warning range.



An aural alert announce the warning in the headset.

WARNING list:

RPM	VOLT 1
OIL TEMP	VOLTS B
WATER TEMP	ENGINE ECU
OIL PRESS	ALT AMPS
FUEL PRESS	EGT

Amplified Emergency procedure are given for each Warning CAS Message.

3.24.1 RPM

Cause:

Engine speed exceed 5 900 RPM.

If throttle reduction doesn't change the RPM

1. Throttle ..... *Reduce to minimum for safe flight.*
2. Airspeed ..... *Reduce to minimum for safe flight.*
3. Land ..... *AS SOON AS POSSIBLE.*

> Note
> The CAS Message is displayed if the engine speed exceed 5 900 RPM. However, the red range starts at 5 800 RPM.
> Small overruns above 5 800 RPM may occur during take-off.

3.24.2 WATER TEMP

Cause:

Coolant temperature exceeds approved maximum.

Procedure:

1.	Throttle	*Reduce power to minimum for flight and increase airspeed as practical.*
2.	Land	*AS SOON AS POSSIBLE.*

Caution

Be prepared for engine failure and an Emergency Landing (§3.9).

3.24.3 OIL TEMP

Cause:

Oil temperature exceeds approved maximum temperature.

Procedure:

1.	Throttle	*Reduce power to minimum for flight and increase airspeed as practical.*
2.	Monitor	*Monitor oil pressure.*
3.	Land	*AS SOON AS POSSIBLE.*

3.24.4 OIL PRESS

3.24.4.1 Oil pressure below 0.8 bar – 12 PSI

Cause:
Oil pressure below approved minimum pressure.

Procedure:

1. Throttle ..... *Reduce power to minimum for flight.*
2. Land ..... *AS SOON AS POSSIBLE.*

> Caution
> Be prepared for engine failure and an Emergency Landing (§3.9).

3.24.4.2 Oil pressure above 7 bar – 101 PSI

Cause:
Oil pressure above approved maximum pressure. This may happen during start at very low ambient temperatures.

Procedure:
Reduce engine speed and check the oil pressure again once it has reached a higher oil temperature.

3.24.5 FUEL PRESS

3.24.5.1 Fuel press <1.5 bar – 22 PSI (+ Fuel odors)

Caution
Probable major fuel leak in pressurized injection system. Risk of Fire: Kill the engine.

1. Fuel shut-off valve ..... *CLOSE*
2. Engine Key Switch StartAssist ..... *OFF*
3. EMGY PWR switch ..... *OFF*
4. EMERGENCY LANDING ..... *PREPARE*

3.24.5.2 Fuel press < 2.5 bar – 36 PSI

If engine delivers power

1. Fuel pressure ..... *Monitor.*
2. Check fuel shut-off valve ..... *OPEN.*
3. Altitude ..... *Descent as practical.*

If the pressure goes back to normal values

4. Land ..... *At nearest suitable airfield.*

Caution
Probable single fuel pump failure, land at the nearest suitable airfield.
Be prepared for engine failure and an Emergency Landing (§3.9).

If fuel pressure remains < 2.5 bars - *36 PSI* at altitude < 7 000ft

5. LAND ..... *AS SOON AS POSSIBLE.*

WARNING
Abnormally low fuel pressure.
Be prepared for engine failure and an Emergency Landing (§3.9).

3.24.5.3 Fuel pressure > 3.5 bar – 51 PSI

Fine fuel filter probably severely clogged, and bypass inoperative.

- **On ground:**
  Cancel flight, maintenance required.

- **In flight:**
  No immediate action required. Land at the Nearest Suitable Airfield. Monitor engine parameters and behavior. In case of doubt, land AS SOON AS POSSIBLE.

Caution
Be prepared for engine failure and an Emergency Landing (§3.9).
Maintenance required before next flight.

3.24.6 ENGINE ECU

Cause:

Both Lanes are steady on.

Procedure:

This warning is redundant with LANE A and LANE B warning lights steady ON. Report to §3.23.4, Both Lanes (A and B) Steady ON.

3.24.7 VOLTS 1

Cause:
Abnormal voltage on essential bus (VOLTS1)

Procedure:

3.24.7.1 Essential bus voltage VOLTS1 < 12.5 V

Essential electrical bus voltage is below 12.5 V - Alternator A or B probably inoperative or the Charge / Over-Voltage circuit breaker "Charge/OV" was disengaged.
The battery is no longer charged, and charge status is critical.

1. Charge/OV circuit breaker ..... *Check ENGAGED*
2. GENERATOR FAULT procedure ..... *Apply (§3.21).*

> Caution
> Be prepared for total loss of electrical systems including flaps and trims

> Note
> If engine ECU bus B "Volts B" voltage is normal, engine normal operation

3.24.7.2 Essential bus voltage VOLTS1 > 15.2V

Battery charging voltage regulator probably faulty. Severe overvoltage. Damage may occur to electrical device.

1. Charge/OV circuit breaker ..... *PULL to disengage*
2. GENERATOR FAULT procedure ..... *Apply (§3.21).*

> Caution
> Battery no longer charged.
> A 80% loaded battery allows 1h10 min of flight with the standard electrical loads in cruise

3.24.8 VOLTS B

Cause:

Anormal voltage on engine ECU (VOLTS B).

Procedure:

3.24.8.1 Engine ECU voltage Volts B < 9V

Engine ECU supply voltage critically low – Alternator A+B probably inoperative.

1. EMGY PWR switch ..... *Switch ON*
2. GENERATOR FAULT procedures ..... *Apply (§3.21).*

3.24.8.2 Engine ECU voltage Volts B > 15V

Engine ECU supply voltage too high. Probable fault in Rotax internal power generation regulation. Damage may occur to engine electrical systems.

1. Throttle ..... *Reduce RPM to minimum for flight*
2. Land ..... *AS SOON AS POSSIBLE*

Caution
Be prepared for engine failure and an Emergency Landing (§3.9).

3.24.9 ALT AMPS

3.24.9.1 Current < 4 Amps

Cause:

The alternator supplies less current than minimum required by aircraft systems.
Faulty charging system, or faulty electrical systems:

- Battery discharges to power aircraft systems
- This is normal when the engine is stopped.
- This is not normal if the engine is running (except in emergency power mode):

Procedure:

1. OV circuit breaker ..... *Check ENGAGED.*
2. Faulty equipment ..... *Switch OFF as practical.*
3. "VOLTS 1" and "VOLTS B" ..... *Monitor.*
4. GENERATOR FAULT procedures ..... *Apply (§3.21).*

3.24.9.2 Current > 35 Amps

Cause:

The generator produces more electrical power than its rating, risk of electrical fire. Battery charge is probably low.

Procedure:

1. Non-essential equipment ..... *Switch off as practical.*
2. Voltage 'Volts1" and "Volts B" ..... *Monitor*
3. BATT DEFAULT warning light status ..... *Monitor*

If current goes back to normal values

4. Flight is possible to your destination at your own discretion

If current remains >35A

5. Land ..... *At the Nearest Suitable Airfield*

3.24.10 EGT

Cause:

One or several Exhaust Gas Temperatures are above approved limits.
This can be the consequence of a faulty sensor, or an engine problem.

Procedure:

- Check engine behavior:
  - Unusual noise / vibration?
  - Unusual odors (smoke)?

➢ **A high EGT with the unusual behavior above can be the sign of an engine malfunction including a broken exhaust manifold. RISK OF FIRE!**

1. Throttle ..... *Reduce power to minimum for flight.*
2. Engine behavior/parameters ..... *Keep monitoring.*
3. Land ..... *AS SOON AS POSSIBLE.*

If **smoke** confirmed

4. Engine Key Switch StartAssist ..... *OFF*
5. Fuel shut off valve ..... *OFF*
6. Search a suitable landing site and prepare for an Emergency Landing (§3.9).

➢ **If the engine runs smooth/as usual**

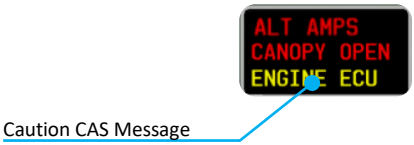
- Display the detailed engine monitoring page on the G3X.
- Check how many EGT are abnormally high.

If only one EGT is abnormally high (or erratic), the 3 other ones are normal, and the engine runs smooth, it is probably a faulty sensor. Keep monitoring your engine behavior and parameters. Flight is possible to your destination at your own discretion. A maintenance inspection is required.
If more than one EGT abnormal (even if the engine seems running "normally"): probable engine malfunction. Risk of damage to the engine.

1. Throttle ..... *Reduce power to minimum for flight.*
2. Engine behavior/parameters ..... *Keep monitoring.*
3. Land ..... *AS SOON AS POSSIBLE.*

3.25 Amber CAS Message

CAUTION (amber): Requires pilot awareness and possible corrective action.



CAUTION list:

EGT	ENGINE ECU
OIL PRESS	OIL TEMP
WATER TEMP	FUEL QTY
FUEL PRESS	VOLTS B
VOLTS 1	ADC FAIL
ATTITUDE FAIL	AIRFRAME TEM

3.25.1 EGT

Cause:

One or several Exhaust Gas Temperatures are above normal operating values.
This can be the consequence of a faulty sensor, or an engine problem.

Procedure:

- Check engine behavior:
  - Unusual noise / vibration?
  - Unusual odors (smoke)?

➢ **A high EGT with the unusual behavior above can be the sign of an engine malfunction including a broken exhaust manifold . RISK OF FIRE!**

1. Throttle ..... *Reduce power to minimum for flight.*
2. Engine behavior/parameters ..... *Keep monitoring.*
3. Land ..... *AS SOON AS POSSIBLE.*

If SMOKE confirmed

4. Engine Key Switch StartAssist ..... *OFF*
5. Fuel shut off valve ..... *OFF*
6. Search a suitable landing site and prepare for an Emergency Landing (§3.9).

➢ **If the engine runs smooth/as usual**

- Display the detailed engine monitoring page on the G3X.
- Check how many EGT are significantly above the other ones.

If only one EGT is abnormally high (or erratic), the 3 other ones are normal, and the engine runs smooth, it is probably a faulty sensor. Keep monitoring your engine behavior and parameters. Flight is possible to your destination at your own discretion. A maintenance inspection is required.

If more than one EGT is abnormal (even if the engine runs “normally”): possible engine malfunction. Risk of damage to the engine.

1. Throttle ..... *Reduce power to minimum for flight.*
2. Engine behavior/parameters ..... *Keep monitoring.*
3. Land ..... *AS SOON AS POSSIBLE.*

3.25.2 ENGINE ECU

This warning is redundant with LANE A or LANE B warning light steady ON.
Report to §3.23.5, One Lane (A or B) Steady ON

3.25.3 OIL PRESS

3.25.3.1 Oil pressure below 2 bars – 29 PSI

Cause:

Oil pressure below normal operation values. This may happen when oil is hot and engine is idling.
This is not normal if RPM > 2 000.

Procedure:

1. Throttle..... *Reduce power to minimum for flight.*

3.25.3.2 Oil pressure above 5 bars – 72 PSI

Cause:

Oil pressure above approved maximum pressure. This may happen during a cold start at low ambient temperatures.

Procedure:

Reduce engine speed and check the oil pressure again once it has reached a higher oil temperature.

3.25.4 OIL TEMP

3.25.4.1 Oil temperature < 50°C – 112°F

Cause:

Oil temperature below normal operation recommendations.

Procedure:

- **On ground:**
  Let temperatures warm up above 50°C before engine run up and take-off.

- **In flight:**
  If possible, increase power to raise the temperatures. If possible, do not apply full power suddenly.

3.25.4.2 Oil temperature > 110°C – 230°F

Cause:

Oil temperature high.

Procedure:

1. Throttle..... *Reduce power to minimum for flight and increase speed as practical.*

Note
Engine heats up more in eco mode than at full power.

3.25.5 WATER TEMP

3.25.5.1 Coolant temperature below 50°C – 122°F

Cause:

Coolant temperature below normal operation recommendations.

Procedure:

- **On ground:**
  Let temperatures warm up above 50°C before holding point checks and take-off.

- **In flight:**
  If possible, increase power to raise the temperatures. If possible, do not apply full power suddenly.

3.25.5.2 Coolant temperature > 110°C – 230°F

Cause:

Coolant temperature high.

Procedure:

1. Throttle..... *Reduce power to minimum for flight and increase speed as practical.*

3.25.6 FUEL QTY

Cause:

Usable fuel less than 5 Liters

Procedure:

This message is redundant with the amber caution light “FUEL LEVEL”.

Follow the procedure FUEL LEVEL §3.23.8 above

3.25.7 FUEL PRESS

Cause:

Possible partial obstruction of fuel delivery.

Procedure:

1. Fuel pressure ..... *Monitor*
2. Check fuel shut-off valve ..... *OPEN*
3. Altitude ..... *Descent as practical*

Flight is possible to your destination at your own discretion.

Note
Maintenance should be carried out.

3.25.8 VOLTS 1

Cause:

Abnormal essential bus voltage > 14.6 V. Battery charging voltage regulator probably faulty. Moderate overvoltage.

Procedure:

1.	Overvoltage circuit breaker	*- PULL to disengage,* *- Then re-engage ONCE*

If no effect

2.	Overvoltage circuit breaker	*PULL to disengage*
3.	GENERATOR FAULT procedures	*Apply (§3.21).*

3.25.9 VOLTS B

Cause:

Engine ECU supply voltage below normal level

Procedure:

1.	Engine ECU bus B voltage “Volt B”	*Monitor*
2.	Essential bus voltage “Volts 1”	*Monitor*
3.	Land	*At nearest suitable airfield.*

Caution

If engine ECU voltage decreasing towards 9V, be prepared to switch EMGY PWR ON and apply GENERATOR FAULT procedures *(§3.21.3)*.

3.25.10 AHRS FAIL / ADC FAIL / ATTITUDE FAIL

Cause:

The G3X AHRS has failed.

Procedure:

Use primary indicators (analog instruments and standalone attitude indicator).

> Note
> Do not trust the specified G3X failed indication.

3.25.11 AIRFRAME TEM

Cause:

Airplane exposed to the sun for too long without protection. The airframe temperature is above approved limit of 54°C.

Procedure:

- **On ground:**
  Start engine and perform engine warm up procedures and taxi on ground to cool down the structure with airflow. Check temperature again. Do not take off with the airframe above 54°C.

- **In Flight:**
  Limit load factor and Land at the Nearest Suitable Airfield.

3.26 Terrain and obstacle annunciations

If terrain and obstacle databases are installed, the following alerts and procedures apply:

Caution
Terrain and obstacle information should only be used as an aid to situational awareness.

3.26.1.1 Terrain warning

Aural alert	Visual alert
Terrain Ahead! Pull Up! Terrain, Terrain Pull Up! Pull Up! Obstacle Ahead! Pull Up!" Obstacle, Obstacle Pull Up! Pull Up! Sink Rate, Pull Up! Pull Up!	**TERRAIN** OR **OBSTACLE** OR **TERRAIN** →

Note
The arrow indicates the terrain or obstacle is outside of the synthetic vision field of view.

Procedure:

1. Ensure terrain and obstacle avoidance according to visual flight rules.

3.26.1.2 Terrain caution

Aural alert	Visual alert
CAUTION, Terrain CAUTION, Terrain Ahead CAUTION, Obstacle CAUTION, Obstacle Ahead CAUTION, Sink Rate	**TERRAIN** OR **OBSTACLE** OR **← TERRAIN**

Note
The arrow indicates the terrain or obstacle is outside of the synthetic vision field of view.

Procedure:

1. Ensure terrain and obstacle avoidance according to visual flight rules.

3.27 Abnormal procedure:
Transponder management in case of G3X failure

Note
The transponder GTX335R is a “remote” unit without instrument panel interface. It is controlled only by the G3X touch screen.
In case of failure of the G3X display, the transponder will remain active on the last mode and squawk code as long as it remains powered. You remain identified on the ATC radars. The VHF remains controllable through its display unit: you can still communicate with the air traffic control and explain you can’t change squawk if requested.

3.28 G3X failures and annunciation

3.28.1 ADC FAIL

Air Data Computer failure is indicated by:

- **ADC FAIL** annunciation.
- Red X over the airspeed and altitude tapes.
- Red X over the vertical speed tape.
- Red X over the TAS and OAT fields.

Procedure:

1. Use primary airspeed indicator and altimeter

3.28.2 Attitude failure

Attitude failure is indicated by:

- **AHRS FAIL** annunciation.
- Removal of the sky / ground presentation.
- Red X over the sky / ground presentation.
- Amber ATTITUDE FAIL over the sky / ground presentation.

Procedure:

1. Use primary attitude indicator

3.28.3 MESSAGE

Cause:

Message This label indicates new system message.

Procedure:

Press the flashing message annunciation to view a new system message.

3.28.4 AHRS ALIGN

During flight, Amber AHRS ALIGN annunciation indicates that the AHRS is beginning to fail and the internal sensors are trying to realign themselves. The attitude presentation behind the annunciation is still valid but should be crosschecked using primary flight instruments.

During system initialization, the AHRS displays the message 'AHRS ALIGN, KEEP WINGS LEVEL' over the attitude indicator. The AHRS should display valid attitude and heading fields typically within the first minute of power-up.

The AHRS can align itself both while taxiing and during level flight

3.28.5 ALIGNING KEEP WINGS LEVEL

Cause:

The G3X has detected an invalid attitude solution and will not display any attitude information.

Procedure:

1.	Attitude information	*Use primary attitude indicator*
2.	Aircraft attitude.....	*- Maintain 1° pitch up and wings level as practical.* *- Avoid more than 10° bank and +/-5° pitch*

The system should display attitude when internal accuracy tolerances are met.

If attitude information does not recover:

3.	Attitude information	*Use primary attitude indicator*

3.28.6 EIS failure

EIS failure is indicated by the loss of displayed information on the EIS, including a blank, frozen, red 'X' over the display, or unresponsive display of EIS parameters.

Procedure:

1. Engine throttle ..... *Position to ensure operation within engine limitation.*
2. Land ..... *At the Nearest Suitable Airfield.*

3.28.7 G3X Touch Failure Annunciations

If a G3X Touch function fails, a large red 'X' is typically displayed over the instrument(s) or data experiencing the failure. Upon G3X Touch power-up, certain instruments remain invalid as equipment begins to initialize. All instruments should be operational within one minute of power-up.
If any instrument remains flagged the G3X Touch should be serviced by an Elixir-Aircraft and/or Garmin-authorized repair facility.

WARNING
Changing the G3X setup made by the manufacturer is prohibited to pilot's / owners and unauthorised maintenance personnel. If you think you have inadvertently entered in the configuration pages seek advice from Elixir Aircraft.

3.28.8 Heading malfunction

A heading failure, loss of magnetometer data, or magnetic field error is indicated by removal of the digital heading readout, a red X, and an amber "HDG" annunciation on the display.

Procedure:

1. Flight instruments ..... *Use primary flight compass*

Note
If the G3X Touch HSI has a valid GPS signal, the G3X Touch HSI instrument will display the GPS track information in magenta.

3.28.9 PFD failure

PFD failure is indicated by the loss of displayed information on the PFD, including a blank, frozen, or unresponsive display.

Procedure:

1. Flight instruments ..... *Use primary flight instruments*

3.28.10 Navigation data failure

Navigation data failure may be indicated by any or all of the following:

- Loss of course deviation information on PFD
- Loss of bearing pointer on HSI

Procedure:

1. Navigation information ..... *Ignore*
2. Navigate ..... *Under Visual Flight Rules*

Note
The Garmin G3X Touch GPS is not a class A navigation aid, it is provided for information purposes only. Only use in VMC with ground or sea in sight.

3.29 External and cockpit lighting failures (At night)

3.29.1 LDG lights failure

Flight is possible to your destination at your own discretion.

Before landing:

1. FLASH lights ..... *Check ON.*
2. NAV lights ..... *Check ON.*
3. Air traffic control ..... *Advise as practical.*

3.29.2 NAV and / or FLASH lights failure

Flight is possible to your destination at your own discretion.

1. Land lights ..... *ON*
2. Air traffic control ..... *Advise as practical.*

3.29.3 Instrument backlight failure

1. Map light ..... *Use as practical.*
2. Personal headlamp ..... *Use as practical.*

3.29.4 Map light failure

1. Personal headlamp ..... *Use as practical.*

4 Normal procedures

4.1 Introduction

This section provides checklists and recommended procedures for normal operation of the aircraft.

4.2 Airspeeds for Normal Operation

The following speeds are a summary of those used during normal operations. However, the appropriate procedures must be followed.

Take-off (§4.6)

Normal, Flaps T/O	*115 km/h – 62 kt*

Climb (§4.7)

Vx, Flaps T/O	*115 km/h – 62 kt*
Vy, Flaps Up	*140 km/h – 76 kt*
Recommended Climb Speed, Flaps Up	*160 km/h – 86 kt*

Approach (§4.10)

Unusual Approach Flaps Up	*140 km/h – 76 kt*
Unusual Approach Flaps T/O	*125 km/h – 68 kt*
Normal Approach Flaps LDG	*110 km/h – 60 kt*

Performance (§5)

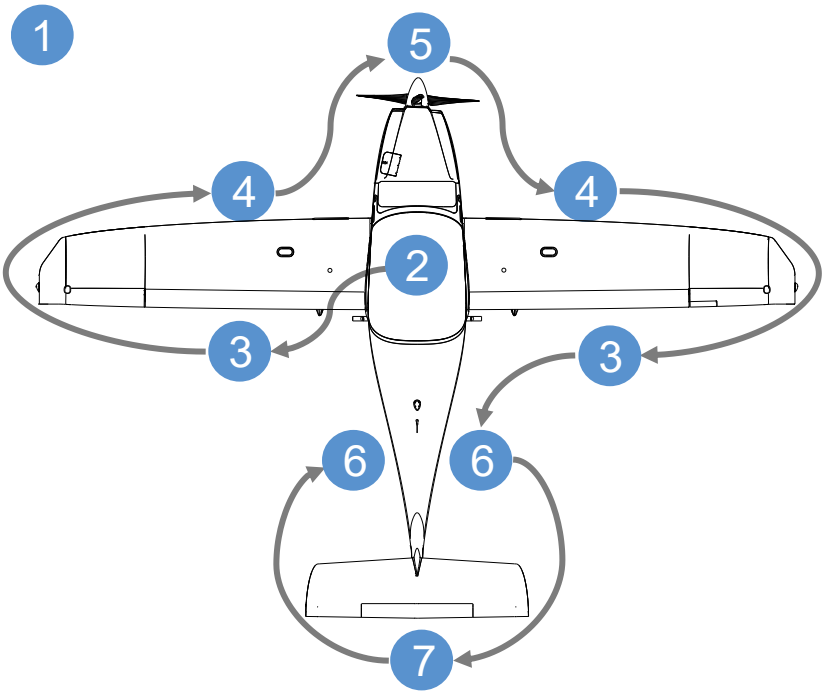
Maximum Take-Off And Landing Demonstrated Crosswind	*33 km/h – 18kt* *Gusts 46 km/h – 25kt*
Maximum Recommended Tailwind	*10km/h - 5kt.*

4.3 Pre-flight inspection

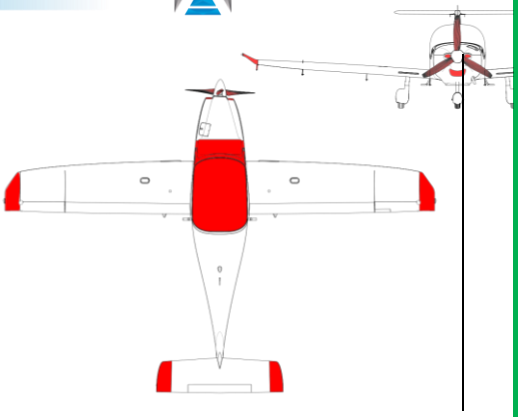
Carry out the pre-flight inspection every day prior to the first flight or if the plane was left unattended. Incomplete or careless inspection can cause an accident. Carry out the inspection following the instructions in the Inspection Check list.

> Note
> The word "condition" , used in procedures or pre-flight check, means visual/manual check of surface, damage; deformation, scratches, attrition, corrosion, icing or other damages, which may lead to flight safety degradation.

Carry out the pre-flight inspection as follows:



4.3.1 Covers



Pitot probe	*Removed.*
Static ports	*Removed.*
Propeller	*Removed.*
Wing & Elevator tips	*Removed.*
Wing mooring eyes	*Removed.*
Air inlets	*Removed.*
Canopy	*Removed.*

4.3.2 Cabin

Canopy	*- Condition of attachment and locking mechanism, cleanness, gas springs condition.*
Lose objects	*Check.*
Engine Key Switch StartAssist	*OFF, key removed.*
BRS safety pin	*Check SECURED.*
MASTER Switch	*ON*
All screens	*Clean and functional.*
MFD	*- ON, check battery voltage. Recharge if VOLTS1 < 12.8V* *- Check Fuel quantity indication.*
NAV, FLASH, LDG Lights	*ON, check functioning.*
Instrument light dimmer	*ON, check functioning for Night VFR flight.*
Map light dimmer	*ON, check functioning for Night VFR flight.*
Day/Night switch	*Check warning light brightness change.*
Flight controls	*- Visual inspection, function, clearance, free movement up to stops, play, check wing flaps and trims operation.*
All switches	OFF
MASTER Switch	OFF
Mandatory documents	On board

4.3.3 Wing trailing edge

Wing flap	*Surface condition, attachment, clearance.*
Main landing gear	*- Wheel, fairing, leg and brake attachment, condition, pressure of tire.*
Fence	*Condition, bonding to wing skin.*
Aileron	*- Surface condition, attachment, clearance, free movement, trim tab surface condition (right aileron only).*
Wing tip	*- Surface condition, attachment, FLASH/NAV condition, fuel tank vent unobstructed, OAT condition (left tip only).*

4.3.4 Wing leading edge

Wing upper surface	- Condition, cleanliness. **WARNING** The Elixir wing skin is structural. In case of any damage to the wing surface (scratch, indentation, impact damage), cancel flight and seek advice from the manufacturer.
Leading edge	- Surface condition, cleanliness - Leading edge stall strips present - LAND light plexiglass shield condition (cracks, clean, transparency)
Pitot probe (right wing)	- Condition, attachment, cleanliness Caution Pitot probe could be hot.

4.3.5 Around the engine cowling

Nose gear	*Wheel, fairing, leg attachment, condition, tire pressure.*
Engine cowling	*Condition*
Propeller and spinner	*Condition*
Engine mount and exhaust pipe	*Condition, attachment.*
Fuel system	*- Draining (both gascolator and belly drains)* *- Check for water and foreign matters.*
Oil quantity	*Check (Procedure below)*

WARNING
Before this check, ensure Engine Key Switch, EMGY PWR and MASTER Switch are OFF

1. Open the oil tank.
2. Turn slowly the propeller by hand in direction of engine rotation several times to pump oil from the engine into the oil tank.

Note
It is essential to build up compression in the combustion chamber.
Continuous pressure and gas transfer matter more than rotation speed.

3. This process is finished when air is returning back to the oil tank and can be noticed by an audible gurgle from the open oil tank.
4. Check oil level and refill as required

The hot oil level should be in the upper half (between the “50%“ and the “max“ mark).

Note
An oil level increase of about 30% is usually noted between cold and hot engine.
Difference between “max” and “min” mark = 0.45 L – *0.12 US gal*.

5. Close the oil tank

4.3.6 Fuselage

Fuselage surface	*Condition, Cleanliness*
Antennas	*Attachment*
Static ports	*Unobstructed*

4.3.7 Tail

Vertical Fin	*- Condition of surface* *- Attachment* *- Free movement* *- Rudder stops*
Tailplane	*- Condition of surface* *- Attachment (apply only light forces at tips).* *- Free movement / play (max +/-5 mm fore-aft and up-down at tailplane tip).* *- Trim tab surface condition, attachment / play (max +/-1.5 mm at tab trailing edge; apply only light forces on control surface)* *- Fence (x1) and vortex generators (x2) present on both sides, condition, bonding to elevator skin.*

Note
Visually check fuel quantity in the tank - Consistency with fuel gauge.

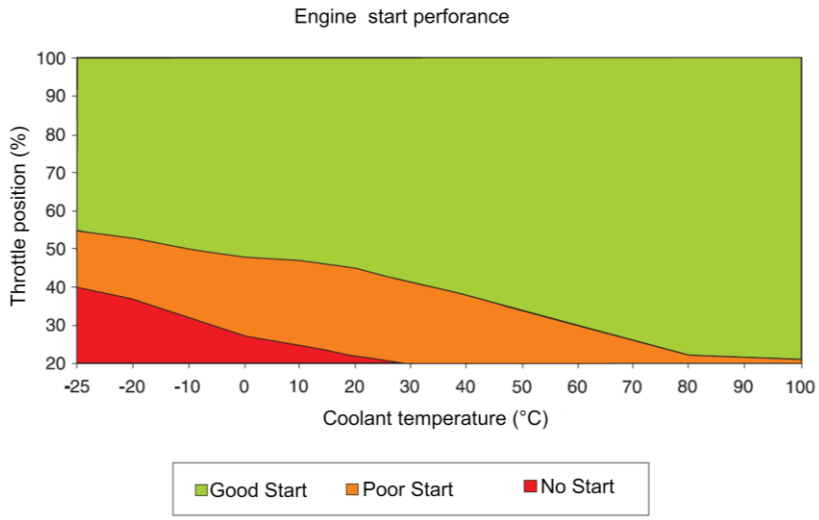
4.4 Engine starting

4.4.1 Before engine start

1.	Glareshield removable extensions	*Install for Night VFR flight*
2.	Day/Night Switch	*- OFF for Day VFR flight* *- ON for Night VFR flight*
3.	Cockpit lights	*Set dimmer depending on light conditions*
4.	Flight controls	*Free & correct movement*
5.	Canopy	*Close and lock*
6.	Seat belts	*Fasten*
7.	Parking brake	*Set*
8.	Circuit breakers	*Check location, function and all engaged*
9.	GVNR propeller governor switch	*Check ON*

4.4.2 Engine start

1.	Fuel shut off valve	*ON*
2.	MASTER Switch	*ON*
3.	Garmin MFD	*Active*
4.	Gamin MFD	*Select PFD + EIS Mode*
5.	FLASH lights	*ON*
6.	LANE Selector	*Switch to BOTH*
7.	Engine Key Switch StartAssist	*Switch to LANES*
8.	"LANE A" and "LANE B" warning lights	*Check ON then OFF after around 3 seconds*
9.	Engine Key Switch StartAssist	*RUN*
10.	Fuel pressure	*Check at 3 bar – 43 PSI*
11.	Throttle position	*Set according to table below*
12.	Propeller area	*Clear*
13.	Engine Key Switch StartAssist	*Select START until the engine runs and release. (Max 10s and let starter cool down 2 minutes before next attempt)*
14.	Throttle	*Set 2000 RPM*
15.	Oil pressure	*Check (above 3 bars – 43 PSI within 10 seconds).*
16.	Engine indications	*Check*
17.	Warning lights	*Check LANE A, LANE B and START PWR OFF.*



Before starting, adjust the throttle position (indicated on the G3X between MAN and RPM) according to the table above. The boundary between the orange and green zones offers an optimal compromise between a good start and avoiding excessive RPM during start-up.

> Note
> Throttle % disappears after engine start.

4.4.3 Engine warm-up

1.	Throttle.....	*- Warm up engine at approx. 2 000 RPM for approx. 2 minutes.*
2.	Throttle.....	*- Continue at 2 500 RPM until oil temperatures reaches 50°C – 122°F*
3.	Engine indications.....	*Check*

Note
During start-up, the motor is supplied by the battery via “start power”.
After startup, the engine is supplied by the generator B.
When RPM > 2 500 for 5 seconds, the generator shifts to A, and the amp meter increases.

4.4.4 Taxiing

1.	NAV lights.....	*ON*
2.	LDG lights.....	*ON for Night VFR flight*
3.	Flaps.....	*UP*
4.	Parking brake.....	*Release*
5.	Brakes.....	*Check*

Apply power and brakes as needed.
Use rudder pedals to steer.
Use also differential braking to make short turns at very low speed.
Do not use wheel brakes more than necessary to avoid:

- Excessive wear,
- Disc over-heating and potential loss of breaking efficiency,
- Potential risks of fire if dry grass trapped in the fairings touch the hot disc.

4.5 Before Take-Off

4.5.1 Holding point checks

Note
When possible, the engine run-up should be performed with the aircraft heading in the wind and on a clean surface.

1.	Parking brakes	*Set*
2.	Seat belts	*Fasten, tighten*
3.	Canopy	*Close and lock*
4.	Flight controls	*- Free movement, observe control surfaces deflection in the correct direction.*
5.	Trims	*Set elevator to T/O position and aileron to neutral.*
6.	Flight instruments	*Check*
7.	Altimeters *(Analog & Digital)*	*Set*
8.	MFD	*PFD + EIS mode*
9.	Oil pressure	*Within limits*
10.	Oil temperature	*> 50°C – 122°F*

4.5.2 LANE check

11. Throttle ..... *Set 4 000 RPM.*

12. **LANE Selector** ..... ***Switch to "B".***

    - "LANE A" warning light ..... *ON*
    - RPM ..... *+ / - 250 RPM maximum*
    - Eco mode ..... *OFF*
    - Following engine parameters lost (red X):
        - *Oil pressure*
        - *All EGTs*
        - *Water temperature*
        - *Fuel flow*

13. **LANE Selector** ..... ***Switch to "BOTH".***

    - "LANE A" warning light ..... *ON*
    - RPM ..... *Back to 4 000*
    - Eco mode ..... *ON*
    - Engine Parameters ..... *Back to normal*

14. **LANE Selector** ..... ***Switch to "A".***

    - "LANE A" warning light ..... *ON*
    - RPM ..... *+ / - 250 RPM maximum*
    - Eco mode ..... *OFF*
    - Following engine parameters lost (red X):
        - *Oil pressure*
        - *Oil temperature*
        - *Fuel flow*
        - *Volts B*

15. **LANE Selector** ..... ***Switch to "BOTH" .***

- "LANE A" warning light ..... *ON*
- RPM ..... *Back to 4 000*
- Eco mode ..... *ON*
- Engine Parameters ..... *Back to normal*

4.5.3 Fuel pump check

16. PUMP TEST Switch ..... *Switch and hold "A".*

- Observe fuel pressure and engine reaction.
- Fuel pressure must stay within the limits.
- Engine must keep running without any change.

17. PUMP TEST Switch ..... *Release "A".*

- Observe fuel pressure and engine reaction.
- Fuel pressure must stay within the limits.
- Engine must keep running without any change.

18. PUMP TEST Switch ..... *Repeat steps 16 & 17 with pump "B".*

> Note
> Avoid switching rapidly from pump 1 to 2. Both pumps would be inoperative for a short moment and engine would stop.

4.5.4 Idle check

1. Throttle ..... *IDLE*
2. Idle RPM ..... *Check 1 400 - 1 500 RPM.*

4.5.5 AOA/Stall warning check

1. "TEST" button on the Garmin GI260 Angle Of Attack indicator ..... *PRESS*

Check

- *Visual Stall Warning : All chevrons illuminated*
- *Audible Stall Warning : VHF and headsets volume adjusted, clearly audible stall warning "beep"*

4.5.6 Trims check

Elevator and aileron trim control — *SET White Mark.*

4.6 Take-off

4.6.1 Line-up

1. Flaps ..... *T/O position*
2. Warning lights ..... *All OFF*
3. BRS handle safety pin ..... *REMOVE*

WARNING
Before take-off, manually check the canopy is locked by pushing the canopy upwards.

4.6.2 Take-off

4. Brakes ..... *RELEASE*
5. Throttle ..... *Full power (max 5 minutes)*
6. Engine parameters .....
   - *RPM 5 200 minimum, increasing with speed.*
   - *Manifold pressure > 28 inHg (at sea level).*
   - *Oil pressure OK.*
7. Airspeed indicator ..... *Active*
8. Rotation .....
   - *Rotate smoothly at 100 km/h – 54 kt*
   - *Lift-off at 110 km/h – 60 kt,*
   - *Accelerate to 115 km/h – 62 kt Minimum.*

4.6.3 Above 300ft AGL – obstacles cleared

1. Engine parameters ..... *Check*
2. Throttle ..... *Reduce to 5 500 RPM.*
3. Flaps ..... *UP above 130 km/h - 70 kt.*
4. Airspeed ..... *160 km/h – 86 kt*
5. LDG light ..... *OFF*

4.7 Climb

4.7.1 Best angle of climb speed V_x

1. Flaps ..... *T/O*
2. Airspeed ..... *115 km/h – 62 kt*

4.7.2 Best rate of climb speed V_y

1. Flaps ..... *UP*
2. Airspeed ..... *140 km/h – 76 kt*

4.7.3 Recommended flight speed

1. Flaps ..... *UP*
2. Airspeed ..... *160 km/h – 86 kt*

This airspeed is a good compromise to increase forward visibility and improve engine cooling without noticeable decrease of climb performance.

4.8 Cruise

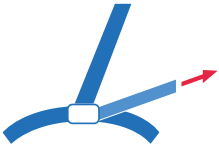
Refer to section 5, for recommended cruising figures.

4.9 Descent

Maintain airspeed below Vne / Vno depending on weather conditions.
For pilots' comfort, reduce speed in rough air conditions even below Vno.
For pilots' comfort, avoid rates of descent in excess of -500 ft/min.
Although the engine is equipped with a coolant thermostat, avoid sudden engine power reduction to avoid thermal shock to the engine.

4.10 Approach

1. Approach speed ..... *150 km/h – 81 kt*
2. Flaps ..... *T/O position.*
3. Seat belts ..... *Fasten*



4. Altimeter ..... *Set current altimeter setting*
5. LDG lights ..... *ON for Night VFR flight.*

4.11 Before landing

1.	Flaps	LDG
2.	Airspeed	*110 km/h – 60 kt*

4.12 Landing

Note
-Landings should be made with full flaps, except in case of flap failure or to extend glide distance during engine malfunction.
-With T/O or LDG flaps, landing distance increases by approximately 100 m - *328 ft*.
-Landings with T/O or LDG flaps require additional power to maintain a normal glide path and low descent rate.

4.12.1 Normal Procedure

1.	Throttle	Idle
2.	Flare and touchdown	Touch on main wheels and slowly release elevator to let the nose wheel down smoothly.
3.	Brakes	As required (after the nose wheel touch-down).

4.12.2 Balked landing procedure

1.	Throttle	Full forward.
2.	Airspeed	Minimum 115 km/h – *62 kt.*
3.	Flaps	T/O
4.	Positive climb	Accelerate to 130 km/h – *70 kt*
5.	Flaps	UP at safe altitude
6.	Throttle	Set 5500 RPM max

4.13 After landing

1.	Flaps	UP
2.	Trims	Set neutral position.

4.14 Engine shut down

1.	Throttle	IDLE
2.	Engine Key Switch StartAssist	OFF, Remove key.
3.	All Switches	OFF
4.	MASTER Switch	OFF

4.15 Aircraft parking

1.	Engine Key Switch StartAssist	Check OFF, keys removed
2.	FLASH lights	OFF
3.	LDG lights	OFF
4.	Day/Night Switch	OFF (Day mode)
5.	MASTER Switch	OFF
6.	EMGY PWR Switch	OFF
7.	BRS Handle safety pin	SECURE
8.	FUEL Shut-off valve	OFF
9.	Parking brake	As required

4.16 Any Phase of Flight

1.	PITOT Heat	*Weather depending, at pilot's discretion.*

> Note
> Use of pitot heat is not recommended in operation when OAT > 5°C – *41°F.*

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5 Performance

5.1 Introduction

The presented data has been computed from actual flight tests with the aircraft and engine in good conditions and using average piloting techniques.
If not stated otherwise, the performance stated in this section is valid for maximum take-off weight 630 kg *(1389 lb)* and under ISA conditions

The performance shown in this section is valid for aircraft equipped with the engine and propeller defined in section 1.

5.2 Stall Speeds

Approved data

Conditions:

1. Engine power ..... idle

WEIGHT	CONDITION		Stall speed							
			Bank angle							
			0°		30°		45°		60°	
			IAS	CAS	IAS	CAS	IAS	CAS	IAS	CAS
630 kg *1389 lb*	Flaps UP	km/h	109	107	117	115	129	127	153	151
		kt	59	58	63	62	70	69	83	82
	Flaps T/O	km/h	96	94	103	101	114	112	135	133
		kt	52	51	56	55	62	61	73	72
	Flaps LDG	km/h	85	83	91	89	101	99	120	118
		kt	46	45	49	48	55	54	65	64

Note
The IAS indication provided by the analogue (E)TSO certified anemometer prevails.
Maximum altitude loss during stall recovery is approximately 300 ft.

5.3 Take-off

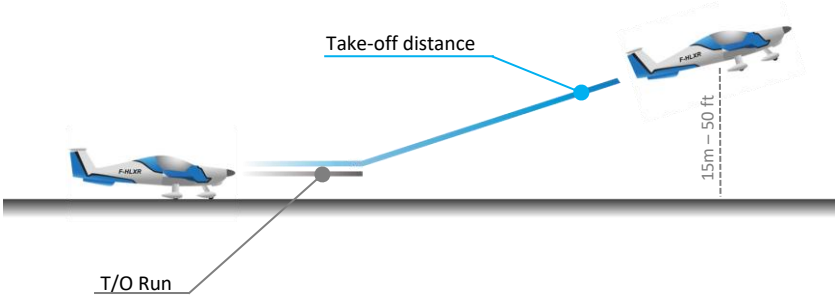
Weight = 630 kg – *1 389 lb*

Conditions:

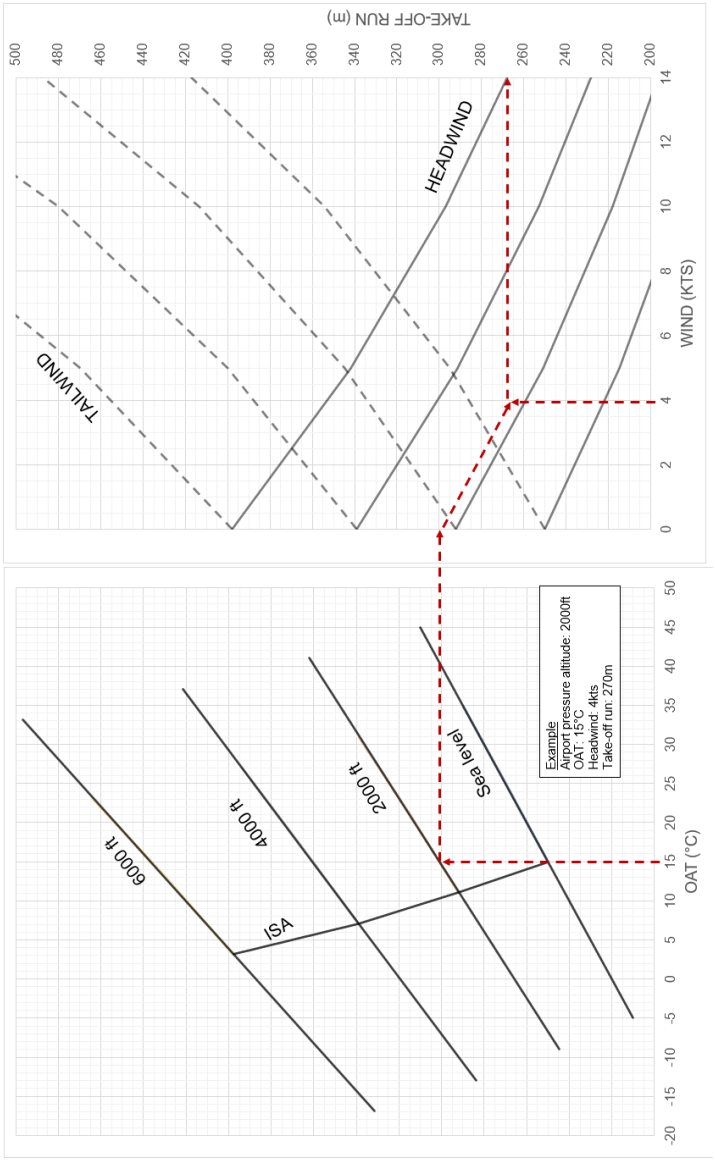
1. Wind ..... No wind
2. Runway ..... Level and Hard
3. Flaps ..... T/O
4. Engine power ..... Max take-off after brakes release
5. Speed ..... - Lift-off at IAS = 110 km/h - 60 *kt* and acceleration to IAS = 124 km/h - *67 kt* (at or before a 15 m - *50 ft* height)

Take-off performance at 630 kg – 1 389 lb			Temperature					
			ISA		ISA+10°C		ISA+20°C	
			T/O run	T/O distance	T/O run	T/O distance	T/O run	T/O distance
Pressure Altitude	0 ft	Meters	250	445	270	480	290	517
		Feet	820	1 460	884	1 575	951	1 695
	2 000 ft	Meters	292	522	315	564	339	607
		Feet	959	1714	1034	1 850	1 113	1 993
	4 000 ft	Meters	339	608	366	657	394	708
		Feet	1 112	1 993	1201	2 155	1 294	2 323
	6 000 ft	Meters	398	716	430	774	464	836
		Feet	1305	2 349	1410	2 539	1521	2 743

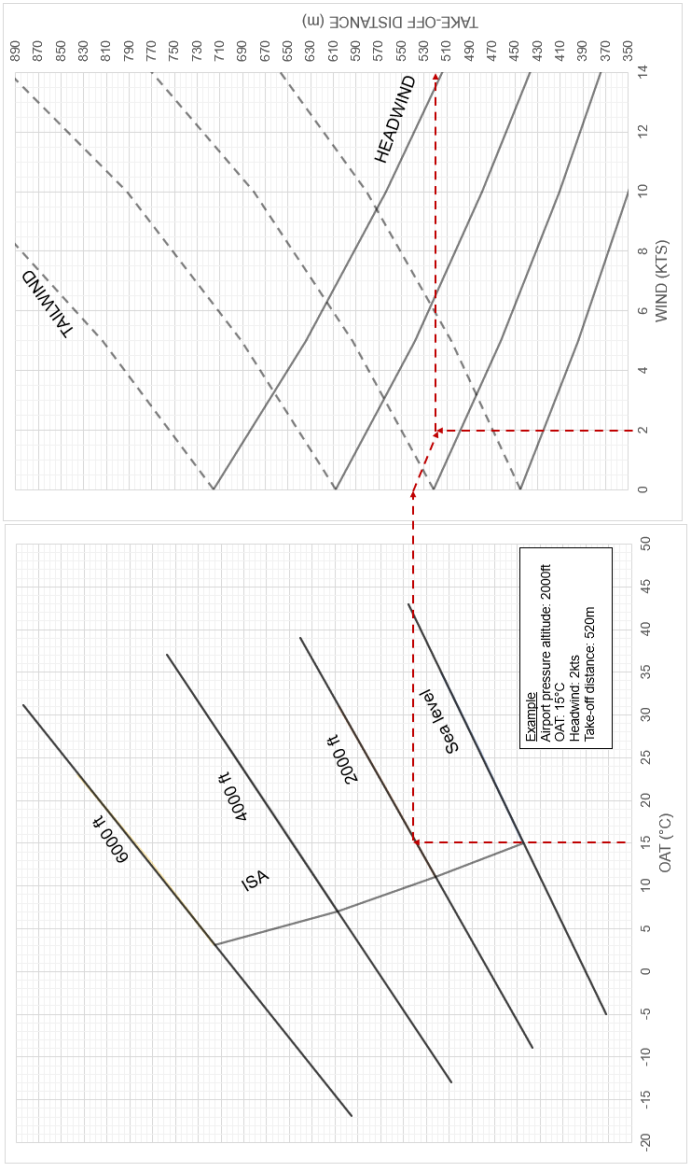
T/O Run = Take-off run.
> 15m = Take-of distance (see definitions in §1.4.4).



Take-off run


TAKE-OFF RUN (m)
500
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
HEADWIND
TAILWIND
0
2
4
6
8
10
12
14
WIND (KTS)
OAT (°C)
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
6000 ft
4000 ft
2000 ft
Sea level
VSI
Example
Airport pressure altitude: 2000ft
OAT: 15°C
Headwind: 4kts
Take-off run: 270m

Take-off distance



5.4 Cross wind

Max. demonstrated cross wind velocity for take-off and landing:

33 km/h gusts 46 km/h.

18 kt gusts 25 kt.

5.5 Rate of climb

Weight 630 kg – *1 389 lb*

- Flaps: UP
- Engine power: max. continuous (Throttle – 5 500 RPM)
- IAS = 140 km/h – *76 kt* (best rate of climb speed)

Pressure altitude (ft)	Vz ISA ft / mn	Vz ISA+10°C ft / mn	Vz ISA+20°C ft / mn
0	1040	990	950
2 000	930	880	840
4 000	820	780	740
6 000	710	670	630
8 000	600	570	530
10 000	500	460	430
12 000	390	350	320
14 000	280	250	220
16 000	170	140	110

Rate of climb values in the table above are interpolated from flight test measures and rounded to the nearest 10 ft/min (0.05 m/s).

- Up to 12 000 ft: Recommended speed IAS = 160 km/h – *86 kt* ➔ Decrease rate of climb in the table by 50 ft/min.
- Above 12 000 ft: Recommended speed IAS = 140 km/h – *76 kt*

5.6 Cruise performance

The values provided below are only indicative. Performance can vary in a great extend depending on mass, balance, temperature, cleanliness of the airframe, piloting accuracy, weather and turbulence, …

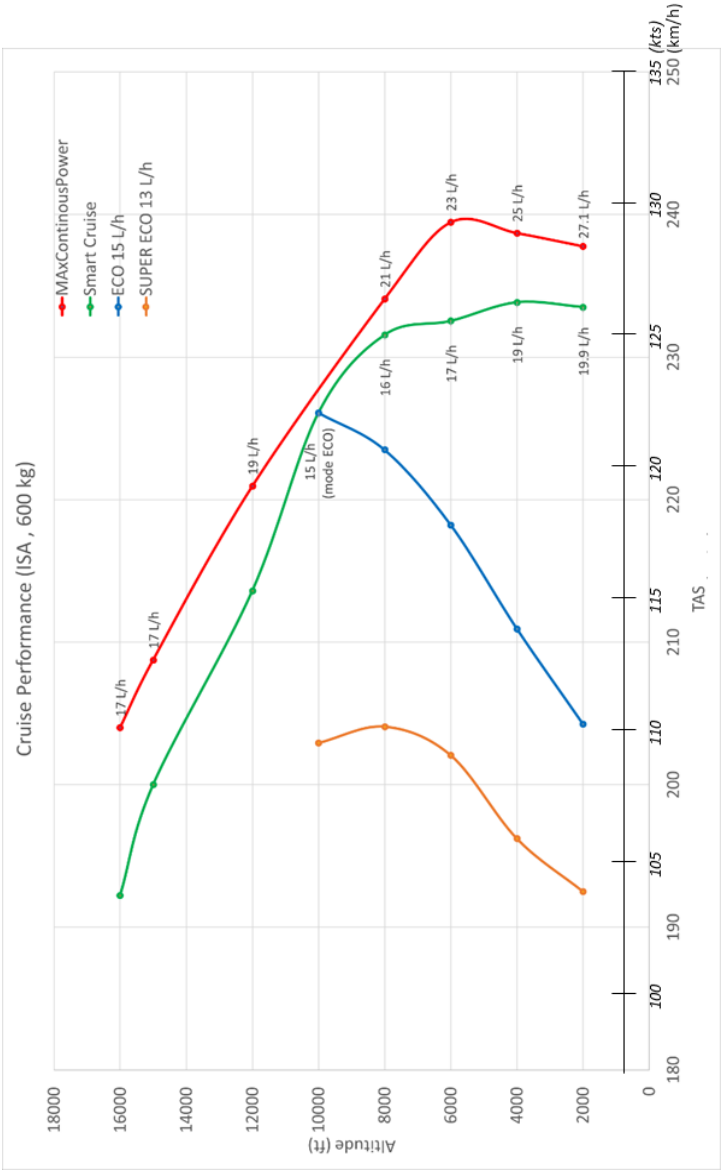
- "Fast cruise" is the maximum cruise speed, with engine speed at 5 500 RPM.
- "Smart cruise" is a compromise between fast and economic cruise, when throttle lever is reduced just enough to activate engine ECO mode ("ECO" displayed above engine speed gauge).
- "Economy cruise" is set by controlling the fuel flow displayed on G3X EIS.

Setting	**Fast cruise**		**Smart cruise**		**Economy cruise**	
	5 500 RPM		**Max ECO**		**15 L/h**	**13 L/h**
Altitude (ft)	TAS (km/h)	Fuel flow (L/h)	TAS (km/h)	Fuel flow (L/h)	TAS (km/h)	TAS (km/h)
2 000	238	27	234	20	204	193
4 000	239	25	234	19	211	196
6 000	239	23	233	17	218	202
8 000	234	21	232	16	223	204
10 000	228	19	226	15	226	203
12 000	221	19	214	n/a	n/a	n/a
14 000	213	18	205	n/a	n/a	n/a
16 000	204	17	192	n/a	n/a	n/a

Setting	**Fast cruise**		**Smart cruise**		**Economy cruise**	
	5 500 RPM		***Max ECO***		***4 US gal/h***	***3.4 US gal/h***
Altitude (ft)	*TAS (kt)*	*Fuel flow (US gal/h)*	*TAS (kt)*	*Fuel flow (US gal/h)*	*TAS (kt)*	*TAS (kt)*
2 000	*128*	*7.1*	*126*	*5.3*	*110*	*104*
4 000	*129*	*6.6*	*126*	*5.0*	*114*	*106*
6 000	*129*	*6.1*	*126*	*4.5*	*118*	*109*
8 000	*126*	*5.5*	*125*	*4.2*	*121*	*110*
10 000	*123*	*5.0*	*122*	*4.0*	*122*	*110*
12 000	*119*	*5.0*	*115*	*n/a*	*n/a*	*n/a*
14 000	*115*	*4.8*	*111*	*n/a*	*n/a*	*n/a*
16 000	*110*	*4.5*	*104*	*n/a*	*n/a*	*n/a*

Airspeed indicator system calibration:
IAS = CAS + 2 km/h *(+1.1 kt)* in any aircraft configuration over the whole flight envelope.

Cruise performance



5.7 Landing Distance

5.7.1 Standard procedure

Weight = 630 kg – 1 389 lb

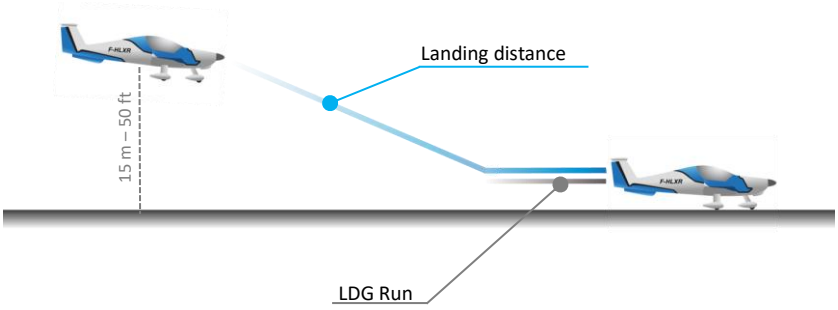
Conditions:

1. Wind ..... *No wind*
2. Runway ..... *Level and Hard*
3. Flaps ..... *LDG*
4. Speed ..... *IAS = 110 km/h – 60 kt.*
5. Engine power during approach ..... *As required for a -3° slope*
6. Normal brakes operation ....

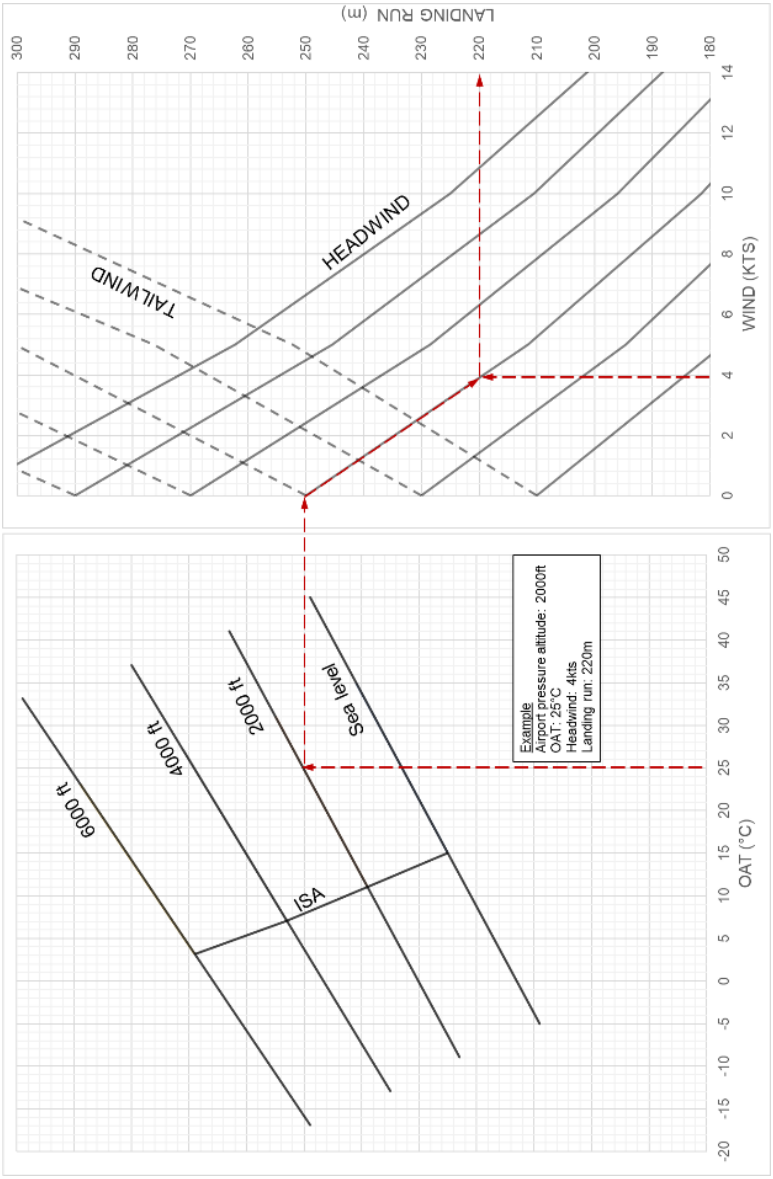
Landing distance at 630 kg – *1 389 lb*			Temperature					
			ISA		ISA+10°C		ISA+20°C	
			LDG run	LDG distance	LDG run	LDG distance	LDG run	LDG distance
Pressure Altitude	0 ft	Meters	225	575	233	583	241	591
		Feet	738	1 886	764	1 912	789	1 938
	2 000 ft	Meters	239	589	247	597	255	605
		Feet	783	1 931	810	1 959	838	1 986
	4 000 ft	Meters	253	603	262	612	271	621
		Feet	831	1 979	861	2 009	890	2 039
	6 000 ft	Meters	269	619	279	629	289	639
		Feet	883	2 031	915	2 063	947	2 095

LDG Run = Landing run.

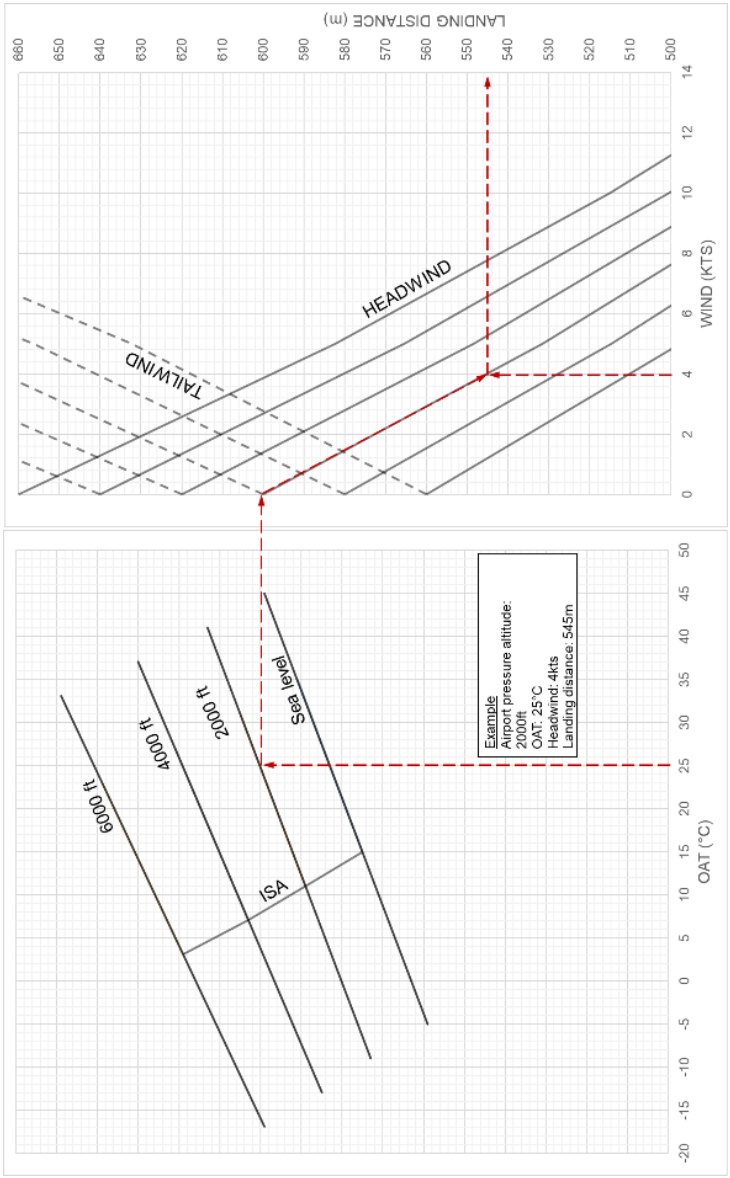
> 15 m = Landing distance (see definitions in §1.4.4)



Landing run


LANDING RUN (m)
300
290
280
270
260
250
240
230
220
210
200
190
180
TAILWIND
HEADWIND
0
2
4
6
8
10
12
14
WIND (KTS)
Example
Airport pressure altitude: 2000ft
OAT: 25°C
Headwind: 4kts
Landing run: 220m
Sea level
2000 ft
4000 ft
6000 ft
ISA
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
OAT (°C)

Landing distance



5.7.2 Steep approach procedure

If operational circumstances require steeper approach slopes than normal procedure, the following procedure can be applied in order to reduce landing distance or improve obstacle clearance. This procedure may necessitate advanced pilot proficiency and specialized training.
The following procedure at a -9%, -5° approach slope has been validated:

Weight = 630 kg – 1 389 lb

Conditions:

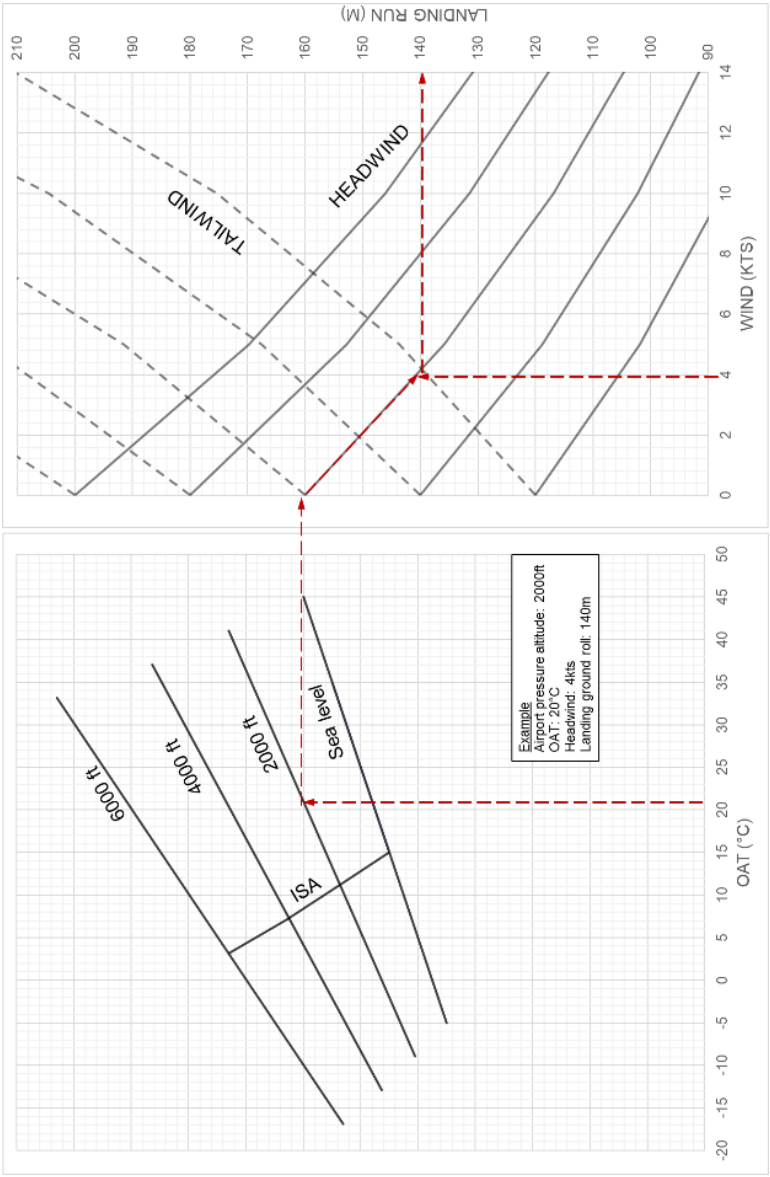
1. Flaps ..... LDG
2. Descent rate ..... *-550 ft/min*
3. Speed ..... *110 km/h – 60 kt*
4. Engine power during approach ..... *As required for a -5° slope*
5. Brakes ..... *Maximum pilot effort W/O skidding*

Note
The max reachable slope is -13.5%, -7.7° at idle power and 110 km/h - 60kt.
Tail wind should be avoided as far as possible.
The actual slope and landing distance will vary with wind conditions as shown in the following graphs.

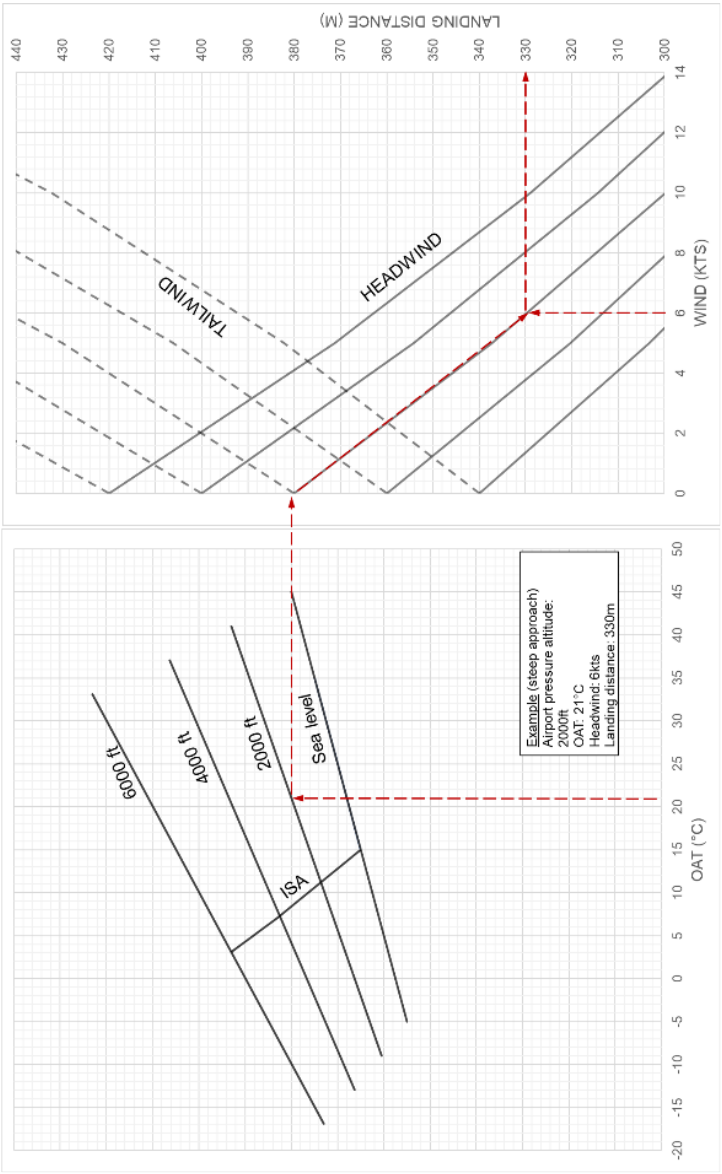
Landing distance at 630 kg – 1 389 lb			Temperature					
			ISA		ISA+10°C		ISA+20°C	
			LDG run	LDG distance	LDG run	LDG distance	LDG run	LDG distance
Pressure altitude	0 ft	Meters	145	365	150	370	155	375
		Feet	476	1 198	492	1 214	509	1 231
	2 000 ft	Meters	154	374	159	379	167	387
		Feet	505	1 226	522	1 244	547	1 268
	4 000 ft	Meters	163	383	169	389	179	399
		Feet	536	1 257	555	1 277	588	1 310
	6 000 ft	Meters	173	393	180	400	193	413
		Feet	569	1 291	590	1 312	634	1 356

Note
Be aware that before landing on a short runway, the pilot should verify that the take-off distance available on the airfield is compatible with published take-off distance.

Landing run - Steep approach



Landing distance - Steep approach



5.8 Operations On Grass Runways

For operation on dry grass runways, the following factors must be applied to the ground distances on a hard runway:

- Take-off Dry Grass: 1.2
- Landing Dry Grass: 1.2

If the grass is known to be wet, the factors should be:

- Take-off: 1.3
- Landing: 1.6

Note
Due to the uncertainty of knowing if the grass is dry or wet, it is suggested that the landing factor be increased to 1.4.

5.9 Performance degradation

5.9.1 Surface Contamination Effects

Rain and insect build-up on the lifting surfaces and fuselage reduce aerodynamic performance and increase stall speed. It is essential to ensure that critical surfaces are clean before flight to maintain optimal performance.

5.9.2 Tailwind

Tailwind impacts takeoff and landing performance.
Landing into the wind is always recommended.
The maximum recommended tailwind for takeoff and landing is 10 km/h - *5 kt*.
Takeoff and landing distances must be increased accordingly.
Refer to the performance charts in this chapter for detailed calculations.

5.10 Noise Characteristic

The Elixir noise levels are available TCDSN No. EASA.A.633.

Noises levels established at max load:

Engine	Propeller	Noise Level	Noise Limit
Rotax 912 iSc3 Sport	*MTV-34-1-A/156-203*	70.1 dB(A)	71.5 dB(A)

6 Weight & Balance

6.1 Introduction

This section contains weight and balance information

6.2 Airplane weighing procedure

See Aircraft Maintenance Manual

6.3 Weight and CG limits

See also section 2 – limitations, §2.7 and §2.8

6.3.1 Weights

Max. take-off weight	*630 kg – 1389 lb*
Max landing weight	*630 kg – 1389 lb*
Max. weight of usable fuel	*72 kg – 158 lb*
Max. baggage weight	*25 kg – 55 lb*

6.3.2 C.G range

Operating C.G range 720 to 860 mm *(28.3-33.9 in)* from firewall

6.3.3 Crew weight

Check aircraft CG remains in approved limits

6.3.4 Arms

Pilot/Passenger	- Seat max fwd-up: 1 050 mm - *41.3 in (*)* - Seat max rear-down: 1 150 mm - *45.3 in (*)*
Baggage compartment	1 580 mm – *62.2 in*
Fuel in tanks	774 mm – *30.5 in*

(*) in case of doubt, as a conservative assumption,
- use the largest arm if the plane is rather tail heavy (two pilots, some luggage)
- use the smallest arm if the plane is rather nose heavy (one light pilot, no luggage)

> Note
> Empty weight includes oil, coolant, hydraulic fluid and unusable fuel.

6.4 Loading and C.G. Check

1. Find empty aircraft weight, arm and moment in the weight and balance report.
2. Record pilot, passenger, baggage and fuel weights.
3. Calculate and record the moment for each item using the following formula:

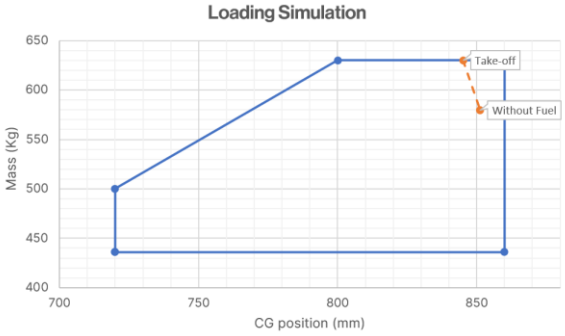
$$MOMENT\ (kg.mm) = MASS\ (kg) \times ARM\ (mm)$$

4. Calculate and record total weight and moment.
5. Determine and record aircraft C.G. using the following formula:

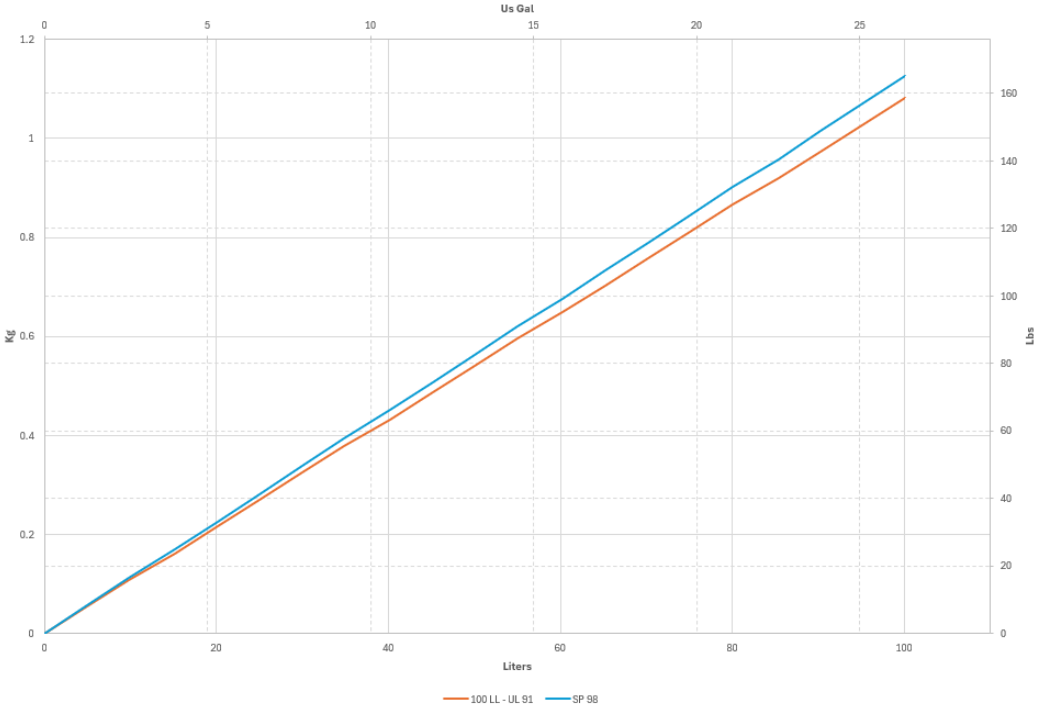
$$AIRCRAFT\ C.G.\ (mm) = {}^{\sum Moments}/_{TOTAL\ WEIGHT}$$

6. Plot the point CG-MASS in the chart below and check it remains inside the approved mass-cg limits.
7. Repeat operation without fuel.

Loading verification example	Mass	x	Arm	=	Moment
Empty aircraft	400	x	706	=	289 649
Pilot	85	x	1 150	=	97 520
Copilot	85	x	1 150	=	97 520
Luggage	10	x	1 580	=	0
Fuel	50.4	x	774	=	39 009
Total w/ fuel	630.0				532 434
Total w/o fuel	579.6				493 434
CG = moment / mass					
CG departure			845		
CG arrival			881		



6.4.1 Fuel weight – Quantity conversion chart



Liters	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	100
US gal	0.0	1.3	2.6	4.0	5.3	6.6	7.9	9.2	10.6	11.9	13.2	14.5	15.9	17.2	18.5	19.8	21.1	22.5	23.8	26.4
100 LL or UL91 : Fuel specific weight : 0.72kg/L - *6.01 lb/US gal*																				
kg	0.0	3.6	7.2	10.8	14.4	18.0	21.6	25.2	28.8	32.4	36.0	39.6	43.2	46.8	50.4	54.0	57.6	61.2	64.8	72
lb	0.0	7.9	15.9	23.8	31.7	39.7	47.6	55.6	63.5	71.4	79.4	87.3	95.2	103.2	111.1	119.0	127.0	134.9	142.9	158.7
SP 98 : Fuel specific weight : 0.75kg/L - *6,26 lb/US gal*																				
kg	0.0	3.8	7.5	11.3	15.0	18.8	22.5	26.3	30.0	33.8	37.5	41.3	45.0	48.8	52.5	56.3	60.0	63.8	67.5	75.0
lb	0.0	8.3	16.5	24.8	33.1	41.3	49.6	57.9	66.1	74.4	82.7	90.9	99.2	107.5	115.7	124.0	132.3	140.5	148.8	165.3

7 Airplane & Systems Descriptions

7.1 Introduction

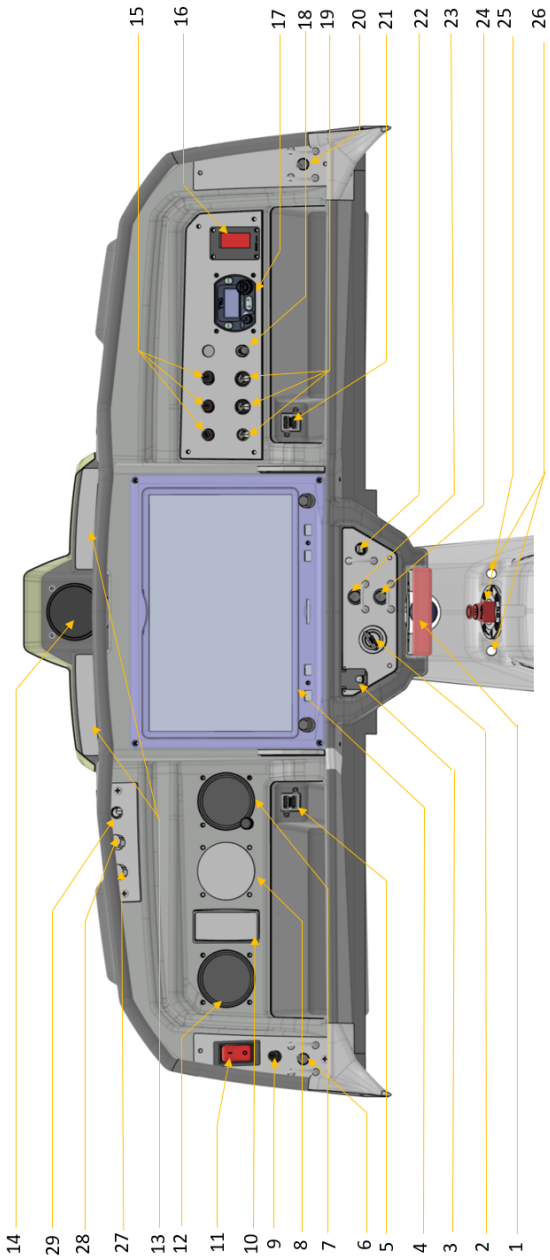
This section provides description and operation of the aircraft and its systems. The *Elixir* aircraft is a single-engine, low-wing monoplane of monocoque structure with two side-by-side seats. The airplane is equipped with a fixed tricycle undercarriage with steering nose wheel.
The airframe makes intensive use of high-end carbon fibre prepreg technologies.
The cockpit is fitted with Garmin G3X suite including 10.6" flight display touch-screen.

7.1.1 Cabin & Entry Dimensions

Cabin Width (Maximum) ..... *1,10 m - 43,3 in*

7.2 Cockpit Description

1 Parachute activation Handle.
2 Engine key switch.
3 Emergency Power switch (EMGY).
4 GDU 460 – GX3 display unit.
5 Left hand charging USB plugs.
6 Left hand pedal adjustment.
7 Altimeter.
8 Artificial horizon + slide indicator.
9 Over-voltage breaker.
10 Angle of Attack indicator.
11 Master switch.
12 Airspeed indicator.
13 Annunciators.
14 Compass.
15 TRIMS/FLAPS – breakers.
16 ELT switch.
17 VHF interface.
18 GVNR – Disconnect switch.
19 FLASH/NAV/LDG - light switches.
20 PEDAL - Right hand pedal adjustment.
21 Right hand charging USB ports.
22 FLAPS – Control switch (UP - T/O - LDG).
23 PUMP - test switch (A – B).
24 LANE - Selector switch (A – B).
25 Fuel shut-off valve.
26 HEATER - Cabin heating.
27 INSTRUMENTS – lighting dimmer.
28 MAP – Map light dimmer.
29 DAY/NIGHT.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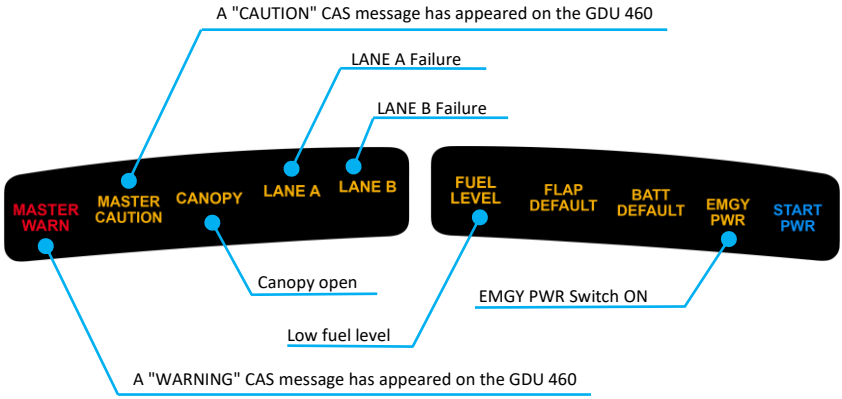
7.3 Annunciator

The aircraft is equipped with two annunciators panels. They inform the pilot about an abnormal situation.



MASTER WARN & MASTER CAUTION are connected to the G3X.
CANOPY is connected to the canopy switch.
LANE A & LANE B are connected to the ECU.
FUEL LEVEL is connected to a secondary fuel level sensor.
FLAP DEFAULT is connected to the flap actuator system.
BATT DEFAULT is connected to the BMS (Battery Management System).
EMGY PWR is connected to the EMGY PWR Swicth.

§3.23, Warnings Lights, details procedure for each annunciation.

7.4 Engine

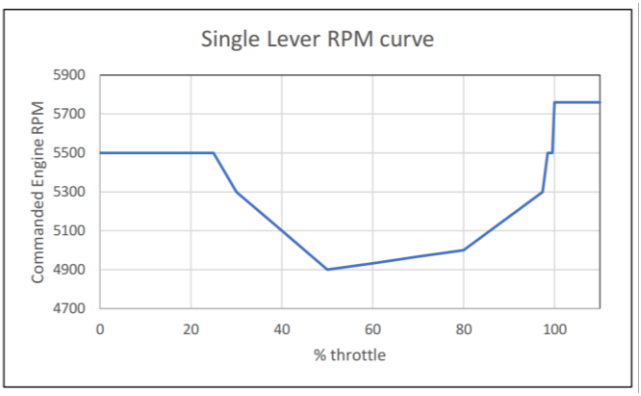
ROTAX Engine type “912 iSc 3 Sport” is installed in the Elixir aircraft.

Note
For information about this engine:
- §2.4 for engine operating limits;
- Rotax “Operator’s Manual” for engine type 912 i series.

7.4.1 Engine controls

7.4.1.1 Single Lever Power Control (SLPC)

Engine power is controlled by means of a unique throttle.
The pilot interacts with the system exclusively through the use of this single throttle lever. There is no need for other pilot control inputs (no propeller knob). The throttle lever is directly linked to the engine throttle valve with a mechanical cable. The engine ECU communicates with the SCU 9is, and the SCU 9is communicates to the Garmin G3X to display engine information.
The commanded propeller RPM is continuously computed within the SCU 9iS using a control law, based on a number of engine and environmental data. A switch is positioned on the governor command for the pilot to disconnect it in case of propeller RPM commanded erroneously (oscillations, erratic behaviour…). The commanded RPM control law follows the curve below.



Remark : the commanded RPM is not necessary the actual RPM of the engine. With low speed and low power, the propeller hub will reach its minimum pitch stop and RPM will decrease with throttle reduction, (as would do a fixed pitch propeller).
Example : with 120 km/h IAS *(65kt)* and flaps T/O, steady altitude, engine revs would be approx. 4 350 RPM. This is below the commanded RPM (which would be 5 500 RPM in that case), which means that the propeller has reached its minimum pitch. This makes it possible to quickly reach maximum

RPM if sudden application of power is required (for an emergency go-around, e.g. runway incursion…).

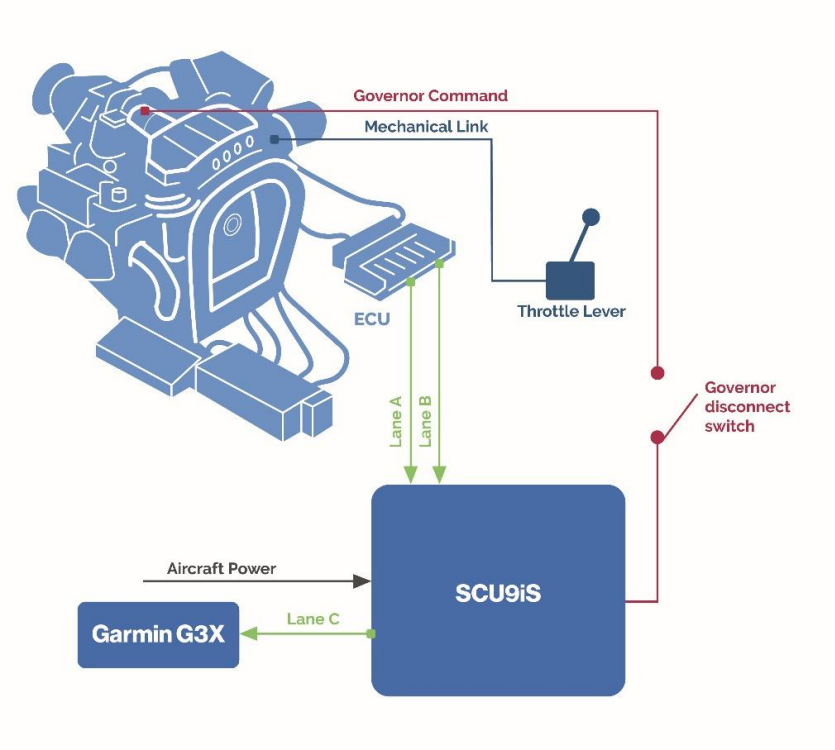
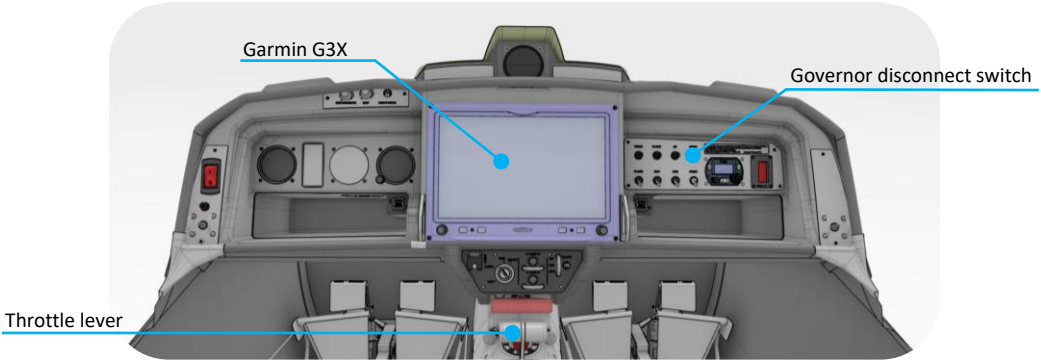


Figure 7.4-1: SLPC system architecture

The system is composed of 6 main elements:

- the Rotax 912 iS engine equipped with an electronic engine control unit (ECU)
- the MTV-34-1-A/156-203 constant speed propeller (MT propeller)
- the P-853-116 electrically driven hydraulic propeller governor (MT propeller)
- the SCU 9iS System Control Unit (RS flight system)
- the governor disconnect switch
- the throttle lever



Caution

When the GVNR Switch is OFF , Anticipate reduced climb rate on takeoff or go around. Elixir Aircraft demonstrated 7% minimum positive climb angle at 4700 RPM, max weight, sea level, in all flaps configuration with full throttle.

Note

The GVNOR Governor Disconnect Switch is protected against inadvertent operation.

Note

When the GVNR Switch is OFF, the signal to the propeller governor is disconnected. The RPM will slowly decrease until reaching the governor minimum RPM mechanical stop, regardless of engine parameter or throttle position variations. In any case, the governor mechanical stops are adjusted so that the engine speed command is mechanically contained between 4 700 RPM and 5 800 RPM. Therefore, regardless of RPM management system behaviour, the aircraft is always protected against:

- Engine overspeed,
- Powerplant underpower / over torque.

7.4.1.2 Engine key switch

The engine key switch StartAssist is a specific feature of the Elixir. The engine startup sequence is fully automated and allows you not only to save time during start up, but also to decrease the workload and the risk of mistake.

This rotary key switch includes 4 positions:

- OFF: All engine systems are OFF.
- LANES: Switch ON Lanes A, or B or A+B according to Lane selector switch position, and the SCU9iS System Control Unit(*).
- RUN: Switch ON Electrical Pumps.
- START (spring loaded): Activates the starter.

For safety reasons, remove the key when engine is not running. Key can be removed only on the OFF position.

(*) the SCU9is triggers a Start Power relay as soon as it is powered through the engine key switch StartAssist, the relay remains energized and the corresponding blue status light on the panel remains lit until the engine reaches 1500 RPM for the first time. As soon as this happens, the relay is deactivated and never activated again until SCU9is is turned OFF then ON

7.4.1.3 Lane selector switch

Lane selector switch should remain on BOTH position to operate the engine normally and get the complete engine instrument display. Only use “Lane A only” or “Lane B only” positions in flight in case of engine malfunction to select the position providing the best engine operation. When a Lane is switched off, some engine information provided by that Lane to the display are lost. Primary engine information are redundant.
When only one Lane is operating, the Rotax 912iS ECO mode is not available, the engine runs only with the Power mode. This mode runs with a rich mixture, expect higher fuel consumption and reduced autonomy and range.

7.4.1.4 Pump test switch

Pump test switch is spring-loaded to ensure both pumps are running in flight.

7.4.2 Engine instruments

Garmin G3X displays all engine instruments as follow:

1. Manifold pressure (in Hg)
2. Engine speed (RPM)
3. Oil pressure (bar)
4. Oil temperature (°C)
5. Exhaust gas temperature(°C)
6. Coolant temperature (°C)
7. Airframe temperature (°C)
8. VOLTS1 (Essential bus) (V)
9. VOLTS B (ECU B voltage) (V)
10. Alternator current (Amperes)
11. Fuel pressure (bar)
12. Fuel consumption (L/h)
13. Fuel quantity (L)

For information about engine instruments range and marking see: Section 2 “Engine instruments markings”.

G3X display with main engine menu activated.

G3X display with Fuel Calc page activated.

G3X display with main engine menu deactivated. Ex: chart mode (Cht).
Essential engine parameters remain displayed on the left column.

7.5 Propeller

Propeller Manufacturer	MT-propeller
Propeller Model Number	MTV-34-1-A/156-203
Number of Blades	3
Propeller Diameter	1,560 m - *61.4 in*
Propeller Type	- Three wood-composite blades, variable pitch, constant speed
Governor	P-853-116, electrically driven

Refer to section 2 for limitations.

> Note
> For technical data refer to documentation supplied by the propeller manufacturer.

7.6 Landing gear

The aircraft has a fixed tricycle landing gear.
Main landing gear uses oleo pneumatic shock absorbers. Each main gear wheel is equipped with disc brakes. Brakes are operated by independent brake levers (manual).
Nose wheel is steered by rudder pedals on ground. The nose landing gear is locked straight during flight, the steering springs provide rudder control spring back. For a shorter turning radius on ground, steering can be accomplished by differential application of individual main gear brakes (this must be done at very low speed only).

7.7 Baggage compartment

The rear baggage compartment is located behind seats.
Make sure that baggage does not exceed maximum allowable weight, and that the aircraft C.G. is within limits with loaded baggage.

Caution
All baggage must be properly secured.

7.8 Seats and safety harnesses

The seats can be individually adjusted on the ground to fit any size of pilots, from about 1.55 m to 2.00 m *(5'-1" to 6'-7")* and even more. With one hand, press the two spring-loaded locking pins behind the seat back against each other, and with the other hand, lift the seat to the position appropriate for your body size. Release the pins in the nearest adjustment hole.

WARNING
Make sure that both locking pins are fully engaged into their position before sitting!

Seat cushions are removable for easy cleaning and drying.

The safety harness is of the 3-point type. The shoulder strap is mounted on a spring-retracting inertia reel. When seated, latch and tighten the belt so that your hips are held firmly into the seat.

WARNING
The hip belt must rest on your pelvis, never on your belly!
Use of the shoulder belt is mandatory.

Note
When you detach your harness, accompany the shoulder belt back to the reel. If you don't, the belt buckle may get whipped against the canopy and scratch/damage it.
Recommended : solo flight : latch the unused safety belt.

7.9 Canopy

Forward opening hinged canopy.
Two powerful gas springs lift the canopy open. The last part of the gas spring stroke has an hydraulic dampening, it is not necessary to accompany the canopy until it is fully open, unless with strong tail winds.
To close the canopy, grab the frame and pull down. Avoid pulling on the eyeball vents.

There is one latching mechanism on the top rear centre of the frame. Make sure that the canopy is latched and mechanism is securely locked into position before operating the aircraft and manually check the canopy is locked by pushing the canopy upwards.
Do not apply large forces on the canopy locking handle, on the ground and in flight. This is not a grab bar!

The canopy frame is a hollow structure made of prepreg carbon fibre. At the hinge arms, two NACA inlets collect air pressure with flight speed. Two eyeball vents are located on each side. They can be closed or open and set to any direction by the crew.

7.10 Airplane parachute system

7.10.1 Introduction

The Elixir aircraft is equipped with an emergency parachute. This section provides some basic instruction for safe use of the system. For more information, the system installed is BRS 1 350 Softpack, refer to *Owner's manual and general installation guide for BRS-6 emergency parachute recovery systems* .

The parachute is designed to bring the aircraft and its occupants to the ground in the event of a life-threatening emergency. The system is intended to save the lives of the occupants but will most likely destroy the aircraft and may, in adverse circumstances, cause serious injury or death to the occupants.

7.10.2 Safety on ground

The parachute and its rocket are installed under the engine cowling, between the canopy and the firewall. When the rocket launches, the parachute assembly is extracted outward due to rocket thrust and rearward due to relative wind.

WARNING

The parachute system does not require electrical power for activation and can be activated at any time.

The solid propellant rocket flight path is upward from the parachute cover. Stay clear of parachute area when aircraft is occupied.

Do not allow children in the aircraft unattended.

Make sure the safety pin remains engaged as soon as the aircraft is not in use.

7.10.3 Parachute system deployment scenarios

- Mid-Air collision.
- Structural failure.
- Loss of control.
- Stall / Spin on approach.
- Engine-out over hostile terrain.
- Pilot incapacitation.

7.10.4 Situations where deployment is not desirable

- Out of fuel, with reasonably large and smooth landing areas within reach.
- Lost, with fuel remaining.
- Fire onboard.

7.10.5 Deployment speed

The maximum airspeed at deployment calculated is 300 km/h – 189kt.

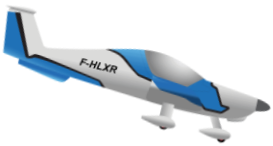
Deployment at higher speeds could subject the parachute and aircraft to excessive loads that could result in structural failure. Once a decision has been made to deploy the parachute, make all reasonable efforts to slow down to the minimum possible airspeed.
However, if time and altitude are critical, and/or ground impact is imminent, the BRS system should be activated regardless of airspeed.

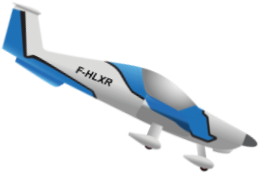
7.10.6 Deployment altitude

No minimum altitude for deployment has been set. This is because the actual altitude loss during a particular deployment depends on many factors such as airplane's airspeed, altitude and attitude as well as environmental factors.
At any altitude, once the parachute is determined to be the only alternative available for saving the aircraft occupants, deploy the system without delay.

Below, two simulations at 600 kg – 1322 lb :

Before deployement.





Angle	*13.7°*	Angle	*21.5°*
Speed	*154 km/h – 83 kt*	Speed	*100 km/h – 54 kt*

After deployement, at stabilised rate of descent.

Altitude loss	*164 m – 540 ft*	Altitude loss	*258 m – 849 ft*

Note
The above examples are simulations and are given for information only.
Experience gained on other aircraft tested with a full set of parameters has shown a reduction in altitude loss between 10 and 15%.

If circumstances permit, it is advisable to activate the airplane parachute system at or above 2 000 ft AGL.

7.10.7 Deployment attitude

To reduce the chances of parachute entanglement and reduce aircraft oscillations under the parachute, the system should be activated from a wing level, upright attitude whenever possible.

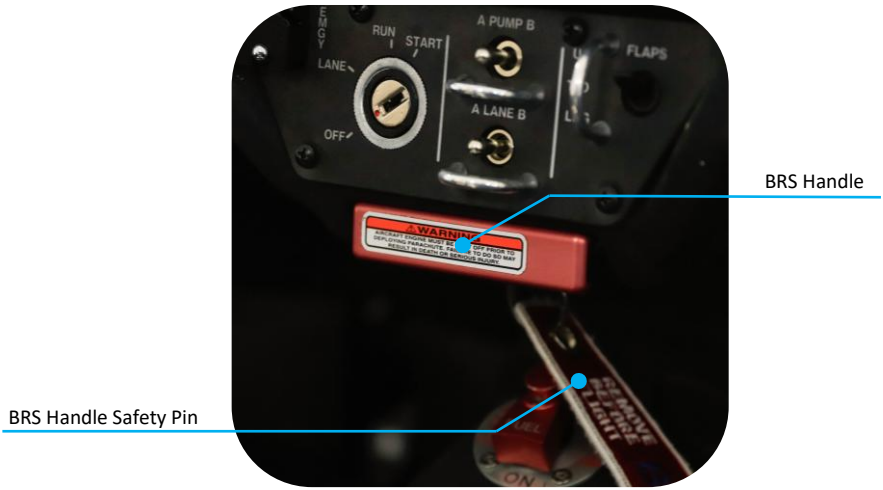
To minimize the altitude loss, it's recommended to deploy the parachute in level flight or at least, avoid negative vertical speed (Refer to the simulations above).

7.10.8 Activation procedure

Refer to §3.22 Ballistic Rescue System Activation

7.10.9 Activation handle

The Ballistic Recovery System is initiated by pulling the red T-handle installed in the cabin, just under the dashboard. A safety pin prevents inadvertent activation when the aircraft is not in use. This safety pin must be removed before each flight and secured again after each flight. A force that can vary between 13kg to 32kg is necessary to activate the deployment system.



7.10.10 Descent

WARNING
Stabilized rate of descent is in the order of magnitude of 8 m/s – *1600 fpm* at MTOW.
Ground impact is expected to be equivalent to fall from a height of approximately 4 meters - *13 ft*.

Simulated stabilized aircraft attitude after parachute deployment :

Roll..... *0° - Wings level*

Pitch..... *-15° - Nose down*

7.10.11 Landing considerations

WARNING
If time permit, occupants must be prepared for it in accordance with the Parachute deployment procedure in §3.22 Ballistic Rescue System Activation

Once the system deployed, occupants must be prepared for touchdown. All occupants must maintain the EMERGENCY LANDING body position until the airplane comes to a complete stop.

The EMERGENCY LANDING position is assumed with tightened seat belt and shoulder harness by placing both hands behind the head with finger locked together. The elbow should be pulled forward to protect the side of the head and face. The upper torso should be erect and against the seat backs.

7.11 Fuel system

7.11.1 Fuel tank

The Elixir has a single tank located into the wing structure in the central spar box and through the centre wing box. It is a safety bladder tank, made of Kevlar reinforced elastomers, filled with military specification anti explosion foam. This safety fuel cell technology is similar with those used in motor racing and military programs.
The tank is equipped with two vent outlets at each wingtip, which must be kept clear. Each vent line is equipped with a calibrated check valve preventing fuel spillage in moderate uncoordinated flight and side g loads on ground, while allowing venting.
The bottom point of the tank, under the wing, is equipped with a drain. (another drain is fitted on the gascolator : check both of them during pre-flight check).

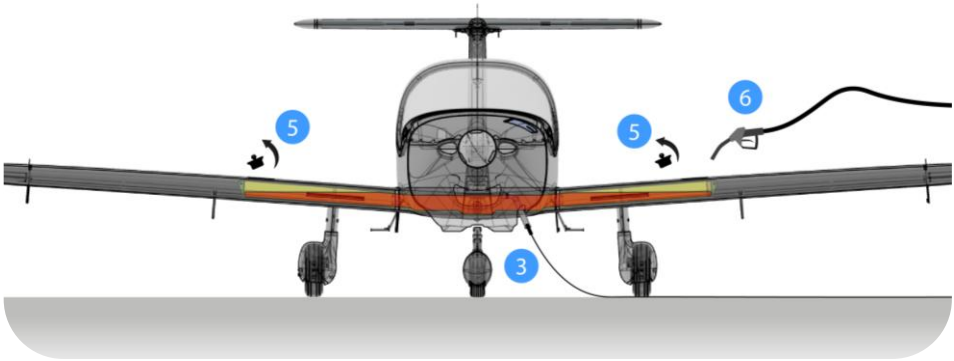
7.11.2 Refueling procedure

The tank is equipped with two fuel caps, one on each wing. Next to each fuel cap, a label reminds approved fuel types. See also 2.12.2 above. Both fuel caps should be opened for refueling, to help fuel transfer from one side to the other.

1. Parking procedure (§4.15) ..... Complete
2. Fuel drains ..... Close
3. Grounding equipment ..... Connect to the exhaust pipe.
4. Check fuel grade ..... See §2.12.2
5. Fuel caps ..... Both open

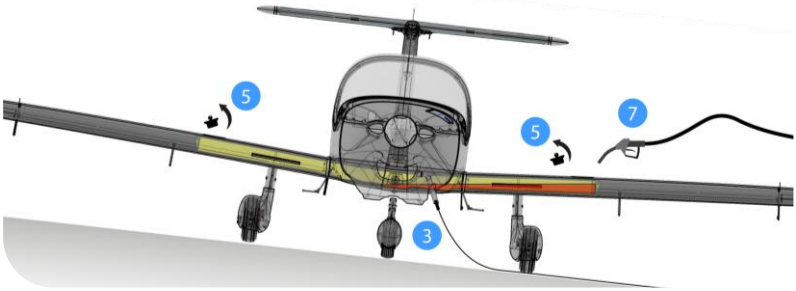
If wings are leveled

6. Fill the tank from one side only .....

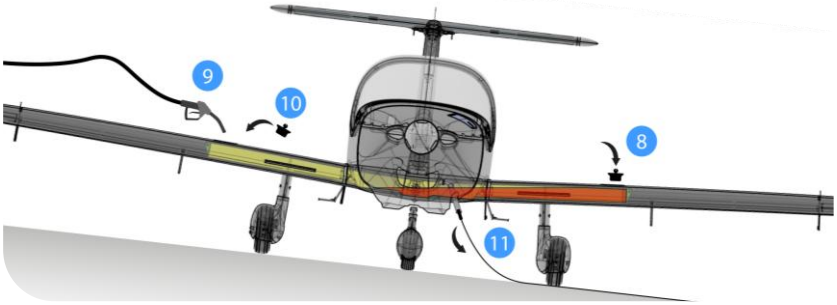


If wings are non-leveled

7. Fill the tank from the lowest side ------- -----
8. Lower fuel caps ---------- Close & lock



9. Fill the tank from the highest side -- -----



10. Fuel caps ---------- Both close & lock
11. Grounding equipment ---------- Disconnect
12. Master switch ---------- ON
13. Check the consistency of indicated fuel quantity on the G3X.
    On Fuel Calc page, adjust fuel remaining quantity and reset fuel totalizer if required.
14. Master switch ---------- OFF, If required

WARNING
Always keep safety in mind. Use usual safety precaution with fuel.

Caution
If you use a filler pistol, pay attention not to damage tank foam and bladder with the pistol nozzle tip.
Spilled fuel must be carefully wiped.
If the wings are not level, never unlock the lowest cap first. You may spill a large amount of fuel!

7.11.3 Fuel distribution

The fuel supply system consists in

- A submerged coarse strainer inside the tank
- A shut-off valve
- A gascolator with an average size filter and a drain
- A dual fuel pump
- A genuine fuel distributor with connections for a fine filter, its calibrated bypass, a fuel pressure sensor, and a calibrated orifice to the return line improving priming and air bubbles relief.
- Fuel lines to the engine (with fittings through the firewall)
- A fuel pressure regulator (built-in the Rotax engine)
- A return line, bringing unused fuel back from the regulator to the fuel tank
- A check valve fitted on the tank return port.

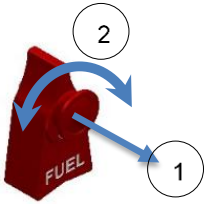
The whole system is installed in the forward central tunnel, accessible behind the forward hatch behind the front landing gear.

7.11.4 Fuel shut off valve operation

The fuel shut-off valve handle is located on the central console in the cockpit.
Fuel supply is open when the handle points forward in the "ON" position. Fuel supply is closed when the handle is turned ¼ turn either left or right in the "OFF" positions.
A spring-loaded knob on the handle lock prevents inadvertent closing of the fuel valve.

- Switching the fuel OFF requires two distinct action :

1- Lift knob
2- Rotate handle ¼ turn left or right until reaching a stop

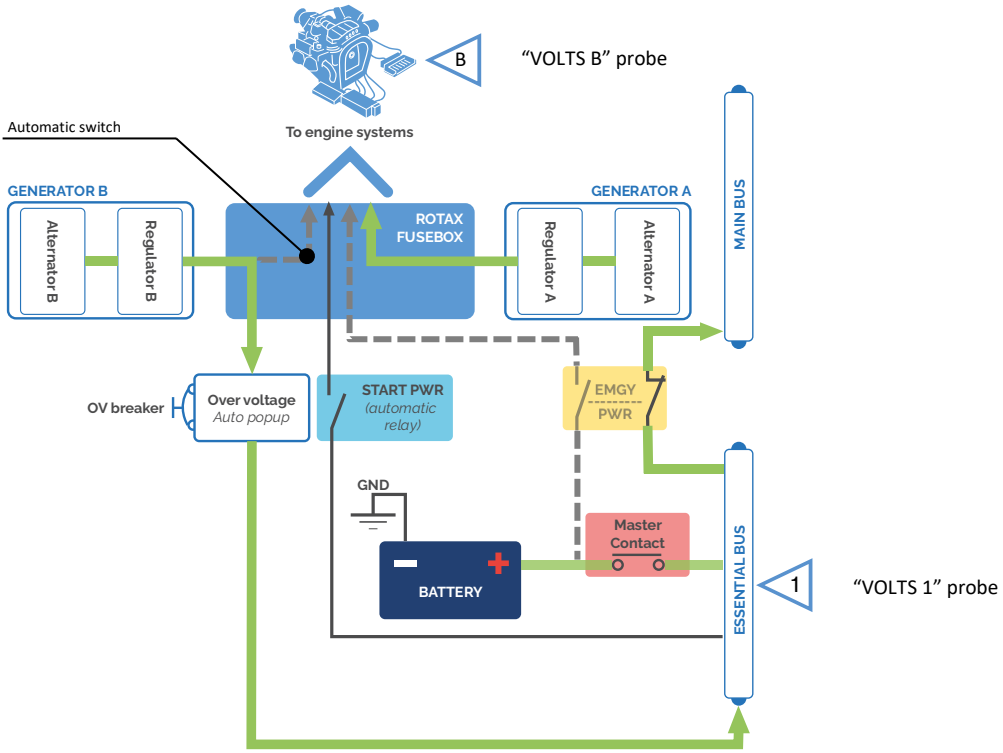


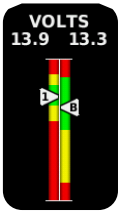
- Opening the valve only requires rotating the handle pointing forward, until the knob locks in the ON position.

Caution
Avoid prolonged fuel pump operation with fuel shut off valve closed or with empty tanks.

7.12 Electrical system

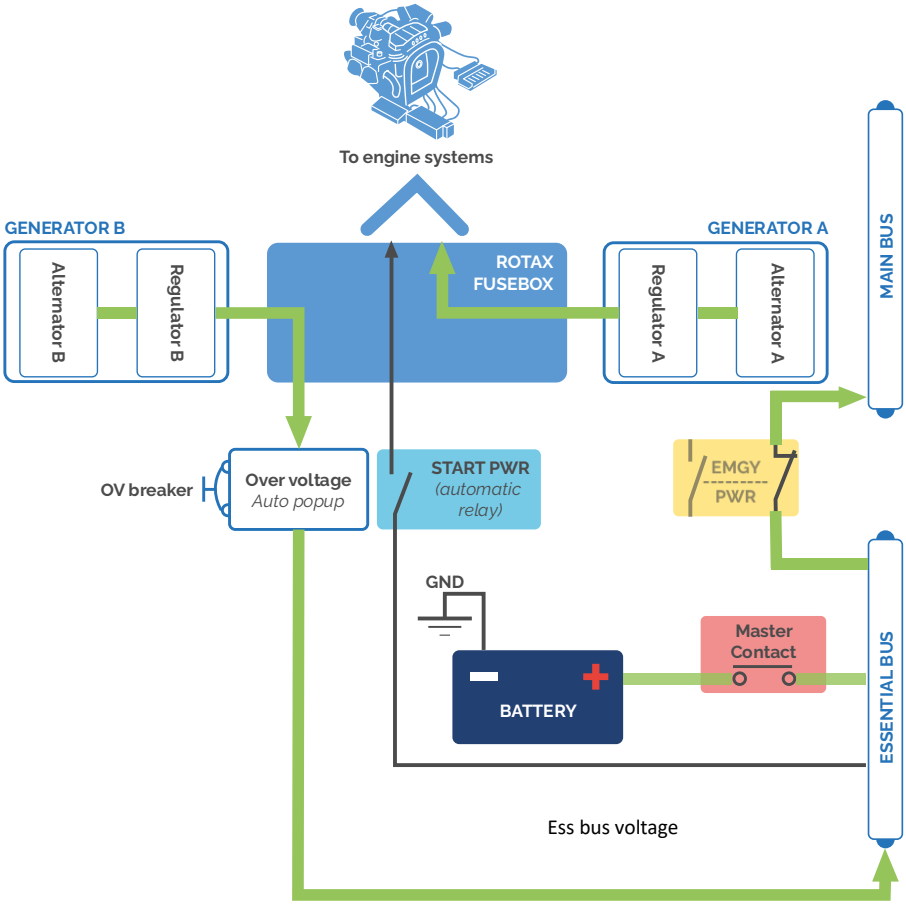
7.12.1 Simplified electrical distribution architecture.





Volts displayed on the GDU 460 PFD & MFD. Refer to §7.4.2.

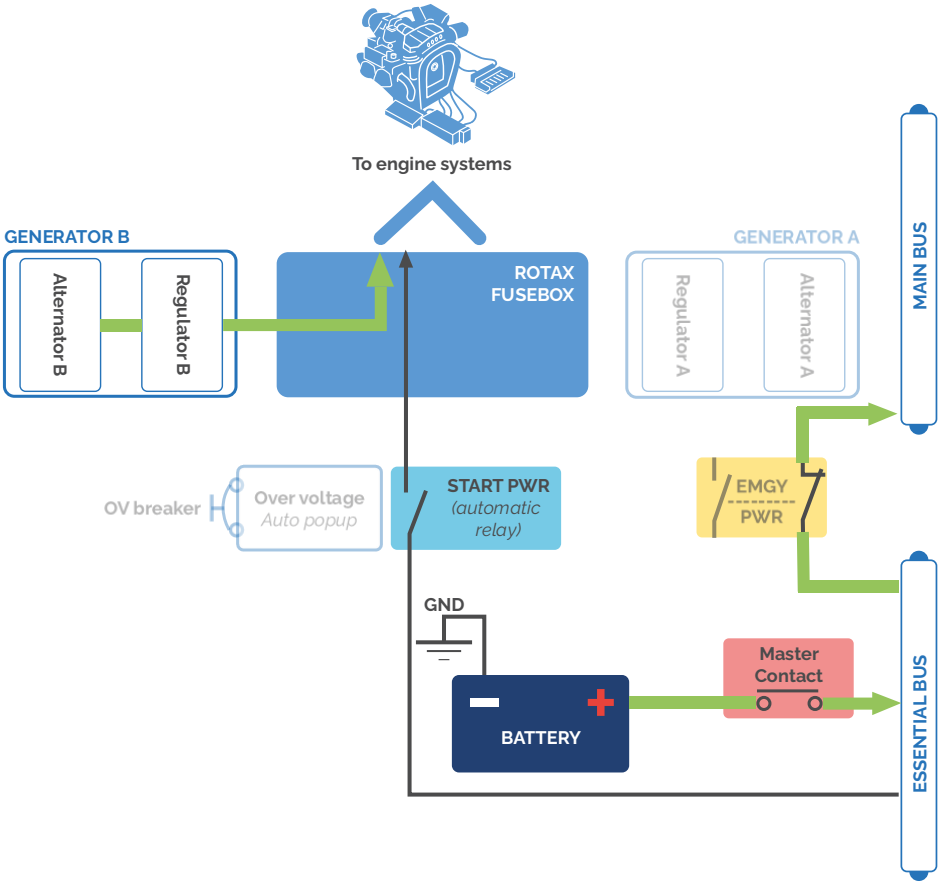
7.12.1.1 Normal case



Generator A	Supplies the Engine
Generator B	Supplies the Aircraft
EMGY PWR	OFF
Battery	Recharged
Main bus	Supplied

7.12.1.2 Generator A failure.

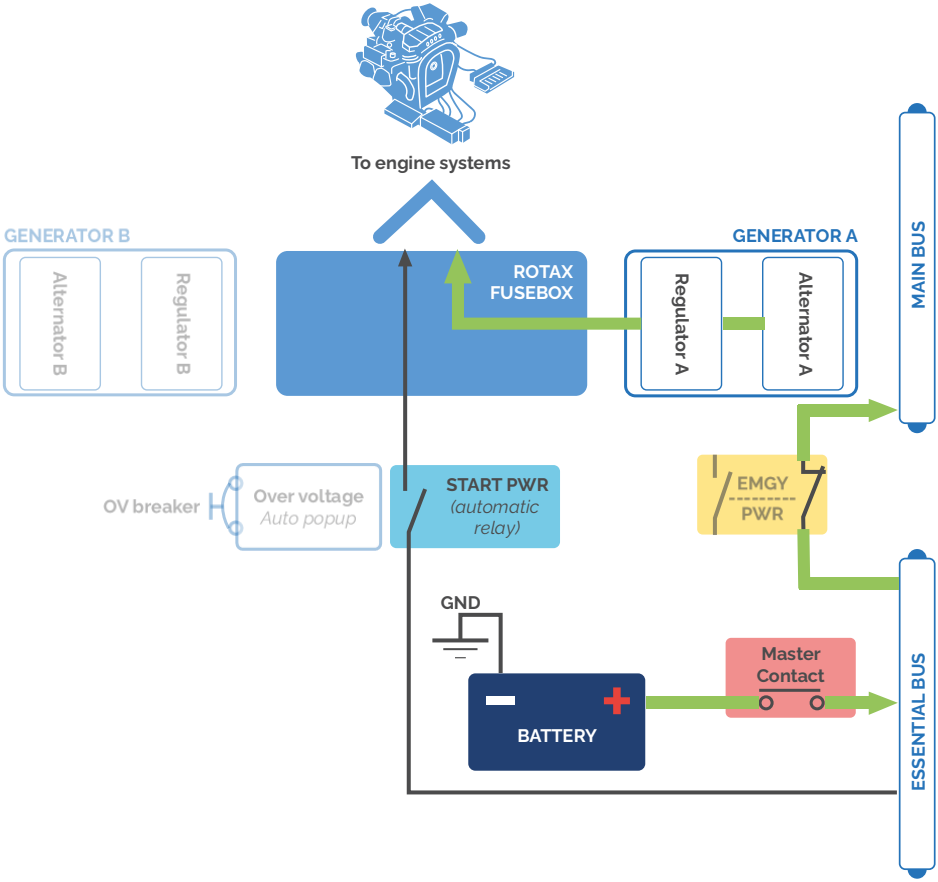
The generator B is automatically disconnected from the aircraft systems and connected to the engine systems. Refer to §3.21.1.



Generator A	Failure
Generator B	Supplies the Engine
EMGY PWR	OFF
Battery	Supplies the Aircraft – Not recharged
Main bus	Supplied

7.12.1.3 Generator B failure.

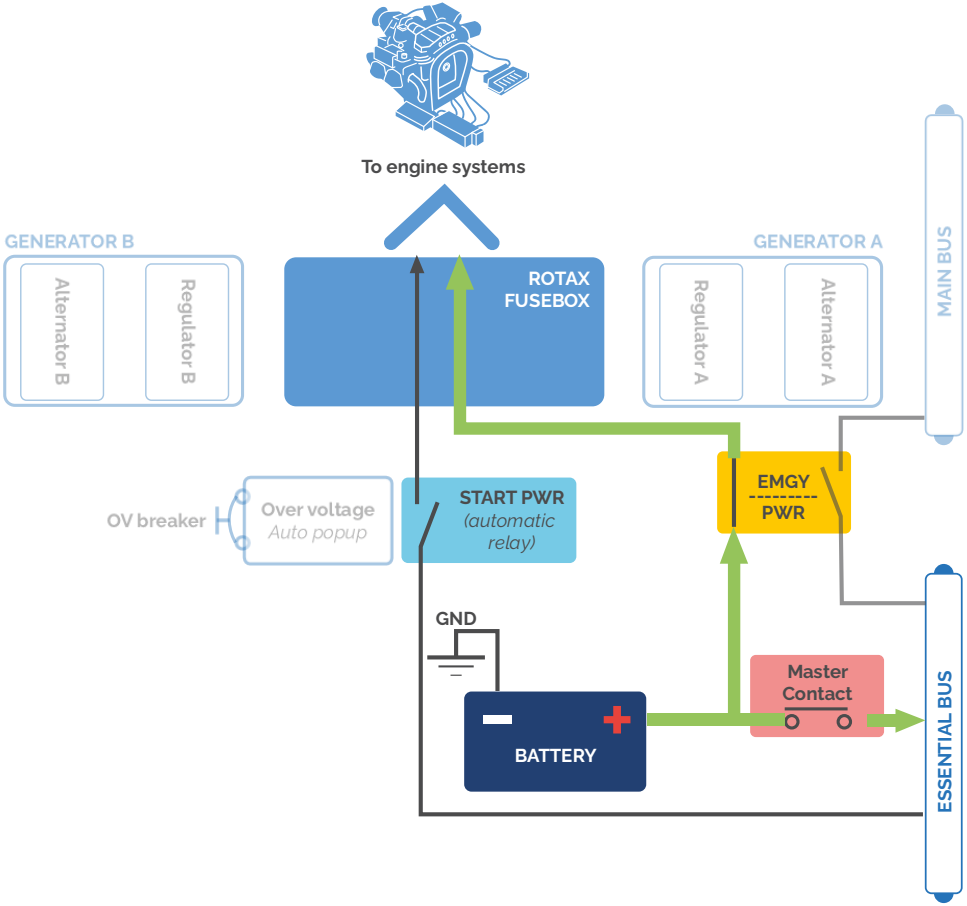
Engine is supply by the Generator A. Airplane systems are supply by the battery.
Refer to §3.21.1.



Generator A	Supplies the Engine
Generator B	Failure
EMGY PWR	OFF
Battery	Supplies the Aircraft – Not recharged
Main bus	Supplied

7.12.1.4 Generator A & B failure.

In this case, the EMGY PWR button is active. Refer to §7.12.5.



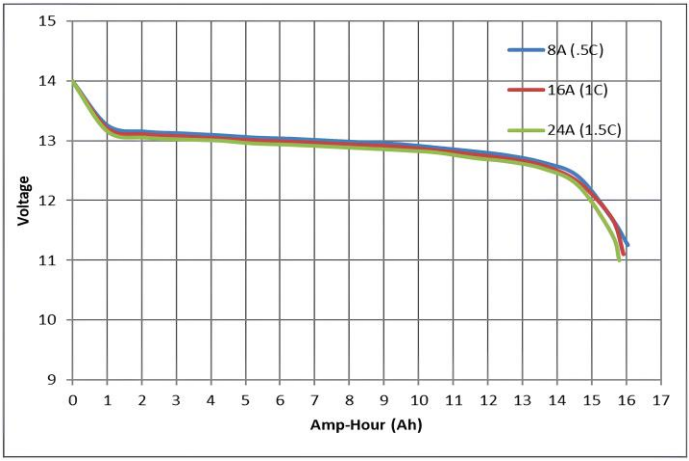
Generator A	Failure
Generator B	Failure
EMGY PWR	ON
Battery	Supplies the Engine & the Aircraft – Not recharged
Main bus	Disactivated

7.12.2 Generators

The Rotax 912iS engine has two individual generators A and B. During normal operation, generator A powers engine electrical systems (ECU, pumps, sensors, etc.) and generator B powers the aircraft electrical systems and charges the battery.

7.12.3 Battery

The EarthX Model ETX-900 TSO LiFePO4 Battery is installed in the electrical compartment next to the parachute. This is the aircraft's main battery. It has a capacity of 15 Ah. Below, the discharge Ah giving an idea of remaining battery capacity.



7.12.4 MASTER switch

The MASTER switch connects the battery and power generation to the aircraft systems.

7.12.5 Emergency Power switch “EMGY PWR”

When EMGY is switched ON, the electrical systems of the Rotax engine are directly powered by the battery. This function is described as “Battery Backup switch” in Rotax manuals. The amber status light “EMGY PWR” is ON.

EMGY shall be switched ON in case of dual generator failure, in which case, the engine cannot be electrically self-powered and requires battery power to run. In this case, the engine autonomy relies only on battery autonomy.
In order to increase this autonomy, when EMGY is switched ON, only the Essential aircraft systems remain powered.
Refer to §3.21.3 for more information about the Emergency Power such as:

- The procedures,
- The time on EMGY PWR,
- The list of Essential systems.

7.12.6 Overvoltage circuit breaker “OVERVOLT”

The OVERVOLT breaker located below the MASTER switch would automatically disconnect the power generation from aircraft systems if an overvoltage is detected. This breaker can also be manually pulled when an overvoltage is observed.

Note
The aircraft electrical systems will remain powered by the battery, but the battery will no longer be charging.

7.12.7 Optional external power

The optional external power plug is intended for battery charging and for aircraft power supply with engine not running only.

The external power plug is located under the engine cowling hatch and is accessible by opening the engine cowling hatch. The connector is compatible with chargers approved by battery manufacturer and prevents reverse polarity to be applied

Note:
Example of appropriate charger: Optimate (TM-275 10A)

WARNING
The external power plug must not be used for engine starting.

Caution
Only use chargers approved by battery manufacturer.

7.13 Instrument and avionics

Note
For instruments and avionics operating instructions refer to the documentation supplied with the instruments and avionics.

7.13.1 G3X general descriptions and functions

Caution
This chapter is a very short description of functions, it does not replace Garmin G3X touch pilot's guide. The pilot must learn the pilot's guide and train on the G3X management on ground before using it in flight.

Note
In case of indicated airspeed incoherence between the G3x and the analogue ASI, the indication provided by the analogue (E)TSO certified anemometer prevails.

All touchscreens can also be controlled by their buttons. See pilot's guides.

The G3X can display the PFD in full screen or a split screen with PFD on the left and a secondary window on the right.

PFD is always displayed.

Swap between split or full screen by clicking on the upper right box.

The secondary window can be:

- Map (navigation moving map)
- Cht (Chart)
- Wpt (Waypoints edition / selection)
- FPL (Flight planning edition / selection)
- Ter (Terrain)
- Info
- Eng (detailed engine parameters)

Navigate through the available windows with the right knob.

The essential engine parameters are always displayed on the left vertical column.
Display the detailed engine parameters window by clicking on the left engine vertical column. See §7.4.2.

Full screen mode.

Split screen mode. Example with Map zoomed on La Rochelle airport.

7.13.2 Transponder

The transponder is powered ON automatically when the MASTER SWITCH is turned ON.
On the G3X touchscreen, click on the upper row XPDR section to display the transponder squawk / mode management pop-up window.

7.13.3 Synthetic Vision System (SVS)

The G3X is equipped with different Synthetic Vision function (detailed in the G3X pilot guide):

- Pathways
- Flight Path Marker
- Airport Signs
- Runway Display
- Terrain Alerting
- Obstacle Alerting
- Zero-Pitch line

Note

Synthetic vision system is only intended for use as a pilot awareness aid. Don't use it to replace visual flying rules. In case of any alert, watch outside. Apply standard VFR procedures.

7.13.4 VHF

The Radio Trig TY91 is interfaced with the G3X. It can be controlled either from the TC90 display unit on the instrument panel or via the G3X touchscreen.
On the G3X touchscreen, click on the COM1 box in the upper row to enter the VHF frequency management screen. The following pop up window will be displayed.

Click on the “STBY” box to swap between active and standby frequencies.

7.13.5 CAS Messages

CAS Messages for “Crew Alert Systems” are displayed on the PFD on a black background (see picture above).

They grouped by criticality (warning, caution, advisory, and safe):

- **WARNING** : Requires immediate attention.
  - Warning messages will flash until acknowledged by pressing the ENT Key.
  - An Aural annunciation can be heard.
  - The “MAST WARNING” indicator lights up (§3.23.1)

- **CAUTION** : Requires pilot awareness and possible corrective action.
  - The “MAST CAUTION” amber indicator lights up (§3.23.2)

- **ADVISORY** : Provides general information.

Note
See the following chapter for more information:
§3.24, Red CAS Message.
§3.25, Amber CAS Message.
§7.13.6, White Advisory CAS Messages.

7.13.6 White Advisory CAS Messages

7.13.6.1 NO AOA CAL

Cause:

The AOA is not calibrated.

Procedure:

The AOA is inoperant. Do not dispatch aircraft.

Report AOA problem to maintenance personnel when back on the ground.

7.13.6.2 ENGINE ECU

Cause:

One or both LANE lights are flashing.

Procedure:

Refer to §3.23.6 “Both Lanes (A and B) FLASHING” or §3.23.7 “One Lane (A or B) FLASHING”

7.13.6.3 PITOT HEAT

Cause:

If the heated pitot is installed, this CAS message indicates that the heated pitot is activated.

Procedure:

Check consistency with switch

7.14 Pitot-static system

The GARMIN GAP26 total pressure probe is located below the right wing. It provides a standard total pressure (front orifice) as well as a secondary pressure (lower orifice) dedicated to AOA computation.
Two small orifices under the body tube are drain holes.
Keep all pitot head orifices clean to ensure proper function of the system.
It is recommended to use a dedicated “remove before flight” cover.
The total pressure is connected with flexible tubing to both the standard dial Airspeed Indicator (total pressure port) and the Garmin GSU25 ADAHRS.
The AOA pressure is connected to the ADARHS only.

Static ports are located on both fuselage sides. They location is highlighted with a sticker.
Keep these orifices clean. Using obturating pins with “remove before flight” flags to avoid ingestion of water or insects is recommended.
When cleaning the aeroplane, do not direct water spray towards the static ports. If you tape them closed, make sure you remove the tape on both sides before flight.
They are connected with flexible tubing to:

- The standard dial Altimeter port,
- The standard dial ASI static port,
- The G3X ADAHRS,
- The altitude encoder for the transponder.

AOA information is displayed on the GDU460 and on the PFD. The AOA warns the pilot that the aircraft is about to stall. An audible alert is heard by pilots directly in their headset before the aircraft stalls.

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8 Airplane Handling, Servicing & Maintenance

8.1 Introduction

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

8.2 Ground handling

WARNING
Never use aileron or flap hinge brackets to tie-down the aircraft.

Note
It is recommended to use parking brake only for short-term parking, between flights during a flight day. After the end of the flying day or if the plane is parked on a sloping area, do not use parking brake, but use wheel chocks instead.

Note
Use anchor eyes on the wings to tie-down the airplane. Move control stick backwards and fix it with the safety belt. Make sure that the cockpit canopy is properly closed and locked.

8.2.1 Parking

It is advisable to park the airplane inside a hangar or alternatively inside any other suitable space *(garage)* with stable temperature, good ventilation, low humidity and dust-free environment.
It is necessary to moor the airplane when it is parked outside a hangar. Also when parking for a long time, cover the cockpit canopy, possibly the whole airplane by means of a suitable tarpaulin. If rain is expected, use a canopy cover, or tape the NACA inlets.

8.2.2 Jacking

Since the empty weight of this aircraft is relatively low, two people can lift the aircraft easily. First of all prepare two suitable supports to support the aircraft. It is possible to lift the aircraft by handling the following parts:

- By pushing the fuselage rear section down in the place of a bulkhead the fuselage front section may be raised and then supported under the firewall.
- By holding the fuselage rear section under a bulkhead the fuselage rear may be raised and then supported under that bulkhead.
- To lift up a wing, push from underneath that wing only at the main spar area. Do not lift up a wing by handling the wing tip.

8.2.3 Road transport

The aircraft may be transported after loading on a suitable car trailer. It is necessary to dismantle the wings and tailplane before road transport, and use suitable conforming jigs or large amounts of foam. The aircraft and dismantled wing should be attached securely to protect these parts against possible damage.

8.3 Towing instructions

To handle the airplane on the ground use the *Tow Bar*, or if pushing the airplane by hand, push on the aft fuselage, placing your hands over the fin root fairing. You can also push on the leading edges close to the fuselage, but not on the wingtips.
You can push down on the fin root fairing to lift the nose wheel and turn the plane in a narrow space.

Hand pushing or pulling at the propeller blade roots is possible with caution.
(Check MASTER switch OFF, EMGY PWR switch OFF, and StartAssist OFF!)

Caution
Do not push or pull on the propeller blade tips or on the control surfaces when towing. You can damage the propeller and the control surfaces.
Avoid excessive pressure at the airplane airframe. Keep all safety precautions, especially in the propeller area.
Never push or pull on the wingtips.

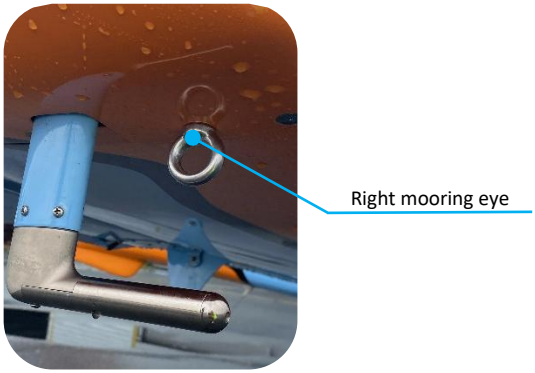
8.4 Tie-down instructions

The airplane should be moored when parked outside a hangar after the flight day. The mooring is necessary to protect the airplane against possible damage caused by wind and gusts.
For this reason the aircraft is equipped with mooring points located on the lower surfaces of the wings and below rear fuselage.

Tie-down procedure:

1. Parking procedure (§4.15) ..... Complete
2. Control stick ..... Fix using e.g. safety harness
3. Air vents ..... Close
4. Canopy ..... Close and lock
5. Moor the aircraft to the ground by means of a mooring rope passed through the two mooring eyes located on the lower surfaces of the wings.
   Pass another mooring rope between the rear of the fuselage and the tail.

Note
In the case of long-term parking, especially during winter, it is recommended to cover the cockpit canopy or possibly the whole aircraft by means of a suitable tarpaulin attached to the airframe.



8.5 Servicing operating fluids

Refer to section 2

See appropriate chapters in the ROTAX engine Maintenance and Operator's manuals for more instructions.

8.5.1 Approved oil grades and specifications

8.5.1.1 Recommended oil type:

Refer to Section 2

See appropriate chapters in the ROTAX engine Maintenance and Operator's manuals for more instructions.

8.5.2 Approved coolant grades and specifications

8.5.2.1 Recommended coolant type:

Refer to Section 2

See appropriate chapters in the ROTAX engine Maintenance and Operator's manuals for more instructions.

8.6 Cleaning and care

Use efficient cleaning detergents to clean the aircraft surface. Oil spots on the aircraft surface *(except the canopy!)* may be cleaned with petrol. The canopy may only be cleaned by washing it with a sufficient quantity of lukewarm water and/or an adequate quantity of adapted detergents. Use either a soft, clean cloth sponge or deerskin. Then use suitable polishers to clean the canopy. Check drain holes are clear.

Caution
Never dry-clean the canopy and never use petrol or chemical solvents!

Upholstery and covers may be removed from the cockpit, brushed and eventually washed in lukewarm water with an adequate quantity of detergents. Dry the upholstery thoroughly before insertion into the cockpit.

Caution
In the case of long term parking, cover the canopy to protect the cockpit interior from direct sunshine.

8.7 Assembly and disassembly

Refer to the Elixir Aircraft Maintenance Manual.

8.8 Aircraft inspection periods

Maintenance, overhauls and time limit periods may depend on type of operation of the aircraft and its overall condition.
At least, inspections and revisions should be carried out in the periods listed in:

- Elixir aircraft Maintenance manual for aircraft maintenance and overhauls.
- Rotax engine Maintenance manual for engine maintenance and overhauls.
- MT Propeller manual for propeller maintenance and overhauls.
- Other equipment specific instructions (see also supplements)

These are minimums, maintenance instructions and periods may be reinforced under severe environment conditions but should never be made lighter.

> Note
> By default, aircraft maintenance should be made in accordance with AC 43.13-1B.

8.9 Aircraft alterations or repairs

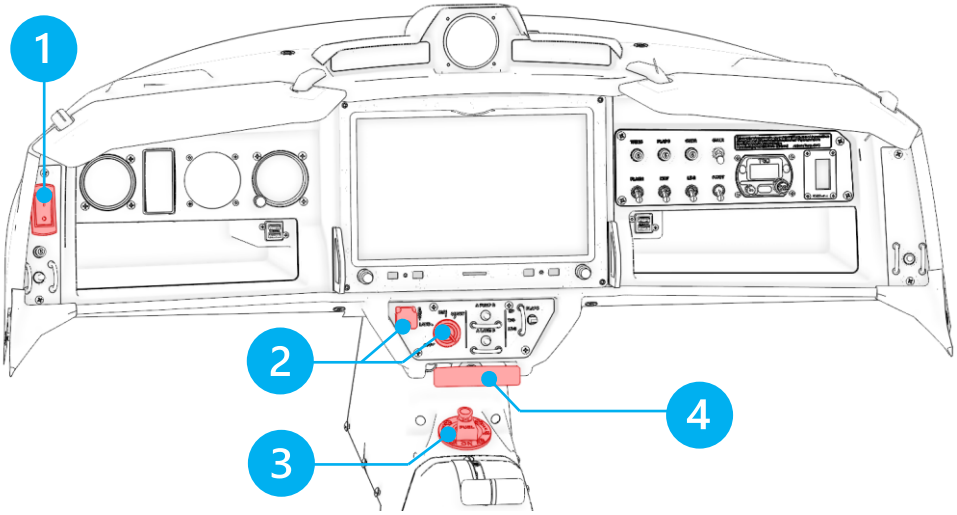
It is mandatory to contact the airplane manufacturer prior to any alterations or repairs to the aircraft to ensure that the airworthiness of the aircraft is not violated.
Structural repairs must be made according to an approved repair procedure issued by Elixir Aircraft, a specific procedure may be necessary. Always use only approved raw materials and original spare parts produced by the airplane (engine, propeller) manufacturer.
If the aircraft weight is affected by any alteration, a new weighing is necessary unless the new mass and CG can be exactly computed, then record the new empty weight into the Weight and Balance record.
Please refer to Elixir AMM.

> Note
> Aircraft repairs should be made in accordance with AC 43.13-1B

8.10 Secure an Elixir

8.10.1 Procedure

> Note
> The procedure below can be used as advice by emergency services to secure an Elixir on the ground.

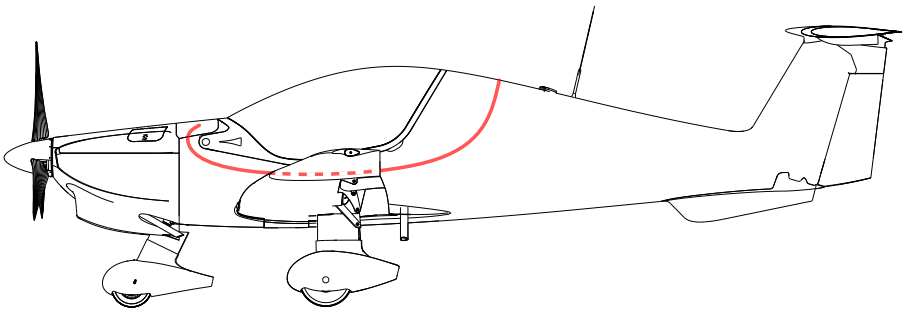


1	Master Switch	*OFF*
2	Remove the Keys & EMGY PWR	*OFF*
3	Shutoff Valve	*OFF*
4	Parachute	*Secure* *(Use Safety Pin)*

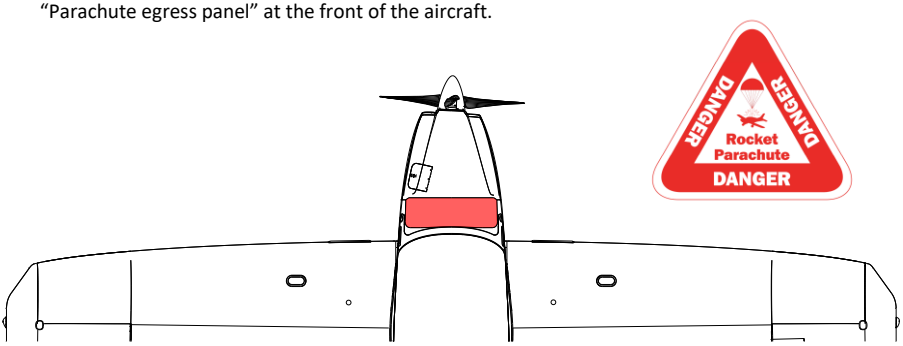
Refer to §7.10.9 Activation handle for the location of the safety pin of the parachute system.

8.10.2 Parachute System Location

A strap runs along the left side of the aircraft only. The strap is masked by paint.



The rocket, the parachute, and all the other parachute systems, are located under the "Parachute egress panel" at the front of the aircraft.



Note
The location of the parachute is given to help the emergency services understand the risks related to the parachute.

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9 Supplements

9.1 Introduction

This section contains the appropriate supplements necessary to operate the aircraft safely and efficiently when equipped with various optional systems and equipment not provided with the standard airplane.

9.2 Inserted supplement

This table must be completed and updated by the aircraft owner, with approved documents, independently for each aircraft in service according to its actual configuration.
This list should not be limited to Elixir Aircraft documents, the owner is required to insert any approved documents corresponding to any approved third-party equipment or modifications added or removed during the life of the aircraft.

Elixir Serial Number	Registration Marks

Author.	Reference / Title	Edition / Revision	Date Of Insertion
Elixir Aircraft	LXR-AI-Rec-Manual-AFM SUP01 Garmin AutoPilot		
Elixir Aircraft	LXR-AI-Rec-Manual-AFM SUP02 Heated pitot		
Elixir Aircraft	LXR-AI-Rec-Manual-AFM SUP03 ADSB IN OUT		

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Elixir Aircraft

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