FLIGHT MANUAL

Airplane Type SHARK 600

Model / Version:

Serial Number:

Registration:

Document Number: Shark600_MA_075 Rev.F

Date of Issue: 05.05.2025

Approval Number and Date:

This airplane must be operated according to the information and limitations presented in this Flight Manual.
This manual must be available to the Pilot at any time during flight.

0 Foreword

0.1 Record of Revisions

Rev.	Number of the document - bulletin	It concerns pages No.	Date of issue	Signature
IR	-	New document		
A	-	Sections 0, 1, 4, 7		
B	-	Sections 0, 2, 3, 4, 5, 7	21.3.2023	
C	-	Sections 0, 3, 5	26.7.2023	
D	-	Sections 0, 5	18.9.2023	
E	-	All sections	25.2.2024	
F	SHARK_SB_005	Sections 0, 1, 2, 3, 4, 5, 7, 9	05.05.2025	

NOTE

It is the responsibility of the owner to keep this manual up to date. Check www.shark.aero for the latest updates.

0.2 Table of Contents

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1 General

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1.1 Introduction

This flight manual is provided with your airplane to allow you to obtain as much knowledge as possible for safe operation. Additionally, this section contains definitions or explanations of symbols, abbreviations, and terminology used in this manual. It also includes supplementary information which can be helpful to the pilot.

Read this manual before your first flight and make sure you understand all the information presented here. This manual does not replace a Flight Instructor!

1.2 Certification Basis

The following standards were used for approval and testing:

UL-2	Requirements of LAA – Light Aircraft Association of Czech Republic.
LTF UL	Ultralight aircraft requirements applicable in Germany.
ASTM	Standard Requirements for Light Sport Aircraft (LSA) valid in US and used as a background for European light airplane standards.

1.3 Warnings, Cautions and Notes

The following definitions applied to Warnings, Cautions and Notes are used in this manual:

WARNING

NON-OBSERVATION OF THE CORRESPONDING PROCEDURE CAN IMMEDIATELY LEAD TO A SIGNIFICANT REDUCTION OF FLIGHT SAFETY.

CAUTION

Non-observation of the corresponding procedure can lead to equipment damage and reduction of flight safety in a short or longer time interval.

NOTE

Information not directly related to the safety of the flight.

1.4 Three View Drawing

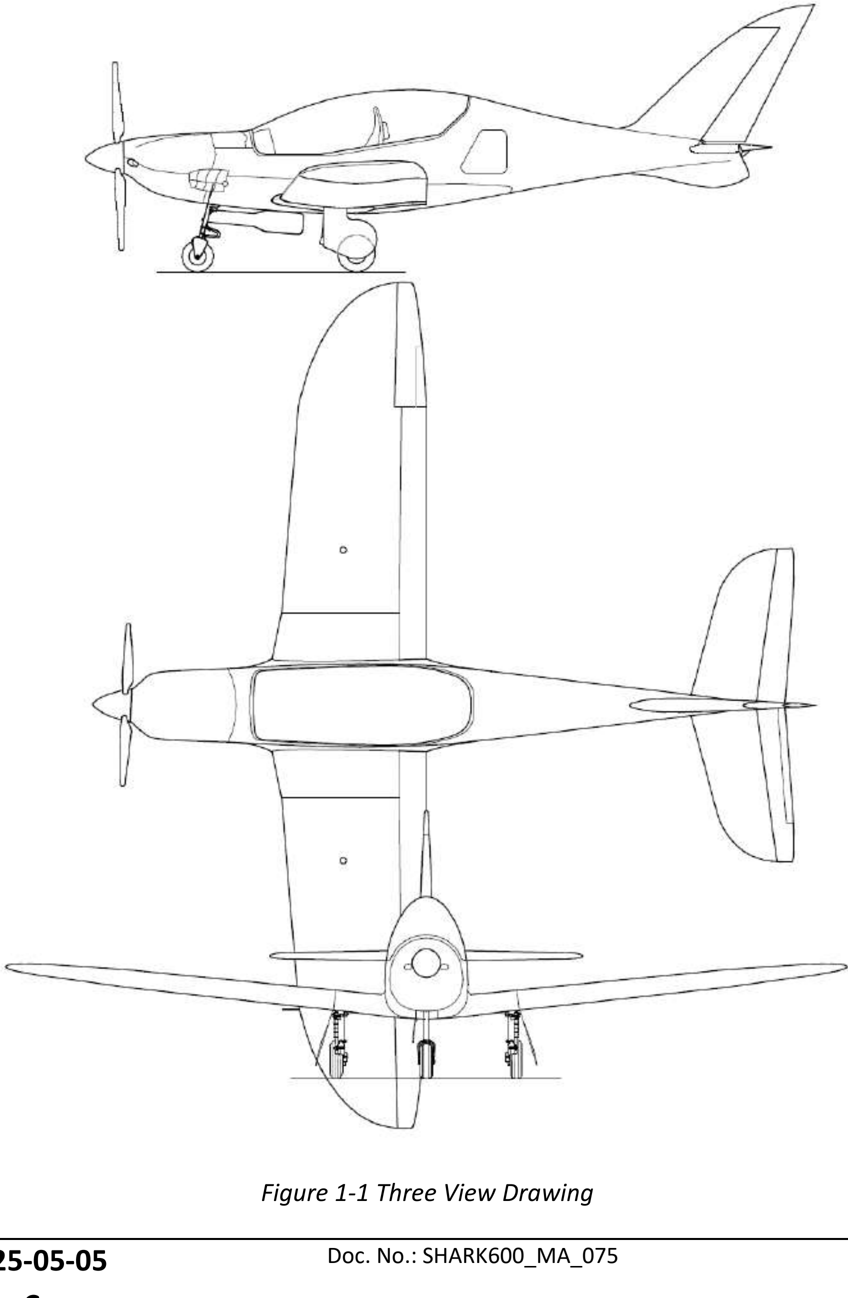

Figure 1-1 Three View Drawing

1.5 Dimensions

Overall Dimensions

Wing Span: ....7.9 m

Length:..6.85 m

Height: ....2.5 m

Wings

Airfoil:..JS20 – JS80

Wing Area:..9.5 m^2

Mean Aerodynamic Chord (MAC):.........1.237 m

Aspect Ratio: 6.671

Dihedral:..6°

Sweep of Leading Edge: ....3.53° / 13.8° / 38°

Aileron

Area:...0.281 m^2 each aileron

Flaps

Area:...0.922 m^2 each flap

Horizontal Stabilizer

Area:...2.154 m^2

Elevator Area:......................................0.662 m^2

Angle of Incidence:...............................-1.5°

Vertical Stabilizer

Area: ....1.062 m^2

Rudder Area: ....0.335 m^2

Landing Gear

Track: ....1.694 m

Wheel Base:..1.48 m

1.6 Engine

Rotax 912 ULS Engine, 4 Cylinder, 4-Stroke, Horizontally Opposed, Liquid Cooled Cylinder Heads, Air Cooled Cylinders.

Propeller is driven via an integrated Reduction Gear.

Reduction Ratio:....................................2.43 : 1

Displacement;.......................................1.352 liters

Output Power:.......................................73.5 kW / 100hp @ 5800 rpm

1.7 Propeller

Two-bladed Variable Pitch Propeller, manufactured by Woodcomp and Neuform:

- In-flight electrically adjustable (Woodcomp SR 3000 2WN)
- In-flight hydraulically adjustable (Woodcomp KW20W)
- In-flight electrically adjustable (Neuform TXR2-V-70)

1.8 Fuel

Approved fuel grades are:

- MOGAS EN 228 Super/Super plus (minimum 98 octane).
- MOGAS ASTM D4814.
- AVGAS 100LL (ASTM D910)

Total Capacity:

- 100 liters (26,4 US gallons) or optional 150 liters (39.6 US gallons), in both configurations 1 liter (0.26 gal) is unusable.

1.9 Lubricant and Oil

Lubrication system is “forced feed type” with an external reservoir.

Type:

- for MOGAS: API SL
- for AVGAS / 100L: API SL

Oil capacity:

- 3 liter maximum (0.79 gal)
- 2 liter minimum (0.53 gal)

1.10 Cooling

The Cooling System consists of a combination of forced air and a pressurized closed liquid system.

Type:

- Conventional cooling liquid mixed with water 50% + 50%

For example: BASF Glysantin Antikorrosion 50% / water 50%

Capacity:

- Minimum: 2.4 Litres (0.63 gal)
- Maximum: 2.5 Litres (0.66 gal)

1.11 Weights

See section: 2.6

1.12 Wing Loading

	Maximum take-off weight 600 kg
Wing Loading	63.2 kg/m²
Power Loading	6.0 kg/hp

1.13 List of Abbreviations

Abbreviation	Definition
AO	Above obstacle
CAS	Calibrated airspeed; Indicated speed corrected for installation and instrument errors. CAS is equal to TAS at standard atmospheric conditions at MSL
Center of Gravity	Point of equilibrium for the airplane mass (weight)
CG Arm	Distance from the reference datum to the CG, it is determined by dividing the total moment (sum of the individual moments) by the total mass (weight)
CG Limits	The CG range which an airplane with a given mass must be operated within
Demonstrated crosswind component	The max. speed of the crosswind component at which the maneuverability of the airplane during take-off and landing has been demonstrated during test flights
EW	Empty Mass (Weight) of the airplane including unusable fuel, all operating fluids and maximum oil amount. Movable ballast is not included in Empty Weight
GS	Ground Speed. Speed of the airplane relative to the ground
hp	Horsepower

Abbreviation	Definition
IAS	Indicated airspeed as shown on the airspeed indicator
ISA	International Standard Atmosphere
KCAS	Calibrated airspeed on knots
KIAS	Indicated airspeed in knots
KTAS	True airspeed in knots
Lever Arm	The horizontal distance from the reference datum to the center of gravity (of a component)
MAC	Mean Aerodynamic Chord
MAP	Manifold (intake) Pressure
MCP	Maximum permissible continuous engine output power during flight
MLW	Maximum mass (weight) permissible for landing
Moment	The mass (weight) of a component multiplied by its lever arm
MPG	Miles (nautical) per US gallon
MSL	Mean Sea Level
MTOW	Maximum Take-off Mass (Weight), the maximum mass (weight) permissible for take-off
OAT	Outside Air Temperature
RD	Reference datum (RD)/ Reference plane. An imaginary vertical plane from which all

Abbreviation	Definition
	horizontal distances for the center of gravity calculations are measured. It is the plane through the leading edge of the wing root rib, perpendicular to the longitudinal axis of the airplane.
rpm	Revolutions per minute
Station	A defined point along the longitudinal axis which is generally presented as a specific distance from the reference datum
Take-off Power	Maximum engine power for take-off
TAS	True airspeed. Speed of the airplane relative to air. TAS is CAS corrected for altitude and temperature error
TFUEL	Temperature (Fuel) (at a specific critical point under the engine cowling)
TMOT	Temperature (Motor) (at a specific critical point under the engine cowling)
Unusable Fuel	The amount of fuel remaining in the tank which cannot be used
Usable Fuel	The amount of fuel available for the flight plan calculation
Useful Load	The difference between take-off mass (weight) and empty mass (weight)

Abbreviation	Definition
VA*, V_A	Maneuvering speed. Maximum speed at which the airplane is not overstressed at full deflection of control surfaces
VFE, V_{FE}	Maximum speed with flaps extended
VLE, V_{LE}	Maximum speed with the gear extended
VLO, V_{LO}	Maximum speed of gear extending or retracting
VNE, V_{NE}	Speed which must never be exceeded in any operation
VNO, V_{NO}	Maximum structural cruising speed which should only be exceeded in calm air, and then only with caution
VS0, V_{S0}	The power-off stall speed with the airplane in landing configuration
VS1, V_{S1}	The power-off stall speed with the airplane in its current configuration
VX, V_x	Best angle-of-climb speed
VY, V_y	Best rate-of-climb speed

* - Indexes of characteristic speeds may, in cases of very small type (e.g., on placards), be written in the font size of the base type.

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2 Limitations

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2.1 Airspeeds

Speed		IAS km/h	KIAS kts	
V_{FE}	Maximum flap extended speed	**141**	**76**	
V_{LO}	Maximum landing gear operating speed	**130***	**70***	
V_A	Maneuvering speed	**185**	**100**	
V_{RA}	Rough Air Speed	**268**	**145**	
		IAS km/h	**KIAS kts**	**At altit.** ft
V_{NE}	Never exceed speed	**328**	**177**	0-3000
	Above 3000 ft. allowed	**313**	**169**	6500
	max. 344 km/h TAS – 185 KTAS	**298**	**161**	10000

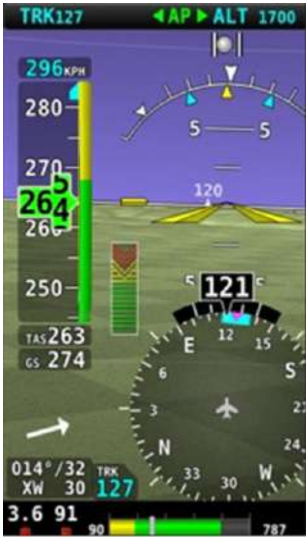
* The landing gear may be extended at speeds up to 200 km/h (108 KIAS).

NOTE

Refer to section 4.6.7 for more details of VNE limitation with altitude

2.2 Airspeed Indicator Markings

NEVER EXCEED SPEED: *328 km/h* *177 KIAS* Radial line
CAUTION RANGE: **268 - 328 km/h** **145 – 177 KIAS**
DESIGN MANOEUVRING SPEED *185 km/h* *100 KIAS* Radial line
NORMAL OPERATION RANGE: **94 - 268 km/h** **51 – 145 KIAS**
FLAPS OPERATING RANGE: **66 - 141 km/h** **37 – 76 KIAS**



Dynon SkyView

Garmin G3X Touch

2.3 Engine

Shark 600 is powered by a 100hp, 4-cylinder Rotax engine.

The type designation is Rotax 912 ULS and the most important details are in the table below.

For more information see the Rotax 912 Operator's Manual which is supplied with the engine, or it is easily downloadable.

Max. take-off power	73.5 100	kW HP
Max. engine speed (5 min)	5800	RPM
Max. continuous power	69 92	kW HP
Max. engine speed (continuous)	5500	RPM
Operation range of outside temperature	- 25	°C
	+ 50	°C

WARNING

FLYING THIS AIRCRAFT MUST ALWAYS BE DONE WITH POSSIBILITY OF A SAFE LANDING DUE TO LOSS OF ENGINE POWER.

2.4 Engine Instrument Markings

The Shark 600 is in equipped with a Dynon SkyView or GARMIN G3X Touch electronic flight display which displays flight instruments and engine instruments. Other EFIS/EMS systems or conventional engine instruments are optional.

Engine Limits		912 ULS
TACH	- Max Engine Speed	5800 RPM
EGT	- Exhaust Gas Temperature	880 ºC
CHT	- Cylinder Head Temperature	135 ºC
OIL	- Oil Temperature	130 ºC
	- Oil Pressure, max, cold start only	7 bar 100 PSI
	- Oil Pressure, minimum below 3500 rpm	0.8 bar 12 PSI
	- Oil Pressure, normal operation	2.0 – 5.0 bar 30 – 72 PSI
	- Fuel Pressure: min-max	0.15 – 0.4 bar 2.2 – 5.8 PSI
ERT	- Engine Room Temperature *	**70 ºC**
TFUEL	- Fuel Temperature *	**70 ºC**

CAUTION

*** Please read chapter 4.5 -Touch and Go's- carefully. It explains the importance of monitoring ERT (TMOT) and TFUEL.**

2.5 Weight Limits

Minimum Empty Weight, standard version	324 kg
Typical Empty Weight, fully equipped version	350 kg
Maximum Empty Weight *(excl. movable ballast)*	374 kg
Max Take Off Weight, *(including parachute rescue system)*	600 kg
Minimum Weight of Crew *(one pilot, front seat)*	55 kg
Maximum Weight One Pilot *(front seat, empty rear seat)*	110 kg
Maximum Weight in Rear Seat	110 kg
Maximum Weight of 2 Occupants	200 kg
Maximum Weight Baggage Area When flying Solo from Front Seat When flying with Occupant in Rear Seat, baggage weight depends on the weight in Rear Seat	 25 kg 0 – 25kg**

** refer to Section 6 for maximum baggage weight.

WARNING

DO NOT EXCEED THESE WEIGHT LIMITS. PAY ATTENTION TO FUEL QUANTITY, ESPECIALLY WHEN 2 PERSONS ARE ON BOARD.

2.6 Center of Gravity Limits

Front center of gravity limit	17.5 % MAC
Rear center of gravity limit	31.5 % MAC

CG limits are valid for extended landing gear.

Note: Retraction of landing gear moves the CG 0,5-1% backwards.

See Section 6 for CG calculations.

2.7 Approved Flight Manoeuvres

Shark600 is not designed/ tested for Aerobatic operations and **therefore only maneuvers intended for normal operations are approved. These maneuvers are:**

- Manoeuvres for normal flying
- Lazy eights
- Chandelles
- Normal (practice) stalls
- Turns with a max bank angle of 60°

WARNING

ALL MANOEUVRES MUST BE PERFORMED WITH A POSITIVE OVERLOAD BECAUSE THE FUEL AND LUBRICATION SYSTEMS ARE DESIGNED FOR POSITIVE LOAD FACTORS. ALL MANOEUVRES MUST BE PERFORMED IN A MANOEUVRE ENVELOPE WITH MAXIMUM + 4G AND -2G OVERLOAD.

WARNING

AEROBATIC MANOEUVRES AND SPINS ARE PROHIBITED.

2.8 Manoeuvring Load Factor

Flaps up 0°	Maximum positive load factor	**+ 4 G**
	Maximum negative load factor	**- 2 G**
Flaps I, II, III	Maximum positive load factor	**+ 2 G**
	Maximum negative load factor	**0 G**

2.9 Flight Crew

Minimum Flight Crew is one Pilot.

Only two Occupants are allowed on board of this aircraft.

2.10 Type of Operation

WARNING

ONLY VFR FLIGHTS ARE PERMITTED

WARNING

FLYING IN CLOUDS AND FLIGHT IN ICING CONDITIONS ARE PROHIBITED.

2.11 Fuel

2.11.1 Approved Fuel Types

Fuel
MOGAS ASTM D4814
MOGAS EN 228 Super/Super (min. RON 98)
AVGAS 100LL (ASTM D910)

2.11.2 Fuel Tank Capacity

Fuel Tank Type	Standard	Long Range
Capacity each tank	50 liters 13.2 US gal	75 liters 19.8 US gal
Total Fuel capacity	100 liters 26.4.US gal	150 liters 39.6 US gal
Unusable Fuel	1 liter	

2.12 Other Limitations

Maximum Demonstrated Cross Wind Component	12 kts 6 m/s
Maximum Demonstrated Head Wind Component	30 kts 15m/s
Maximum Outside Temperature	50°C
Minimum Outside Temperature	-25°C

CAUTION

Heavy rain or excessive moisture can cause decrease of airplane performance. Increase take-off and landing speeds by 10 km/h.

2.13 Placards

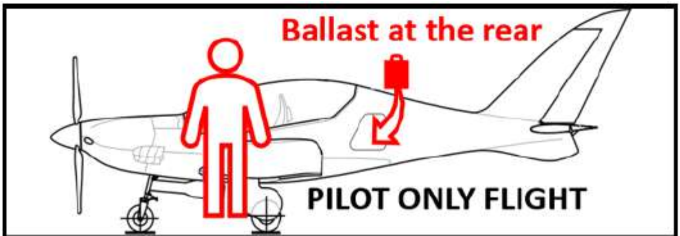
Production Label

Producer : SHARK.AERO s.r.o
Serial number :
Year :
Type / Model : SHARK 600

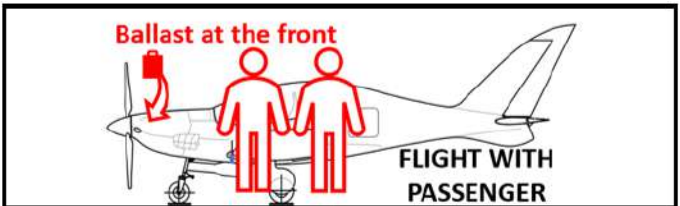
Registration Label

Registration:		
Producer:	**SHARK.AERO s.r.o.**	
Type/Name :	**SHARK 600**	
Production number/year:		
Empty weight:		**kg**
Max. take-off weight:	**600**	**kg**

Front and rear seat / luggage weight limit label:



Front seat kgs		Rear seat kgs		Baggage kgs		Fuel litres	
Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
55	110	0	15	0	25	0	150**



Front seat kgs		Rear seat kgs		Baggage kgs		Fuel litres	
Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
55	90*	95	110*	0	0	0	25
55	105	25	95	0	0	0	100**
55	110	25	85	0	5	0	100**
55	110	25	75	0	10	0	100**
55	110	25	70	0	15	0	100**

* Sum of weights on front and rear seat is 200 kg maximally.

** Maximum amount of fuel is limited by MTOW = 600 kg.

Basic information placards:

AEROBATICS MANOEUVRES AND INTENTIONAL SPINS ARE PROHIBITED

This product is not subject of the National Civil Aviation Authority approval and is operated at the user's own risk.

This ultra-light aircraft has been approved only for VFR day flights under no icing conditions.

OPERATION INFORMATION AND LIMITS – speeds km/h IAS			
Call Sign			
Empty Weight			kg
Max. Take-off Weight		**600**	kg
Max. Payload			kg
Max. Baggage Weight		**25**	kg
Min / Max. Pilot Weight		**55 / 110**	kg
Max. Passenger Weight (Rear Seat)		**110**	kg
Max. Pilot + Passenger Weight		**200**	kg
Stall Speed, Landing Configuration	**VS0**	**60**	km/h
Stall Speed, Clean Configuration	**VS**	**85**	km/h
Maximum Flap Extended Speed	**VFE**	**141**	km/h
Max. Gear Operating Speed	**VLO**	**130**	km/h
Design Maneuvering Speed	**VA**	**185**	km/h
Max. Extended Gear Speed	**VLE**	**230**	km/h
Rough Air Speed	**VRA**	**268**	km/h
Never Exceed Speed	**VNE**	**328**	km/h

OPERATION INFORMATION AND LIMITS – speeds kts KIAS			
Call Sign			
Empty Weight			kg
Max. Take-off Weight		**600**	kg
Max. Payload			kg
Max. Baggage Weight		**25**	kg
Min / Max. Pilot Weight		**55 / 110**	kg
Max. Passenger Weight (Rear Seat)		**110**	kg
Max. Pilot + Passenger Weight		**200**	kg
Stall Speed, Landing Configuration	**VS0**	**32**	KIAS
Stall Speed, Clean Configuration	**VS**	**46**	KIAS
Maximum Flap Extended Speed	**VFE**	**76**	KIAS
Max. Gear Operating Speed	**VLO**	**70**	KIAS
Design Maneuvering Speed	**VA**	**100**	KIAS
Max. Extended Gear Speed	**VLE**	**124**	KIAS
Rough Air Speed	**VRA**	**145**	KIAS
Never Exceed Speed	**VNE**	**177**	KIAS

ENGINE SPEED

Max. take-off (max 5min)	**5 800** rpm
Max. continuous	**5 500** rpm
Idling	**1 400** rpm

This aircraft has not been flight tested for recovery from unintentional spins.

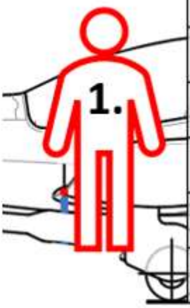
50 liters
Natural 98
min. MON 90 RON 98

FUEL TANK VOLUME LIMIT
Standard

75 liters
Natural 98
min. MON 90 RON 98

FUEL TANK VOLUME LIMIT
Optional (Long Range)

ALLOWED COMBINATIONS OF WEIGHT ON REAR SEAT AND BAGGAGE WEIGHT



2. kg	Max. kg
0 – 15	25
15 - 70	15
71 - 75	10
76 - 85	5
86 - 110	0

Baggage Compartment

CG calculation
SHARK600 S/N
Empty weight kg
Empty CG %

Cockpit

tyre 3.0 Bar
44 PSI

On Landing Gear

NO STEP

On the Wing close to the Fuselage

NO PUSH

On Control Surfaces

Rescue Parachute Warning on motor cowling close to canopy-frame

Rescue Parachute Warning on fuselage adjacent to occupant entrance (UK only)

WARNING – EMERGENCY PARACHUTE
(Action to be taken)
Unapproved Equipment - see Pilot's Handbook

Rescue Parachute Warning adjacent to the release control (UK only)

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3 Emergency Procedures

3.1 Introduction

This section provides checklists and procedures in the event of emergencies. Non-normal situations caused by airplane or engine malfunction are extremely rare if appropriate maintenance and pre-flight inspections are carried out correctly.

The guidelines, described in this section, should be applied to solve the problems. All air speed values in this chapter are presented in km/h - Indicated Airspeed. Each Pilot flying Shark 600 should be thoroughly familiar with this section of the flight manual.

IMPORTANT NOTE

Checklists with titles in **BOLD UPPERCASE UNDERLINED**, often referred to as **BOLDFACE CHECKLISTS** must be memorized and performed from memory when operating the aircraft.

3.2 ENGINE FAILURE DURING THE TAKE-OFF RUN

Throttle	**Idle**
Rudder	**Maintain directional control**
Brakes	**Apply as needed**
When safely stopped	
MAG1 and MAG2	Off
ATC	Radio call
Master Switch	Off

3.3 ENGINE FAILURE AFTER TAKE-OFF

Airspeed	**120 km/h IAS** **65 KIAS**
Landing Site	**Find most suitable field, make only small changes in heading and limit bank angle**

If no suitable field available carry out **3.25 BALLISTIC RECOVERY SYSTEM ACTIVATION** drill

Flaps	**As required**
Landing Gear	**Down**
MAG1 and MAG2	**Off**
Fuel selector	**Closed**
FUEL PUMP	**Off**
Master Switch	**Off**
Harness	**Tighten**

If landing surface not suitable or too short, consider deploying BRS late in flare or during ground-roll.

After touchdown	Brakes as required

WARNING

IF NO SUITABLE LANDING AREA IS AVAILABLE ACTIVATE THE BRS IMMEDIATELY

3.4 ENGINE FAILURE IN FLIGHT

Convert excess speed to height or a turn towards landing area

Airspeed	**120 km/h IAS**
	65 KIAS
Trim	**As required**
Landing area	**Choose area for outlanding**
Radio	**Consider MAYDAY** call but the priority is to fly the aircraft

If sufficient altitude and time available:

Carry out the **3.6 ENGINE RE-START IN FLIGHT** drill

If no suitable field is available and the engine does not restart

Carry out the **3.25 BALLISTIC RECOVERY SYSTEM ACTIVATION**

If the engine does not restart and a suitable field is available

Carry out the **3.11 FORCED LANDING WITHOUT POWER** drill

3.5 CARBURETOR ICING

Carburetor icing is indicated by rough running engine, variations in RPM and power output whilst other indications are normal.

Airspeed	**140 km/h IAS**
	76 KIAS
Throttle	**Try to find RPM with minimum power loss**

Leave the icing area (if possible - a 180° turn may be an option).

After 1-2 minutes slowly increase engine power to establish cruise speed.

If engine power is not recovered, carry out the **3.4 ENGINE FAILURE IN FLIGHT** drill

3.6 ENGINE RE-START IN FLIGHT

Airspeed	**120 km/h IAS**
	65 KIAS
Master switch	**On**
MAG1 and MAG2	**On**
Fuel selector	**Switch to the fuller tank**
Choke	**Closed**
FUEL PUMP	**On**
Throttle	**1/3 forwards**
ENG START	**On**
Starter	**Start**

If the engine cannot be started due to insufficient battery power, increase the airspeed to 150-170 km/h (81-92 KIAS) for propeller windmilling to support engine starting.

CAUTION

Loss of altitude needed for in-flight engine start is approximately 600 ft.

Repeated attempts to restart the engine will result in battery failure and loss of electrical services such as undercarriage and flap selection.

If the engine does not re-start, conserve battery power.

3.7 ENGINE FIRE ON THE GROUND

Fuel selector	**OFF**
Throttle	**Max**
FUEL PUMP	**Off**
MAG1 and MAG2	**Off**
Master Switch	Off
Parking Brake	Set
Aircraft	Evacuate

3.8 ENGINE FIRE IN FLIGHT

Cabin Heat	**Off**
Fuel selector	**Off**
Throttle	**Max**
Airspeed	Increase, to attempt to extinguish the fire.

Carry out the **3.4 ENGINE FAILURE IN FLIGHT** drill.

WARNING

DO NOT ATTEMPT TO RESTART ENGINE

3.9 COCKPIT / ELECTRICAL FIRE

Cockpit vents and windows	**Open, to remove smoke and fumes**
Electric equipment	**Switch off all electric equipment not needed for a safe landing**

Land as soon as possible at closest airfield, or make **3.12 PRECAUTIONARY LANDING**

3.10 GLIDING

Optimal gliding speed		**125 km/h IAS** **67 KIAS**
Glide Ratio	Flaps 0	1:11

3.11 FORCED LANDING WITHOUT POWER

If no suitable field available carry out the **3.25 BALLISTIC RECOVERY SYSTEM ACTIVATION** drill

Airspeed	**125 km/h IAS**	**67 KIAS**
Trim	As required	
Landing Field	Choose most suitable field	
Throttle	**Idle**	
Fuel selector	**OFF**	
MAG1 and MAG2	**Off**	
Flightpath and flaps	Adjust to control glide angle of final approach	
If a belly landing safer	Carry out **3.15 Belly landing** drill	
Once landing assured		

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LANDING GEAR	**Down**
Master Switch	**Off**
Harness	**Locked and tight**

If landing surface not suitable or too short, consider deploying BRS late in flare or during ground-roll.

3.12 Precautionary Landing

Airspeed	125 km/h IAS 67 KIAS
FLAPS	0

Choose suitable landing site and check it at low pass by over-flying it upwind. Evaluate wind (direction and speed), surface, slope and obstacles.

Follow normal pattern and Approach and Landing Checklist.

Flaps	As required
LANDING GEAR	Down
After Touchdown	
MAG1 and MAG2	Off
Master Switch	Off
Fuel selector	Off
Brakes	As required

3.13 Landing with a damaged landing gear

In case of damaged wheel or leg, non-extended leg, or unlocked leg, Belly Landing is recommended. If pilot decides to land with gears down, use normal approach and landing procedure, keep damaged leg above ground during the flare as long as possible using ailerons and elevator.

3.14 Landing with a flat tire

Use normal approach and landing procedure, keep the damaged tire above the ground during the flare as long as possible by using aileron and elevator.

3.15 Belly landing

Use belly landing when field for landing is too soft and collapse of landing gear after touch-down is expected with risk of overturning the aircraft: water, mud, snow, sand. Belly landing is usually safer and less damage is inflicted on the aircraft. Grass or snow is preferred over asphalt and concrete. Damage in a controlled belly landing is often less than would be expected in a collapsed landing gear situation on a soft surface.

Retract FLAPS 0 and cut off engine by selecting MAG1 and MAG2 Off when safely established on final. Set the Fuel Selector to OFF and only if time allows and sufficient pilot capacity remaining adjust the 2 bladed propeller in horizontal position with the starter motor. The priority is to fly the aircraft and land with wings level.

3.16 Landing gear does not move up

LAND GEAR	Switch/circuit breaker Off
Altitude:	Climb to safe altitude where you can continue flight without stress
LAND GEAR	Switch/circuit breaker On
Speed:	130 km/h
	70 KIAS
LANDING GEAR	Extend and visually confirm down, leave down for the rest of the flight

CAUTION

Do not operate aircraft again until the landing gear has been repaired and adjusted by an authorized person.

NOTE

The electric system of landing gear has a safety switch installed. The switch is activated by air pressure from the static system. This system blocks retracting the gear below 120 km/h (65 KIAS), and activates warning sound and warning lights if one or more gear-legs is/are not down and locked below this speed.

3.17 Landing gear does not go down / Emergency LG release

If any malfunction occurs during the extending of the landing gear:

- **Switch Off** the LAND GEAR switch/circuit breaker
- Climb to safe altitude where you can continue flight without stress
- Reduce speed to 120 km/h (65 KIAS)
- **Switch On** LAND GEAR switch/circuit breaker and extend the landing gear
- If landing gear is not down and locked, retract landing gear and then extend it again. Combination of positive and negative G loads can help to release the system if there is a mechanical failure
- If one of the landing gear legs is not fully extended and locked, use the following **Emergency Landing Gear Release** procedure;

LAND GEAR switch/circuit breaker	Off
Speed	Reduce 120 km/h IAS (65 KIAS)
FLAPS	FLAPS I
Emergency Release Handle	Pull the corresponding red gear-emergency-handle
Gear position indicators	Cross check

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CAUTION

Emergency Landing Gear Release Notes:

- **If you have any doubts that the landing gear is not properly down and locked, check the gear visually via the gear position indicators in the inspection windows**
- **The gear position indicator red-black flag-arrows need to be aligned. This visual check is the primary indication and takes precedence over the LANDING GEAR indications on the instrument panel**
- **When the Emergency Landing Gear Release is used, it is not possible to retract the gear until the release mechanisms are re-assembled by an authorized technician**
- **In case of one landing gear leg staying locked in the up position, it is a safe procedure to retract the other gear legs as well and perform a belly landing**

3.18 Extreme turbulence encounter

Airspeed	Reduce to V_A; 185 km/h IAS (100 KIAS)
Harness	Locked and tight
Loose objects	Stow

3.19 Engine vibrations

Power setting	Find a power setting which gives minimal vibrations
Flight Adjustable Propeller	Find propeller pitch setting with the least vibrations.

If vibrations increase, land as soon as possible, consider landing off-airport.

3.20 LOW OIL PRESSURE

Low oil pressure might be an indication of an imminent engine failure.

Power	**Reduce to minimum practical power**

Convert excess speed to height and start diversion towards a suitable airfield.

Land as soon as possible, consider an off-airport landing.

3.21 Inadvertent flight in icing conditions

Throttle	Increase to higher-than-normal power setting.
Heading/Course	Reverse or alter route to avoid icing.
Altitude	Climb above moisture or descend to warmer air.

3.22 Electrical failures

In case of Electrical System failure, there are 3 indicators providing information about the system status.

1. Charging Indicator: Red LED on left top edge of instrument panel. Providing primary information about electric regulator status.

Condition	
ENG START switch On and engine not running	LED is flashing due to the generator not providing energy
Engine is running	LED is Off Generator provides energy, regulator provides volts and amps
Engine is running LED is flashing	LED is flashing Generator does not provide energy. Electrical equipment will use main and back up batteries. After about 30 minutes the battery is depleted.
In flight: Switch off all instruments not required for flight. Make a precautionary landing at the closest airport for maintenance.	**LANDING GEAR** must be extended by the Emergency Landing Gear Release procedure. **Flaps** are inoperative and a FLAPS 0 landing must be made. **Radio** and **Transponder** are inoperative. The engine will operate normally, Dynon operates normally using its backup battery, Oblo operates normally using its backup battery.

CAUTION

If the generator is not providing energy and the aircraft is operating on battery power, very limited battery life remains. Land as soon as possible.

2. Volt Meter	
Condition	
Engine not running	Voltmeter shows battery voltage. Normal value is 12 to 13,5V. Below 11V the battery is empty and engine start is not possible.
Engine running	Voltage is provided by the regulator. Normal level is 13.5 – 14,4V. If regulator fails, charging indicator starts flashing, voltage drops below 10.5V, some instruments stop working.

3. Ammeter	
Condition	
Engine running Ammeter indicates negative or zero values	With negative values -15 to 0 Amps, battery is being charged. 0 shows fully charged battery.
Engine running Ammeter indicates positive values	Power is drained from battery. This indicates a regulator failure.
Engine not running	Ammeter indicates a positive value, indicating that electrical equipment takes power from the battery.

3.23 STALL RECOVERY

Simultaneously	**Side-stick centrally forward until buffet and all stall indications stop**
	Max power
Once stall indications stop and at a safe speed	
	Roll wings level
	Select desired flight path (climb)

NOTE

Loss of altitude after stall in straight direction is 100 ft, in turn 150 ft.

3.24 SPIN RECOVERY

If an inadvertent spin is detected (uncommanded roll and aircraft stalled):

Immediately select IDLE power and centralise the rudder and side-stick.

If the spin continues and below 3000 ft AGL

BRS Handle	**PULL**
MAG1 and MAG2	**Off**

Carry out the **3.25 BALLISTIC RECOVERY SYSTEM ACTIVATION** drill

If above 3000 ft AGL

Turn indicator	identify direction of turn
Rudder	apply full opposite rudder
Side-stick	continue to move centrally forward until the spin stops
When the spin stops	centralise controls and pull out of the dive to desired flight path (climb).

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WARNING

IF OUT OF CONTROL OR IN A SPIN SITUATION BELOW 3000 FT AO, DO NOT DELAY ACTIVATION OF THE BRS.

WARNING

THIS AIRCRAFT HAS NOT BEEN FLIGHT TESTED FOR RECOVERY FROM UNINTENTIONAL SPINS. THE PROCEDURE ABOVE IS FOR INFORMATION PURPOSES ONLY.

3.25 BALLISTIC RECOVERY SYSTEM ACTIVATION

ZOOM – TRIM – MAGS – MAYDAY – BOOM!

Convert excess speed to height

Trim to maintain an upward vector

MAG1 and MAG2	**Off**
Radio	**Consider MAYDAY call**
Red Deployment Handle	**Pull fully to end of travel**

Once parachute is deployed and if time permits:

Post BRS Activation Actions

ELT	Activated
Fuel Selector	OFF
LANDING GEAR	DOWN
MAYDAY	Transmitted
BAT MASTER	OFF
Canopy	Unlocked or jettisoned if ditching on water

Before impact:

Brief passenger and adopt posture:

- Straps tight, buttocks well back in seat
- Legs forward with feet on the rudder pedals to ensure optimum thigh support
- Back pressed firmly against the seat back
- Head located hard back against the headrest
- Eyes closed

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NOTE

The Ballistic Recovery System is secured by a pin with a red flag labelled: REMOVE BEFORE FLIGHT. This pin must be removed before every flight. In case you forgot to do so remove the pin before use.

CAUTION

Use of the Ballistic Recovery System can result in considerable airframe damage.

NOTE

Use of the Ballistic Recovery System is recommended:

- if it is not possible to continue safe flight because of structural failure caused by bird strike, collision, overloading, over-speed, icing
- if it is not possible to land safely because of flight in IMC conditions
- if pilot lost control of aircraft position because of spin, turbulence
- if pilot can´t find safe field for forced landing
- if landing on water is necessary
- if pilot lost capability to control aircraft – heart attack, seizure

Trying to land aircraft in all above-mentioned circumstances brings pilot and passenger to serious risk of life and can cause serious damage to the aircraft. Use of the Ballistic Recovery System is highly recommended, it can save life and reduce damage to the aircraft.

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A second handle for Ballistic Recovery System is located in front of the passenger seat. The two systems operate independently and separately.

Speed and altitude is needed for activation of the Ballistic Recovery System. However, even just partially deployed parachute can significantly reduce speed at impact. Referring to numerous years of experience, it is key to note that the MAGNUM rescue system may work even at very low altitudes and save human lives. In emergencies, it is recommended to activate the MAGNUM rescue system even at altitudes which are below limits; even this option offers a considerable chance of rescue.

Do not delay decision to use the BRS as it takes a finite time to deploy the system and carry out post deployment drills, ideally:

- With the aircraft under control deploy before 1000 ft AO
- With the aircraft out of control deploy before 3000 ft AO
- Convert excess speed to height
- Maintain an upward vector as long as possible
- Activate at apex of flight path before aircraft stalls

WARNING

DO NOT DELAY PULLING THE RED DEPLOYMENT HANDLE IF RISK OF IMPACT IS IMMINENT

3.26 Misplaced movable ballast – pilot solo flight

If a takeoff occurs with the movable ballast incorrectly positioned in front:

- continue to fly, expect degraded ability to trim at lower speeds and with flap extended
- use FLAPS I for approach and landing
- approach at 120 km/h (65 KIAS)
- higher side-stick elevator forces will be required in the flare
- expect longer landing than usual

3.27 Misplaced movable ballast – flight with passenger

If the take-off with passenger occurs in with a misplaced movable ballast in the rear:

- continue flying, the aircraft can be significantly more sensitive to control inputs and will have a reduced stability margin
- use extra caution when making steering inputs
- do not release the side-stick
- do not perform stalls

CAUTION

It is the pilot's responsibility to check the loading of the aeroplane before each flight, determine the position of the movable weight and check that the movable weight is in the position.

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NOTE

In the event of a misplaced movable ballast, consider a precautionary landing at a suitable airport and moving the ballast to the correct position.

3.28 HIGH CARBON MONOXIDE (CO) LEVEL ALARM

Cockpit HEAT Control Knob	**CLOSE**
Cockpit VENT switch	**OPEN (10 seconds)**
Cockpit air vents (front and rear)	**rotate fully open**
Canopy air vents (front and rear)	**fully open**

LAND AS SOON AS POSSIBLE

After landing stop as soon as possible

MAG 1, MAG 2	OFF
Canopy	**Open**

Carry out 4.2.14 After landing checklist

Vacate aircraft

3.29 TRIM OR AUTOPILOT SERVO RUNAWAY

Condition: Out of trim forces experienced without deliberate pilot trim switch activation.

If out of trim forces experienced, not in accordance with demanded trim situation:

Side-stick	**Oppose out of trim forces**
Autopilot	**Disconnect while holding side-stick firmly**
Trim circuit-breaker/switch	**Off**
Airspeed	**Select airspeed to reduce pilot fatigue**

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Select and maintain power and attitude to obtain required performance. LAND AS SOON AS PRACTICABLE

WARNING

FAILURE TO ACT PROMPTLY MAY RESULT IN A SITUATION WHERE CONTROL FORCES MAY BECOME SO HIGH THAT IT IS EXTREMELY FATIGUING FOR THE PILOT TO CONTINUE FLYING THE AIRCRAFT ACCURATELY.

WARNING

THE AUTOPILOT MAY COUNTER SOME OUT-OF-TRIM FORCES.

WHEN DISCONNECTING THE AUTOPILOT, A SUDDEN CHANGE IN FLIGHT LOAD CAN OCCUR. THIS CAN BE PREVENTED BY FIRMLY HOLDING THE SIDE-STICK DURING AUTOPILOT DISCONNECTION.

CAUTION

After selection of flap and during approach to land, significant out of trim forces may be experienced

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NOTE

Trim or autopilot runaway is one situation where prompt and decisive action can reduce consequences in a rapidly deteriorating situation.

Out of trim forces may occur as a result of passenger interference with the rear cockpit trim switch – however do not assume this to be the case. Carry out the actions above.

3.30 Trim failure

Condition: Activation of the side-stick trim switch does not result in reduction of out of trim forces, nor a change in trim indication on the EFIS.

Airspeed	Select airspeed to reduce pilot fatigue

LAND AS SOON AS PRACTICABLE

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4 Normal Procedures

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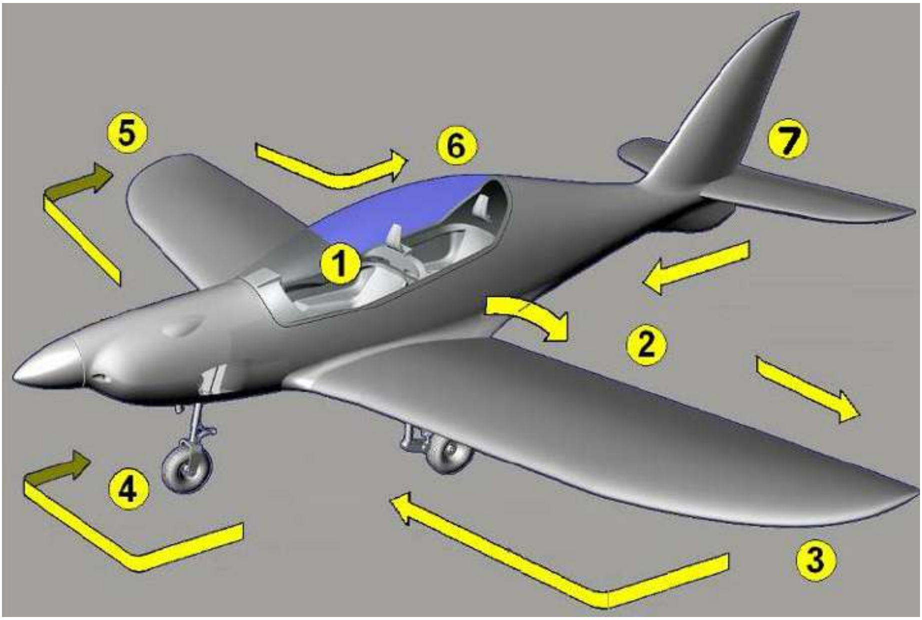
4.1 Pre-Flight Inspection



Numbers correspond with list below

CAUTION

Never lift open the canopy using the window aperture persex – structural damage is likely to occur. Only use the approved canopy opening support notch/handle to avoid damage.

1 Cockpit

MAG1, MAG2	Off
Master	Off
Position of seats	Checked & adjusted
Safety belts	Inspected
Instruments and equipment	Inspected
Headsets	Connected
Side-stick	Inspected, freedom of movement
Rudder pedals	Inspected, and adjusted
Rudder control cable	Inspected
Floor	Inspected, no debris or loose articles
Engine and prop control	Inspected, freedom of movement
Parking brake	Set
Canopy	Check condition and cleanliness checked, sliding window function checked

2/3 Left Wing

Flap	Control rod inspected, bolts and nuts inspected, secured
	Stiffness of control tested
	Hinge bolts and nuts inspected, secured
	Surface inspected
Fuel tank ventilation	Ventilation hole in the outbound flap hinge clear (blow inside to test throughput)

Aileron	Control pushrod, ball end, root hinge, nuts, anti-trim tab pushrod, ends, pins inspected, secured
	Teflon sealing tape inspected, freedom of movement up to limit stops
Wing tip	Shake - check gaps in pins
	Press down/lift, test shock absorber function
	Position light, camera fix point - inspect
Wing surface	Top, bottom, leading edge inspected
Pitot tube	Inspected
Inspection window	Aileron bell crank, pushrods, ball ends, bolts, nuts inspected
Fuel tank cap	Inspected, fuel quantity checked, cap secured
Window, wing root sealing tape, stickers, walkway	Inspected
Fuel drain	Fuel drained, checked for water

4 Landing gear left/right/front legs, tires, wells

Left/right main leg	
Tire and wheel	Inspected, pressure (3.0 bar/ 44 psi)
Brake system	Disc and securing wire, calliper, bolts
Trailing arm	Hinges, bolts, nuts, wheel axle, wheel nut, secure and inspected
Shock absorber	Inspected

c

Main leg, attachment, locking strut	Inspected
Retracting cable and release lock	Inspected
Gas spring, steel spring, Bowden	Inspected
Sensors up/down, flag, window, LED	Inspected
Gear main doors	Carbon holding arm, bottom spring bracket, upper limit stop, free movement of leading edge, upper rear hinge inspected
Main gear small doors	Hinges, hooks, spring, microswitch inspected, LED function tested
Wing pins	Main spar 2 pins IN and secured, rear spar IN, nut secured
Fuel filter	Inspected
Fuel lines	Condition, connection inspected
Sensor fuel tank	Connectors and wiring inspected
Nose landing gear	
Tire and wheel	Inspected, pressure (3.0 bar/ 44 psi)
Fork, axle, nut, composite spring	Inspected, secured
Main leg, locking strut	Inspected
Servo plus hinge, emergency lock	Inspected
Bowden, flag, sensors	Inspected
Front doors strip	Hinge, sliding pushrod function inspected

Side doors	Inspect hinges, arm, spring function
Parachute Bowden cables, parking brake valve plus hoses, transponder antenna	Inspected

4 Powerplant

Remove left gills, disconnect movable ballast connector, remove upper engine cowling, inspect

Engine, propeller	Surface and general condition, check for leaking liquids
Engine mount	Checked for cracks, secured nuts, fixed ballast
Exhaust system	Clamps, cracks, EGT sensors inspected
Ignition system	Wiring, boxes, spark plugs plus connectors
Fuel system	Gascolator, hoses, pump, pressure sensor, fuel flow sensor inspected
Carburettors	Clamps, filters, bowls, drain hoses inspected
	Carburettor heating system – open valve if flight in conditions with risk of icing is expected
Cooling system	Hoses, radiator, overflow bottle, level checked
Oil system	Hoses, clamps, radiator, pressure sensor, thermostat, oil tank inspected
Propeller control system	hydraulic

	Governor and Bowden
Propeller control system electric	
	Wiring and contact plate and box
Throttle and choke Bowden cables	
	Secured, free movement to limits
Sensors	CHT, MAP, TMOT, TFUEL inspected
Battery, Starter	Battery box, fuse, wiring, external plug, wiring to starter inspected
Heating valve	Valve, servo, wiring, exhaust hose inspected
Brake fluid level	Collector bottle level checked - if installed here. Fill if needed.
Bottom engine cowling	Sealing to radiators, landing light, NACA flap, servo, plexiglass inspected. Winter plug - adjusted
Oil level check	Remove oil tank lid Turn propeller until “burps” Check oil amount, refill if needed Re-fit oil tank lid
Oil access panel door	OPEN if OAT is over 30°C and if there is a risk of vapor lock during taxi
Movable ballast	Check position and locate to proper position according to intended flight configuration, locking pin secured

5 Right wing

As Wing above (2/3)

6/7 Fuselage and tail section

Fuselage plus tail	Surface, static ports on sides inspected
Stabilizer	Shake on tip – check no gaps condition, rear pin nut and safety needle inspected
Pushrods, trim connector	Bolts, nuts, secured
Elevator Right & Left	Freedom of movement up to limits
Trim Tab	Inspected
Strobe lights, sealing tapes, camera fixpoints	Inspected
VHF, ELT antenna	Inspected
Baggage compartment	Check correct loading, rear bulkhead, check brake liquid in collector cup -if installed here. Fill if needed.
ELT	ARMED

8 Movable Ballast

Position	Stowed and secured in baggage for flight with 1 occupant. Stowed and secured in engine cowling for flight with 2 occupants.

4.2 Flight Procedures

4.2.1 Boarding

General

Headsets	Installed
Documents	Check mandatory documents for aircraftand pilot on board
Essential equipment	Pens and kneepad with checklists on board
Tablet, mobile	Installed
USB key in Dynon slot	Installed
Movable ballast	Inserted in correct position and secured
Seats	Adjusted (consider raising to highest position for ease of subsequent adjustment)

When passenger is seated

Passenger seat	Adjusted
Harness	Secured and tight
Controls	Free (through full range, stick, throttle, pedals)
BRS briefing:	Completed (Safety pin removal, stowing, insertion)
If installed:	
Master	On
MAG1, MAG2	On
EFIS (rear seat)	On

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Ventilation & window	Adjusted
Armrests	Secured

When Pilot is seated

EFIS	On (Use Skyview Button 1, press for 2s)
Seat height	Adjust
Pedals	Set
Harness	Secured and tight
Pilot equipment	Tablet, mobile, kneepad, maps, cap, glasses
Headset	Connected, ANR ON
Canopy	Closed and locked or latched on strut
Windows	Set
Mirror	Set

4.2.2 Before engine start

PARK BRAKE	ON
Fuel tank selector	As required (LEFT if tanks are full)
EFIS	Check TMOT and TFUEL < 55°C

4.2.3 Engine start

Master Switch	On
Propeller	High RPM (Hydraulic propeller only)
ENGINE COOLING	OPEN
ENG START	On
FUEL PUMP	On

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STRB LIGHTS	On
M AG1, MAG2	On
Throttle	Cold engine: Idle Warm engine: approx 2cm forward
Choke	Cold engine - On Warm engine - Off
Propeller area	Check and call “CLEAR”
Red ENGINE START	Actuate (10 sec max-then cool for 2 min)
After engine starts	Maximum 2500 rpm, set 2000
Oil pressure	Checked (rising within 10s)
Choke	Off

CAUTION

Warm up engine at 2000 rpm for 2 minutes, continue at 2500 rpm until oil reaches 50 °C.

WARNING

BATTERY MUST BE DISPOSED OF IF DEEP DISCHARGED (BELOW 8V) DUE TO DENDRITIC DAMAGE

NOTE

Jump starting is not recommended.

4.2.4 After engine start

EFIS	On
RADIO	On
FLAPS	On - Flaps 0 green LED flashing, acknowledge by pressing “FLAPS 0”
TRIM	On
LAND GEAR	On, Audio Warning noted, self test complete, no flashing lights
PROP	On (Electric prop only)
AP	On
POS LIGHT	On
LAND LIGHT	On
Other circuit breakers	As required
On EFIS:	
QNH	Set
TRIM indicator	Neutral
MESSAGES	Checked
Backup instruments	Set

4.2.5 Taxi	
Brakes	Checked
Nosewheel steering	Checked

CAUTION

Excessive TFUEL and TMOT can cause engine overheat. When TMOT is above 70°C in the engine compartment cool down the engine to avoid vapor lock.

NOTE

Engine warm up may be performed during taxi.

The recommended maximum taxi speed is 10 km/h (6 KTS) (slow runing speed). Do not use too much brake in snowy conditions, melting ice can freeze on brake discs.

4.2.6 Engine function

PARK BRAKE	Set
Engine temperatures	Checked
Throttle	Set 4500 rpm
Engine indications	Checked
Propeller	Test
Throttle	Set 4000 rpm
MAG1	Off/On (max drop 350 rpm)
MAG2	Off/On (max drop 350 rpm, max difference from MAG1)
Throttle	Idle, check smooth running
Throttle	Set 2000 rpm

CAUTION

Maximize cooling during engine functional test. Consider pointing the aircraft into the wind. Minimize duration of the test and high power settings.

4.2.7 Before departure

The form below may be used as an easy way to perform both the engine function test and the before departure items. The first three rows include flight preparation items.

Type: **SHARK 600**	Registration		Callsign		Production Number	Date	
Crew :					Purpose of flight :		
Weather TWR:	wind:		visibility/clouds			°C	hPa/inHg
Check before departure	Fuel L	R	fuel pump	selector	charging	cooling flap	brakes
Landing gear	rpm max	magnetos	flaps	trim	radio	transponder	prop
Free controls	canopy	+baggage lock	movable ballast				

Fuel tank selector	LEFT or RIGHT (LEFT if full tanks)
Propeller	High RPM
Choke	Off
ENGINE COOLING	OPEN
TIS	As required
FLAPS	Set for take off

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MOVABLE BALLAST	Position verified
Altimeter bug	Set
Heading bug	Set
BAT CHARGE	Not illuminated
Trim	Set for take off
Engine indications	Checked
MESSAGES	Checked
FUEL PUMP	On
Circuit Breakers	As required
PITOT HEAT	As required
Backup instruments	Checked
MAG1, MAG2	On
Harness	Secure and tight
Flight controls	Full and free movement
Canopy	Closed, latched, sliding window forward, scoop closed
Baggage compartment	EFIS indication CLOSED
BRS Pin	Removed front and rear, cross checked

4.2.8 Take-off

Brakes	Released
Throttle	Max
Engine parameters	Checked
Airspeed indication	Checked

At safe height and with positive rate of climb

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FLAPS	FLAPS 0
FLAPS Circuit Breaker	Off
LANDING GEAR	Up
Propeller rpm	Set (Max 5500 rpm, normal 5000)
Throttle	Set MAP (Max 27 inHg, normal 26 inHg)
Engine indications	Monitor

NOTE

Maintain directional control with rudder pedals. Above 50 km/h (27 KIAS) raise front wheel 10 cm off the ground. Keep this attitude until the aircraft lifts off at approximately 90 km/h (49 KIAS). Reaching 120 km/h (68 KIAS) and with a positive rate of climb, select FLAPS 0 and retract landing gear.
The landing gear system is connected to pitot-static / electronic system. This prevents unintentional retraction of the gear on the ground or in the air below IAS 100 km/h (55 KIAS). Gear down selection will work at any speed.

If any of the 3 legs of landing gear are not down and locked below 120km/h (65 KIAS), the pressure switch will activate a warning sound and light.

Properly retracted legs are indicated by red LED lights on the control panel for 10 sec. Properly closed small landing gear doors are indicated by green lights in viewing windows.

A visual inspection of the landing gear being down and locked can be done through small inspection windows. These are positioned on top of each

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wing and in the mid console in front of the pilot and correct indication will have 3 visual indicator arrow pairs aligned.

4.2.9 Climb

Propeller	5500 rpm maximum
Airspeed	135 to 180 km/h (70 to 100 KIAS)
	V_X – 135 km/h (73 KIAS) – max. angle
	V_Y – 150 km/h (81KIAS) – max. climb
Engine Indications	Monitor, if needed reduce power to avoid overheating

4.2.10 Cruise

FUEL PUMP	Off
Propeller	4000 – 5500 rpm
Throttle	Set MAP (from 22 inHg to full)
Engine Indications	Monitor, adjust power and ENGINE COOLING to keep temperatures within limits
MESSAGES	Checked
Fuel tank selector	Set

NOTE

Aim to keep Oil temperature and cylinder head temperature as close to 100°C as possible

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The following values are recommended for optimized cruise:

SHARK 600 - Rotax 912 ULS	Engine speed (1/min)	MAP (inHg)	Fuel flow (l/h)
Take-off power (5 min Max)	5800	28.4	
Max. continuous power	**5500**	**27**	**25.5**
75 %	5000	26	20.0
55 %	4600	22	15.0
Long range Cruise	4000	23	12.0

WARNING

SWITCH BETWEEN LEFT AND RIGHT TANK ON REGULAR BASIS TO PREVENT FUEL STARVATION.

AVOID PROLONGED OPERATION WITH IDLE POWER DURING FLIGHT AS THE ENGINE MAY BECOME OVERCOOLED AND LOSE POWER

4.2.11 Descent

Harness	Secured and tight
Fuel tank selector	LEFT or RIGHT
Engine Indications	Monitor
ENGINE COOLING	As required

4.2.12 Approach and landing

FUEL PUMP	On
LANDING GEAR	Down (3 green lights on) 3 visual indicator arrows aligned
Airspeed	Below 141 km/h IAS (76 KIAS)
FLAPS Circuit Breaker	On
FLAPS	Flaps set
Airspeed	Maintain below 141 km/h IAS (76 KIAS)
Brakes	Checked
PARK BRAKE	OFF
Propeller	Max

NOTE

Approach and landing are conventional. Pilots can choose to fly power-on or power-off approaches as appropriate.

For a power-on approach, bring throttle to idle at approx 30ft. Maintain a speed of 90-100 km/h (50 – 55 KIAS) until the flare. When flaring at a height of 1-2 ft, bring the aircraft into a nosewheel-high attitude. This might require significant nose-up inputs. Touch down on the main wheels first. If runway length permits, consider aerodynamic braking with the nosewheel held off the ground. Lower the nosewheel onto the runway smoothly.

4.2.13 Go around (balked landing)

Power	Max
Airspeed	minimum IAS 100 km/h (55 KIAS)
FLAPS	FLAPS 1
After achieving a positive rate of climb:	
FLAPS	FLAPS 0
LANDING GEAR	Up
Airspeed	135 to 180 km/h (73 to 97 KIAS)
Propeller	maximum 5500 rpm
Engine Indications	Monitor
ENGINE COOLING	As required

CAUTION

The go around procedure poses a significant risk of flap overspeed if power and attitude are not managed accurately. The Shark 600 has a high power to weight ratio; applying full power without raising the nose to the climbing attitude is likely to rapidly and significantly overspeed the flaps with an associated risk of severe damage and loss of control occurring.

4.2.14 After landing

After touchdown

Throttle	Idle
Brakes	As required

Clear of runway

BRS	Safety pin inserted, front and rear, cross checked (as appropriate)
ENGINE COOLING	OPEN
FLAPS	FLAPS 0
FUEL PUMP	Off
PITOT HEAT	Off

Engine shut down

PARK BRAKE	ON
Power	Cool down the engine at 2000 rpm (if necessary)
ELT	Checked
ENGINE COOLING	CLOSE
HEAT	CLOSE
VENT	CLOSE
All Circuit Breakers	Off (usually from right to left, except for STRB LIGHTS)
MAG1, MAG2	Off
Master switch	Off
STRB LIGHTS	Off

4.2.15 Aircraft securing post flight	
BRS safety pins	In
EFIS rear circuit breaker	Off
Master switch	Off
Check the airplane overall condition	
Pickets, tie down, and control locks and covers as required	

NOTE

If the ambient temperature is above 15°C and you intend to fly the aircraft again within one hour, leave the oil access panel door open. If possible, position the aircraft facing into the wind to allow TMOT and TFUEL to decrease, reducing the possibility of vapor lock.

4.2.16 Short field take-off and landing procedures

For **Short Field Take-off** use flaps II, further follow normal procedures for take-off.

For **Short Field Landing** use flaps III. Use approach speed 90 km/h, expect higher descent rate, adjust power to compensate.

4.3 Fuel system and its use

The fuel system consists of a wing fuel tank in each wing, both connected by a fuel valve. It is necessary to check fuel level regularly and switch between tanks if require.

There is a fuel return line from the engine to the left fuel tank which maintains correct fuel pressure, and as well helping bleed off any vapors that could cause vapor lock, resulting in a possible loss of power.

An electric fuel pump is installed behind the fuel tank selector.

4.3.1 Normal use of fuel system:

1. Use left fuel tank when both tanks are full.
2. Switch to right tank after about 30min of flight time.
3. Switch between tanks as needed in order to keep tanks balanced.
4. The fuel system returns fuel back into left fuel tank – no matter whether the fuel tank selector is set to left or right. When operating with fuel amounts close to the required minimum, consider using the left tank.

4.4 Cooling flap - adjustable engine cooling inlet operation

NOTE

Adjust the position of winter plug based on outside temperature during pre-flight check according to Aircraft Maintenance Manual.

Do NOT overextend the turn-range of the cooling flap control knob. The flap LED indicator has servo delay to the pre-selected position, always observe and follow LED indicator.

Turn knob to the left to CLOSE. Turn knob to the right to OPEN. Knob range is approximately 270°.

Engine start - Adjust the cooling flap control knob (left side panel below dashboard) according outside air temperature:

OAT	OAT < 10˚C	OAT < 20˚C	OAT > 20˚C
Cooling flap	CLOSED	HALF OPEN	FULLY OPEN
LED Indicator			

Taxing - Adjust the position with regard to engine temperatures. For OAT over 25°C keep cooling flap FULL OPEN on the ground.

Take-off and climb - open the cooling flap by 1-2 LED-step/s for each 10°C of OAT, keep fully open for over 30°C.

Cruise - adjust cooling flap to keep TMOT between 90-100°C

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Approach - adjust/close cooling flap to avoid over-cooling the engine.

Landing - close flap fully for landing.

Ground and Taxing - warm engine up if necessary

4.5 Touch and go's and the risk of vapor lock

Problems with engine re-start can occur during hot days. This is caused by overheated fuel in the engine compartment. Fuel starts boiling at 70-80°C. Due to formation of bubbles an irregular fuel supply occurs, and power loss including engine failure can occur during take-off. This effect is called vapor lock.

To reduce risk of vapor lock, the T connection of the return line is placed on the highest position of fuel hoses. Two temperature sensors are installed inside engine compartment, one close to the fuel line, so the pilot has information about these temperatures.

Temperatures over 60°C indicate yellow so attention is needed, temperatures over 70°C generate a **red indication, which causes the risk of vapor lock.** Recommendation is to turn airplane in the wind and run engine at idle to reduce temperature or shut it down to let it cool down. In hot environmental conditions, keep the oil inspection door on the upper motor cowling open in flight, to reduce this problem.

There is no risk of vapor lock during flight. After take-off the engine compartment cools down to a temperature of about 20°C above the outside air temperature. Rotax recommends using AVGAS fuel in case of vapor lock issues.

c

4.6 Performance considerations

Because the Shark 600 performance is higher than most ultralights, more awareness required. Please read the following items.

4.6.1 Turbulence

Shark 600 economy cruise speed is 240 km/h (130 KIAS). Normal cruise ranges between 250 km/h and 270 km/h (135 – 146 KIAS) at 75% power and fuel consumption 20 l/h.

Maximum speed with maximum continuous power is 280-300 km/h (151 – 162 KIAS) depending on the systems installed – e.g. landing gear doors, airbox, injection, exhaust, weight, temperature and altitude. For longer trips 250 km/h (135 KIAS) is an advisable economy cruise speed which can be used for planning and is even acceptable in light turbulence.

Speed up to 270 km/h (146 KIAS) is comfortable for passengers when flying in light turbulence.

CAUTION

Reduce speed to 180-230 km/h (97 – 124 KIAS) when flying in moderate to heavy turbulence.

4.6.2 Manoeuvring speed (V_A)

Manoeuvring speed, V_A, is the speed where the pilot can use single, full deflections of the control surfaces. V_A is 185 km/h (100 KIAS). At this speed a full “nose up” deflection of the elevators would cause the plane to stall at 4G, therefore limiting the stress on the airframe.
Beware that normal cruising speed is significantly higher, so it is necessary to use smaller and smooth movements of controls to avoid overstressing the aircraft.

4.6.3 Speed reduction

The extremely sleek design of the Shark 600 may present a challenge to pilots converting from lower performance “draggy” ultralights or flying club aircraft. The Shark 600 will slow from cruise speeds to just above circuit speeds as follows:

- Idle power: around 1 nautical mile
- 15 inHg: In excess of 2 nautical miles

The Shark 600 will not slow down perceptibly whilst descending.

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NOTE

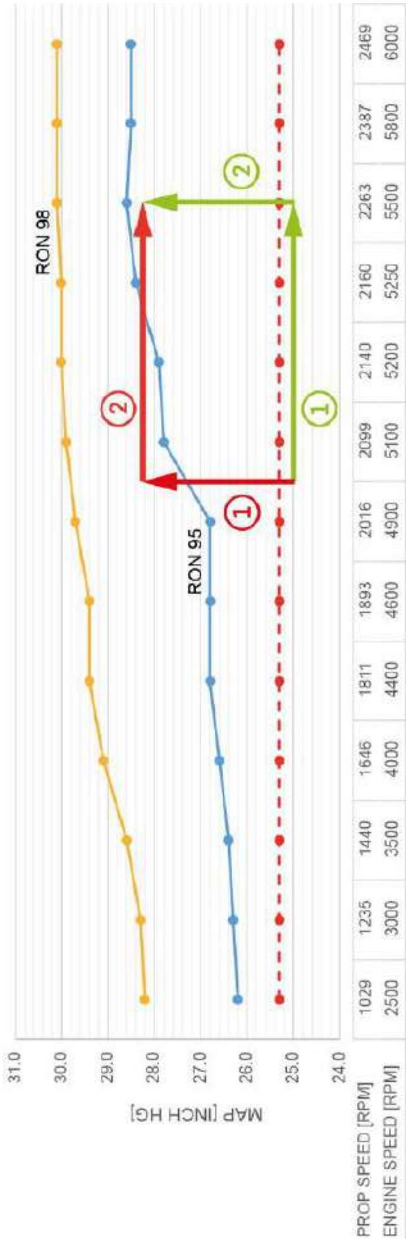
The Shark 600 has been carefully designed to comply with the slow speed regimes of the ultralight category as well as to be capable of very high speed cruise and excellent maneuverability. The wing shape/profile and sleek design mean that there is a wide range of pitch attitudes which will be selected in every flight. The Shark 600 has excellent forward visibility which means that selecting accurate pitch attitudes in combination with accurate power settings provides very precise control of aircraft performance. Much more than in lower performance aircraft types the following “equation” is important and valuable:

POWER + ATTITUDE = PERFORMANCE

4.6.4 Propeller & engine RPM

The Shark 600 easily increases its speed during maneuvering. Careful power management is required to avoid engine RPM overrun. This is especially important for fixed pitch propellers but as well for electric adjustable propeller due to their slow angle movement. It takes about 12 seconds to change the blade angle from minimum to maximum. Therefore, even at constant speed mode it is recommended to reduce RPM during maneuvering and work smoothly with the throttle.

Hydraulically controlled propellers do have the advantage to change blade angle very fast, therefore the risk of engine overrun is minimal.



Use the graph to determine appropriate MAP and RPM settings depending on fuel type to ensure maximum margin/robustness for piston damage/pre-ignitions.

The blue and orange lines represent the limits for RON 95 and RON 98 respectively above which piston damage may occur. The areas above the RON 95 inch Hg line and the RON 98 inch Hg line respectively must be avoided at all times. RON 95 and RON 98 lines are valid for manifold air temperature up to max. 50 °C / 122 °F.

In addition, adjustment of the power needs to be performed in a correct way as described by the green arrows:

1 - First increase propeller speed [rpm].

2 - Then increase MAP with the throttle lever.

Power decreasing is done by opposite procedure:

1 – Decrease MAP.

2- Then decrease propeller speed.

4.6.5 Flaps

In the traffic pattern, extend the landing gear at 130 km/h (70 KIAS), reduce speed further to 120 km/h (65 KIAS) to extend FLAPS I.

One potential error is attempting to deploy flaps at too high a speed. To counter this, the flap control system is equipped with a pressure switch which prevents flaps extending above 140 km/h (75 KIAS). If the flaps are in an extended position and the speed increases above 130 km/h (70 KIAS) a blinking LED on the flap panel will provide overspeed warning.

The flaps will not extend at a speed over 140 km/h (76 KIAS).

It is important to check if flaps are in the desired setting after the flap deployment command! Check LIMITATION-OPERATION-INDICATION.

The design structural limit of the flaps is 140 km/h (76 KIAS). Higher speeds can cause structural overload.

CAUTION

The go around procedure poses a significant risk of flap overspeed if power and attitude are not managed accurately. The Shark 600 has a high power to weight ratio; applying full power without raising the nose to the climbing attitude is likely to rapidly and significantly overspeed the flaps with an associated risk of severe damage and loss of control occurring.

4.6.6 Landing gear operation

A pressure switch in landing gear system prevents retraction below 100 km/h (55 KIAS). It is recommended to keep airplane in a shallow climb after take-off and wait until speed passes 120km/h (65 KIAS).

It is recommended to visually check, if retracting procedure starts (lights flash), or if landing gear is fully retracted (3 red lights illuminate for 10 sec). Test flight with opened landing gears with installed doors was made up to 230 km/h (124 KIAS), without any damage.

4.6.7 Flutter versus altitude

Fast airplanes are more susceptible to flutter. Problems may occur during higher speeds at high altitudes because critical flutter speed decreases with altitude.

V_{NE} is limited for this reason according to following table to keep TAS speed constant for altitudes above 3000 ft.

IAS V_{NE} versus altitude:

Altitude	ft	0	3000	6500	10000	13000
IAS	km/h	328	328	313	298	283
KIAS	Kts	177	177	169	161	153
TAS	**km/h**	**328**	**344**	**344**	**344**	**344**
KTAS	**kts**	**177**	**186**	**186**	**186**	**186**

For high altitude flights, keep maximum allowed IAS in this table, or check TAS displayed on modern EFIS devices.

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5 Performance

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5.1 Introduction

The performance calculations are valid for a:

- Standard airplane
- Maximum take-off weight 600 kg
- Normal flying technique
- ISA conditions (sea level, 15°C, 1013 hPa, 29.9 inHg)

CAUTION

Variations in Pilot Technique, Weather Conditions and Airplane Handling (e.g. propeller pitch) can cause significant differences in Flight Performance

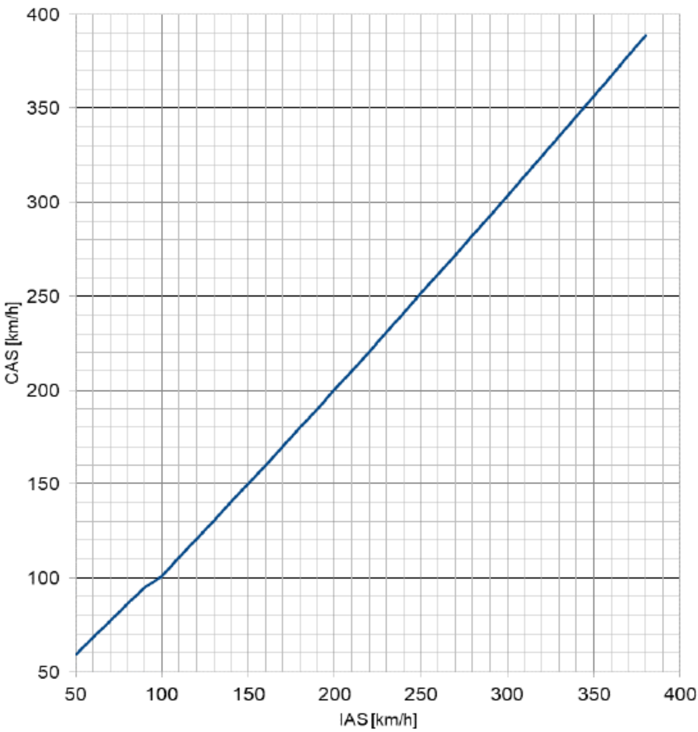
5.2 Airspeed indicator system calibration

Primary airspeed indicator – EFIS **km/h**

	Cruise FLAPS 0	Take-off FLAPS I	Landing FLAPS III
IAS [km/h]	CAS [km/h]		
50			59
60		64	68
70		74	77
80		84	86
90	92	93	95
100	101	103	104
110	111	112	113
120	121	122	121
130	130	131	130
140	140	141	139
150	150		
160	160		
170	170		
180	180		
190	190		
200	200		
210	210		
220	220		
230	231		
240	241		
250	251		
260	261		
270	272		
280	282		
290	293		
300	303		
310	314		
320	324		
330	335		
340	346		
350	356		
360	367		
370	378		
380	389		

NOTE

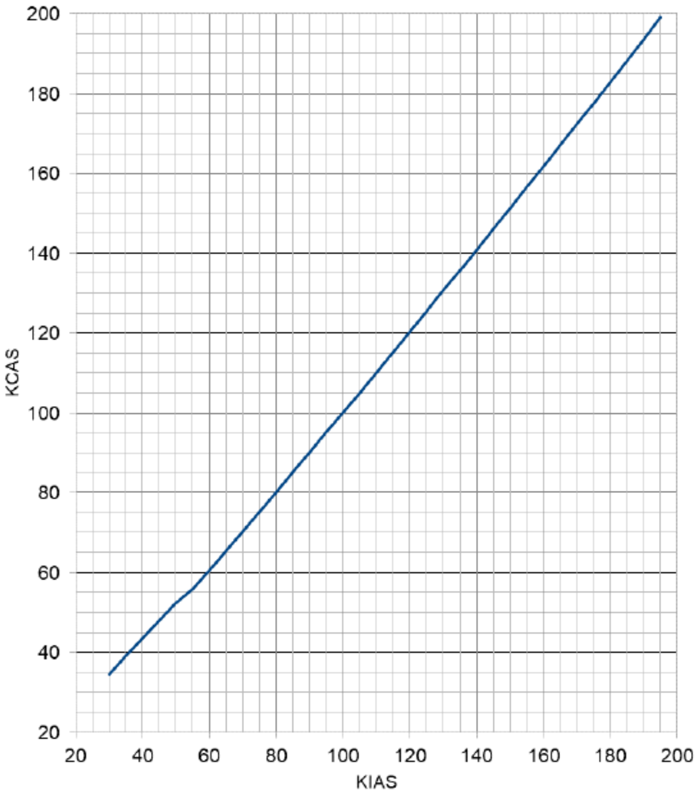
Changing from cruise to take-off or landing configuration does not affect the margin of error of airspeed indicator.



Primary airspeed indicator – EFIS

knots

	Cruise FLAPS 0	Take-off FLAPS I	Landing FLAPS III
KIAS	KCAS		
30			35
35		37	39
40		42	43
45		47	48
50	51	52	52
55	56	56	57
60	61	61	61
65	65	66	66
70	70	71	70
75	75	76	75
80	80		
85	85		
90	90		
95	95		
100	100		
105	105		
110	110		
115	115		
120	120		
125	125		
130	131		
135	136		
140	141		
145	146		
150	151		
155	157		
160	162		
165	167		
170	172		
175	178		
180	183		
185	188		
190	194		
195	199		
200	204		
205	210		
210	215		



	IAS km/h	CAS* km/h	
V_{S0}	**60**	68	Stall speed in landing configuration
V_{S}	**85**	87	Stall speed in clean configuration
V_{FO-III}	**100**	103	Recommended speed for flap extending III
V_{FO-II}	**110**	112	Recommended speed for flap extending II
V_{FO-I}	**120**	121	Recommended speed for flap extending I
V_{LO}	**130**	130	Maximum gear operating speed
V_{FE}	141	**140**	Maximum flap extended speed
V_{A}	185	**185**	Design Maneuvering speed
V_{LE}	**230**	231	Max. extended gear speed
V_{B}	268	**270**	Design cruise speed- max gust intensity loading
V_{RA}	**268**	270	Maximum turbulence penetration speed
V_{H}	297	**300**	Maximum speed in level flight at maximum continuous power - Woodcomp propellers
V_{NE}	**328**	333	Never exceed speed

* CAS speeds at H=0, ISA

	KIAS	KCAS*	
V_{S0}	**32**	37	Stall speed in landing configuration
V_S	**46**	47	Stall speed in clean configuration
V_{FO-III}	**54**	55	Recommended speed for flap extending III
V_{FO-II}	**59**	61	Recommended speed for flap extending II
V_{FO-I}	**65**	65	Recommended speed for flap extending I
V_{LO}	70	**70**	Maximum gear operating speed
V_{FE}	**76**	76	Maximum flap extended speed
V_A	100	**100**	Design Maneuvering speed
V_{LE}	**124**	125	Max. extended gear speed
V_B	145	**146**	Design cruise speed- max gust intensity loading
V_{RA}	**145**	146	Maximum turbulence penetration speed
V_H	**160**	162	Maximum speed in level flight at maximum continuous power - Woodcomp propellers
V_{NE}	177	**180**	Never exceed speed

*KCAS speeds at H=0, ISA

5.3 Stall speed

Config.	FLAPS Deflection	Indicated	Stall speed*			
			IAS km/h	CAS km/h	KIAS	KCAS
Clean	0°	0	85	87	46	47
Take-Off	20°	I	72	76	39	41
Short T-O	30°	II	68	73	37	37
Landing	38°	III	60	68	32	37

* Stall speeds applicable for Max. Take-Off Weight and Idle Power

5.4 Take-off distance, MTOW 600kg

5.4.1 With a flight adjustable prop Woodcomp SR 3000 2WN or KW20W

FLAPS position I (20°)	Take-off run	Total take-off distance to 50 ft
Grass surface	200 m	405 m
Paved surface (concrete / asphalt)	190 m	395 m

FLAPS position II (30°)	Take-off run	Total take-off distance to 50 ft
Grass surface	180 m	330 m
Paved surface (concrete / asphalt)	170 m	320 m

FLAPS position 0 (0°)	Take-off run	Total take-off distance to 50 ft
Grass surface	270 m	480 m
Paved surface (concrete / asphalt)	250 m	440 m

5.4.2 With a flight adjustable prop Neuform TXR2-V-70

FLAPS position I (20°)	Take-off run	Total take-off distance to 50 ft
Grass surface	260 m	430 m
Paved surface (concrete / asphalt)	250 m	410 m

FLAPS position II (30°)	Take-off run	Total take-off distance to 50 ft
Grass surface	235 m	410 m
Paved surface (concrete / asphalt)	225 m	385 m

FLAPS position 0 (0°)	Take-off run	Total take-off distance to 50 ft
Grass surface	350 m	540 m
Paved surface (concrete / asphalt)	330 m	510 m

5.5 Landing distance, MLW 600kg

Speed at 50ft

- 110 km/h IAS (59 KIAS) for FLAPS I, II, III
- 120 km/h IAS (65 KIAS) for FLAPS 0

Propeller fine pitch, idle power, landing gear down

FLAPS position III (38°)	Landing ground roll	Total landing distance from 50 ft
Grass surface	200 m	350 m
Paved surface (concrete / asphalt)	180 m	330 m

FLAPS position II (30°)	Landing ground roll	Total landing distance from 50 ft
Grass surface	240 m	380 m
Paved surface (concrete / asphalt)	220 m	360 m

FLAPS position I (20°)	Landing ground roll	Total landing distance from 50 ft
Grass surface	265 m	430 m
Paved surface (concrete / asphalt)	245 m	410 m

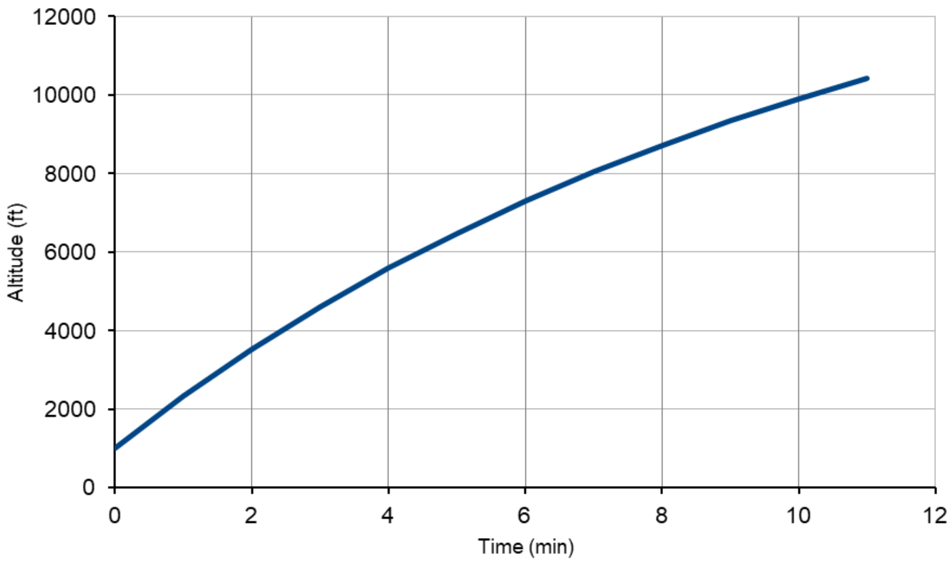
FLAPS 0 (0°)	Landing ground roll	Total landing distance from 50 ft
Grass surface	350 m	560 m
Paved surface (concrete / asphalt)	320 m	530 m

5.6 Best rate of climb, V_y

FLAPS 0, Clean configuration, 600kg, Max. continuous power

Altitude	Woodcomp SR 3000 2WN KW20W	Neuform TXR2-V-70	V_y Best rate of climb IAS	V_x Best angle of climb IAS
2000 ft	6.2 m/s	5.2 m/s	150 km/h	135 km/h
	1230 ft/min	1030 ft/min	81 KIAS	73 KIAS
5000 ft	4.8 m/s	3.9 m/s	150 km/h	125 km/h
	940 ft/min	770 ft/min	81 KIAS	67 KIAS
9000 ft	3.0 m/s	3.3 m/s	145 km/h	130 km/h
	595 ft/min	650 ft/min	78 KIAS	70 KIAS

Time to climb from 1000 ft, V_y, 600kg, Max. continuous power



5.7 Cruise, endurance, range

Conditions: MSL, ISA Units: **km, km/h, liters**

Rating		Long Range Cruise	Economic Cruise	Fast Cruise	Max. Cruise
Power			55%	75%	Max. continuous
	RPM	4000	4300	5000	5500
MAP	in.Hg	23	24	26	27
Fuel Flow	l/h	12,0	15,0	20,0	25,5
IAS	km/h	235	251	280	297
TAS	km/h	236	252	282	300
Fuel /100km	liters	5.1	6.0	7.1	8.5
Standard fuel tanks 100l					
Endurance*	hours	**7.4**	**5.9**	**4.4**	**3.5**
Range*	km	**1748**	**1493**	**1253**	**1046**
Optional fuel tanks 150l					
Endurance*	hours	**11.6**	**9.3**	**6.9**	**5.4**
Range*	km	**2731**	**2333**	**1958**	**1635**

* plus VFR reserve 30 min

Conditions: MSL, ISA   Units: **NM, knots, US gallons**

Rating		Long Range Cruise	Economic Cruise	Fast Cruise	Max. Cruise
Power			55%	75%	Max. continuous
	RPM	4000	4300	5000	5500
MAP	in.Hg	23	24	26	27
Fuel Flow	gal/h	3.2	4.0	5.3	6.7
KIAS	kts	127	135	151	160
KTAS	kts	127	136	152	162
MPG	NM/gal	40.2	34.3	28.8	24.1
Standard fuel tanks 26,4 US gal					
Endurance*	hours	**7.4**	**5.9**	**4.4**	**3.5**
Range*	NM	**943**	**806**	**676**	**565**
Optional fuel tanks 39,6 US gal					
Endurance*	hours	**11.6**	**9.3**	**6.9**	**5.4**
Range*	NM	**1474**	**1259**	**1057**	**882**

* plus VFR reserve 30 min

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6 Weight and Balance

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6.1 Introduction

To guarantee safety, good performance and predictable flight characteristics it is essential to operate the Shark 600 within the weight and balance envelope.

It is pilot's responsibility to ensure that weight and balance limitations are within limits before every flight. This chapter will explain the pilot the procedures of weighing the aircraft and provide awareness of the correct CG during Flight Operations.

6.2 Movable ballast weight

Shark 600 uses a movable ballast weight.

It is a 6 kg non-structural weight that is added to the aircraft and used to adjust the location of the CG to keep handling characteristics within limits.

The movable ballast is not counted into the Basic Empty Weight, but it must be always present on board during the flight operations, placed and secured in front or rear slot.

Actual position of movable ballast is indicated by:

- an LED on instrument panel
- a red flag visible under front position lid or in baggage compartment
- physical presence of the ballast block in the slot

CAUTION

It is the pilot's responsibility to check visually that the movable ballast is located in the correct position.

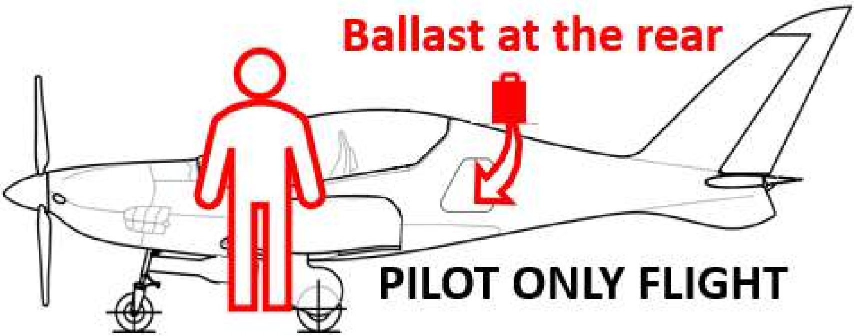
WARNING

INCORRECT POSITION OF MOVABLE BALLAST CAN LEAD TO CG OUT OF THE APPROVED RANGE AND CAUSE REDUCED STABILITY OR CONTROLABILITY OF THE ARICRAFT.

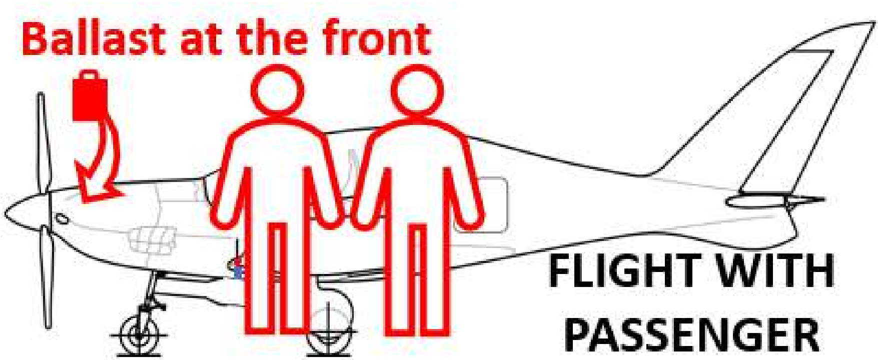
Following principles are used to set proper movable ballast location:

There are two positions where the movable weights can be placed;

- **PILOT ONLY FLIGHT (1 Occupant operations) - if only the pilot is on board, no passenger or heavier load is in the rear seat (less than 15 kg) – Movable ballast is placed in the rear position** - in the pocket located in the baggage compartment rear bulkhead, accessible through the baggage door.



- **FLIGHT WITH PASSENGER in the rear seat (2 Occupant operations), or any load heavier than 25 kg placed on the rear seat** - **movable ballast is placed in the front position** - in the pocket on engine cowling, accessible through the lid.



Red flag visible when the lid is closed indicates that the movable ballast is located in the front position.

CAUTION

The movable ballast must be secured by the pin in both front and rear positions.

6.3 Aircraft weight and balance data

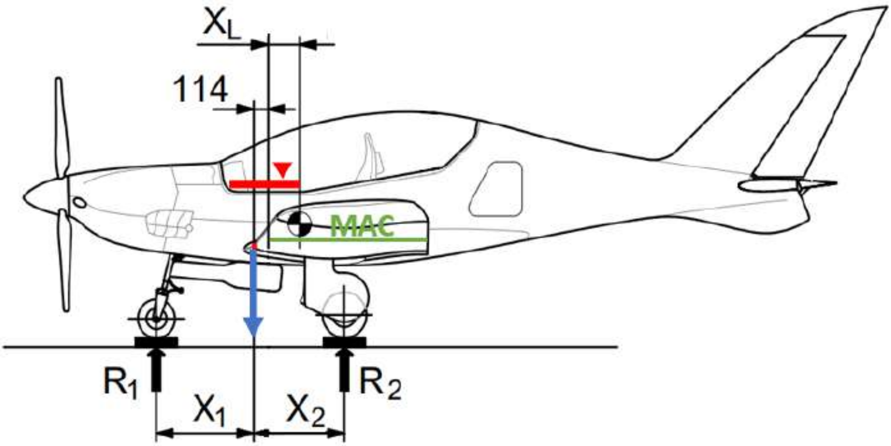
The empty weight of each plane is calculated and recorded in this weighing record, which is integral part of this airplane documentation:

SHARK600	S/N			
Date	Empty weight** EW [kg]	Center of gravity		Recorded by
		X_L , [mm]	X_T [%]	
*				

* Actual weight information shall be entered here before the first flight. Other lines shall be used when any change is made on the airplane configuration.

** Empty weight EXCLUDING the movable ballast

6.4 Weighing procedure



The airplane is weighed standing on main wheels – all tyres must have the correct size and pressure. All operating fluids must be filled to the normal volume with only useable fuel remaining. Movable ballast must be removed during this weighing procedure.

Place a levelling tool on the front part of the canopy frame.

Add thin sheets of plywood between front tyre and scale to level the airplane horizontally, to zero degrees on levelling tool on the canopy frame.

The reference plane (datum) is defined on the leading edge of the wing, where wing and fuselage connect.

Lower a plumb-line from this point and mark the floor to obtain the reference line.

The following values have to be measured:

Front Wheel reaction	R_1 =		kg
Main Left Wheel reaction	R_{2L} =		kg
Main Right Wheel reaction	R_{2R} =		kg
Distance between Front Landing Gear and ref. line	X_1 =		mm
Distance between Main Landing Gear and ref. line	X_2 =		mm

To find the Airplane Empty Weight (M_L);

$\mathbf{M_L = R_{2L} + R_{2R} + R_1}$

To find the Centre of Gravity (CG) **position to MAC**:

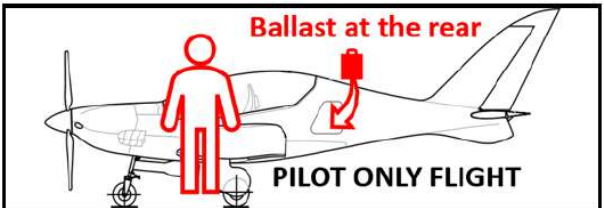
$$X_L = \frac{(R_{2L} + R_{2R}) * X_2 - R_1 * X_1}{M_L} - 114 = \qquad [\text{ mm }]$$

Centre of gravity position XT **to MAC in %:**

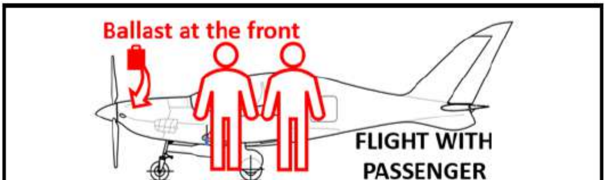
$$X_{L\%} = \frac{X_L * 100\ \%}{b_{MAC}} = \frac{\quad * 100\ \%}{1237} = \qquad [\%MAC]$$

6.5 Limit useful load combinations

Following table can be used as a simple load plan check. Useful load within the ranges of single table line secures that the resultant CG is within the limits approved for safe operation. Pilot is responsible for ensuring, that the MTOW of 600 kg is not exceeded.



Front seat kgs		Rear seat kgs		Baggage kgs		Fuel litres	
Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
55	110	0	15	0	25	0	150**



Front seat kgs		Rear seat kgs		Baggage kgs		Fuel litres	
Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
55	90*	95	110*	0	0	0	25
55	105	25	95	0	0	0	100**
55	110	25	85	0	5	0	100**
55	110	25	75	0	10	0	100**
55	110	25	70	0	15	0	100**

* Sum of weights on front and rear seat is 200 kg maximally.

** Maximum amount of fuel is limited by MTOW = 600 kg.

***Use only one row** on placard to read allowed combination of usefull load limits.*

Example 1:

Pilot - 95 kg,
Passenger - 84 kg
– select table FLIGHT WITH PASSENGER-
The ballast must be placed in the front.
A maximum of 5 kg of luggage may be placed in the luggage compartment.

Example 2:

Pilot - 100 kg
Baggage – 15 kg
Passenger maximum weight is then limited to 70 kg

6.6 Center of gravity determination

It is the pilot's responsibility to load the aircraft correctly within the weight and balance limitations.

6.6.1 Weight & balance application

The QR code shown below or in the cockpit will direct you to the application at https://app.shark.aero

CG calculation

SHARK600 S/N

Empty weight kg

Empty CG %

1. Select proper certification basis of your aircraft
2. Fill manually the Empty weight and Empty CG fields (without movable ballast)
3. Use sliders to fill intended aircraft loading
4. Note any CAUTION messages that pop-up if not-allowed combinations of loads are used
5. Ensure that the weight and CG is inside the envelope from take-off weight up to zero fuel weight
6. Keep in mind, that the app is only a supporting tool, and it is still the pilot's responsibility to check the CG by primary Weight & Balance charts

NOTE

FLIGHT WITH PASSENGER: In specific weight combinations where the center of gravity is calculated using the application, it is permissible to load the baggage compartment with more than the 15kg limit mentioned on the placard.

6.6.2 Weight & balance charts

On the next pages you will find two charts to determine the aircraft center of gravity and different weights during flight (take-off weight up to zero fuel weight).

Procedure in steps:

1. Choose the correct chart

for a **PILOT ONLY FLIGHT** (1 OCCUPANT) - with maximum of 15 kg of baggage in the rear seat and a normal loading in the baggage compartment.

or;

for a **FLIGHT WITH PASSENGER** (2 OCCUPANTS) - use this table when you have more than 25 kg in/on the rear seat.

2. Draw vertical "weight-lines"

for weights loaded in each respective compartment;
Front Seat, Rear Seat, Baggage Compartment and Fuel
(beware that the front seat compartment starts at 55kg; the minimum pilot weight)

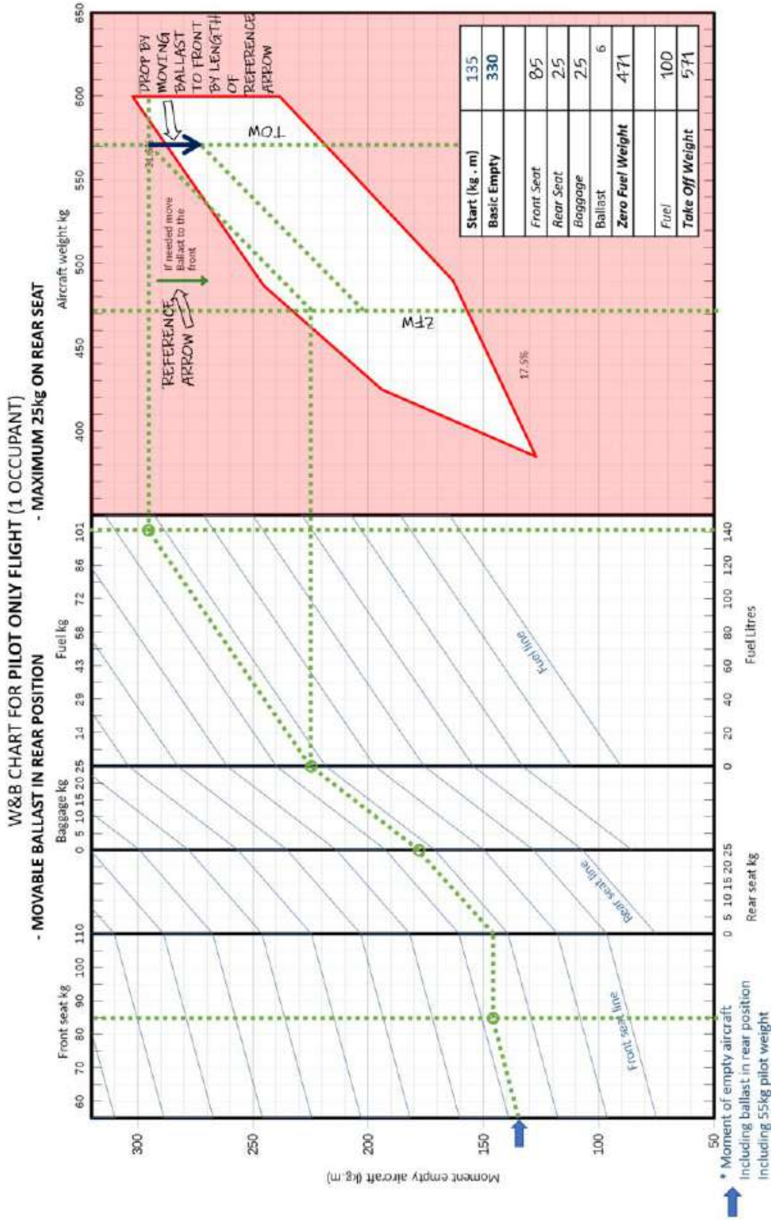
Fill in weights into the side table, calculate and draw zero-fuel-weight and take-off-weight lines (it must be always less than or equal to 600kg).

3. Start your next line at "Moment Empty Aircraft" at the left side of the table. Check that the Moment Empty Aircraft is correct for the airplane you are going to fly

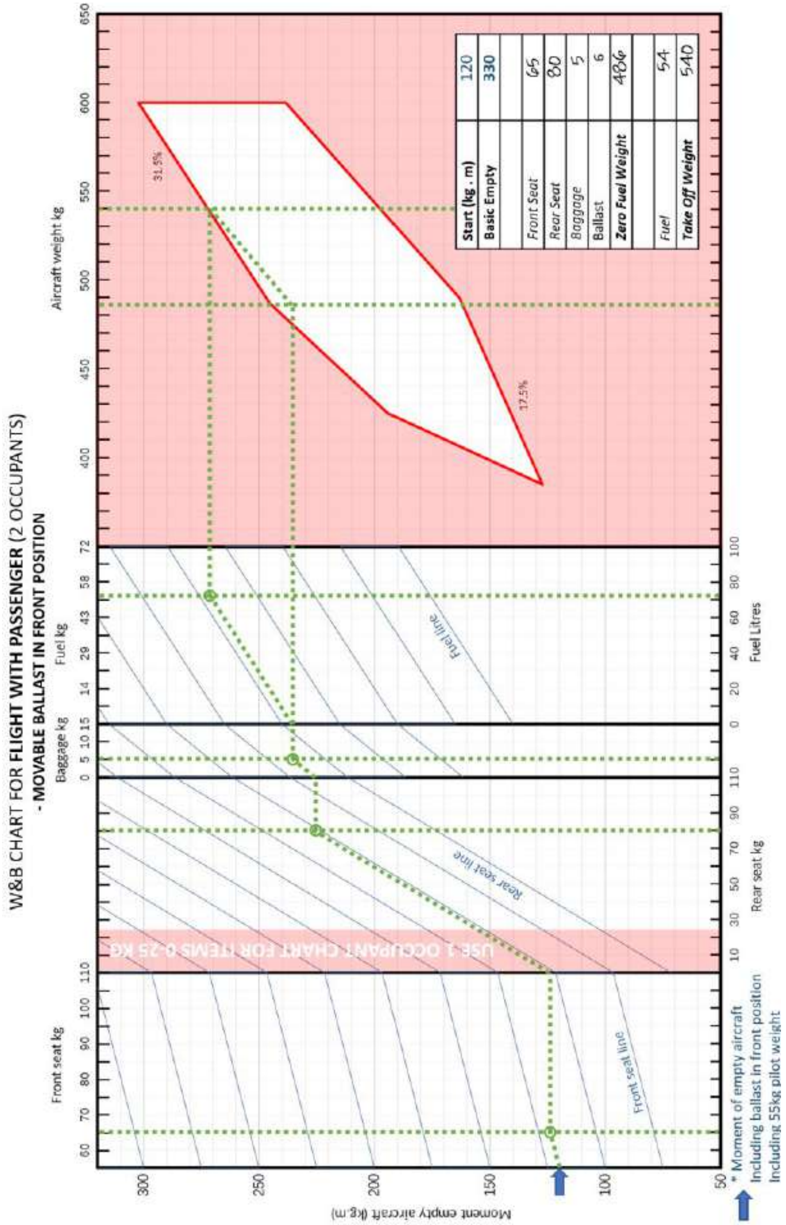
4. Follow slope of the Blue Lines until you intercept the vertical weight-line you draw earlier in that compartment. From this point you continue horizontally to the right until you meet the next compartment. If there is no weight in the next compartment, proceed horizontally to the next compartment
5. When you reach the fuel compartment; first proceed horizontally until you intercept the vertical zero-fuel-weight line. This intersection gives you the CG position at the aircraft's zero-fuel-weight
6. Then again enter the Fuel-compartment and follow the blue lines until you intercept the vertical fuel weight-line. Then continue horizontally to intercept with the vertical take-off-weight line. This interception gives you the CG position at the take-off weight of the aircraft
7. Note; when flying solo, the take-off-CG could be too far rearward (too far to the top in the table) for baggage 25kg and rear seat load above 15kg. Only then it is allowed to move the ballast weight from the rear to the front position. Then the Take- off CG point moves down by the length of the green "reference" arrow
8. Check if both ZFW CG and TOW CG are within limits given by CG envelope highlighted on CG charts

Front center of gravity limit	17.5 % MAC
Rear center of gravity limit	31.5 % MAC

Example chart: **PILOT ONLY FLIGHT** (1 OCCUPANT)



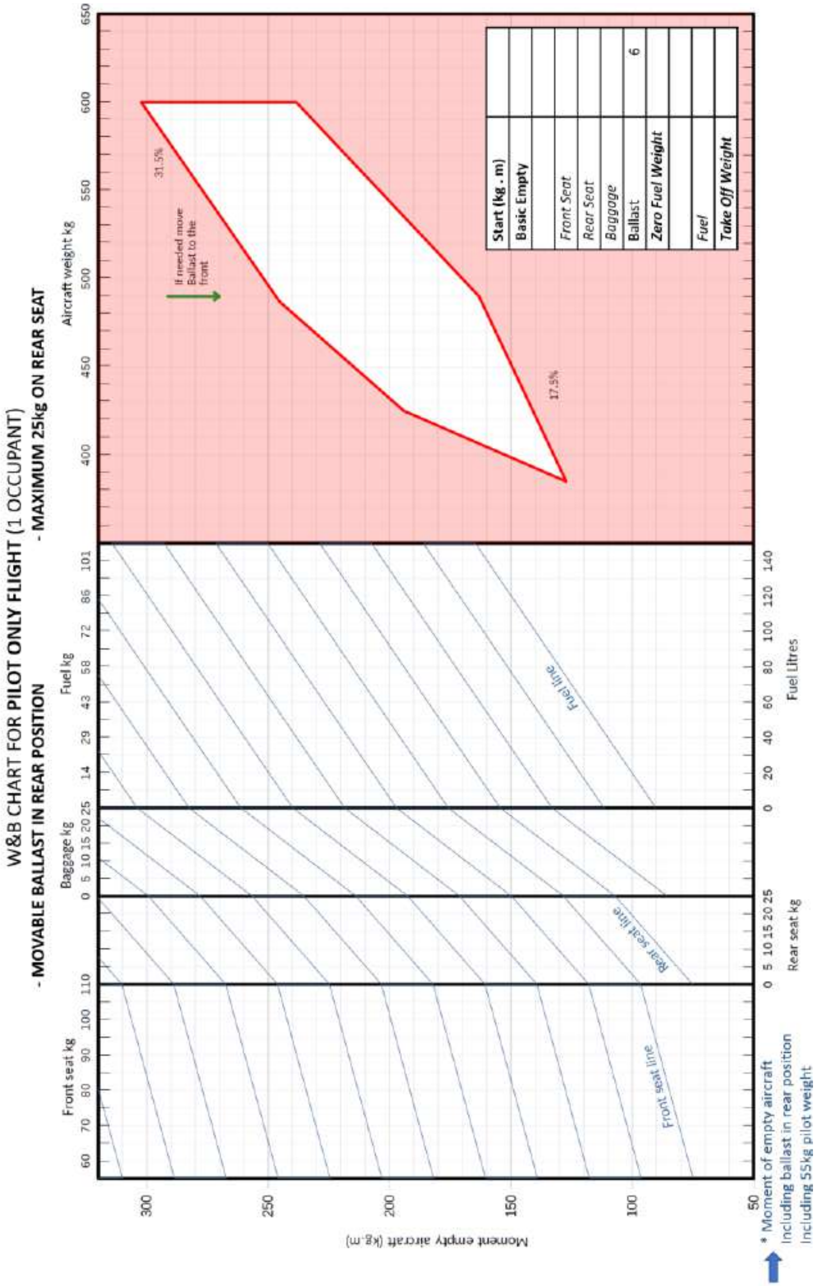
Example chart: **FLIGHT WITH PASSENGER** (2 OCCUPANTS)



6.7 Weight & balance charts

Use charts on following sheet to determine CG position before the flight.

INTENTIONALY EMPTY SPACE


W&B CHART FOR PILOT ONLY FLIGHT (1 OCCUPANT)
- MOVABLE BALLAST IN REAR POSITION
- MAXIMUM 25kg ON REAR SEAT
Aircraft weight kg
400
450
500
550
600
650
31.5%
17.5%
If needed move Ballast to the front
Start (kg . m)
Basic Empty
Front Seat
Rear Seat
Baggage
Ballast
9
Zero Fuel Weight
Fuel
Take Off Weight
Fuel kg
14
29
43
58
72
86
101
Fuel line
Fuel Litres
0
20
40
60
80
100
120
140
Baggage kg
0 5 10 15 20 25
Rear seat line
Rear seat kg
0 5 10 15 20 25
Front seat kg
60
70
80
90
100
110
Front seat line
Moment empty aircraft (kg.m)
50
100
150
200
250
300
* Moment of empty aircraft
Including ballast in rear position
Including 55kg pilot weight

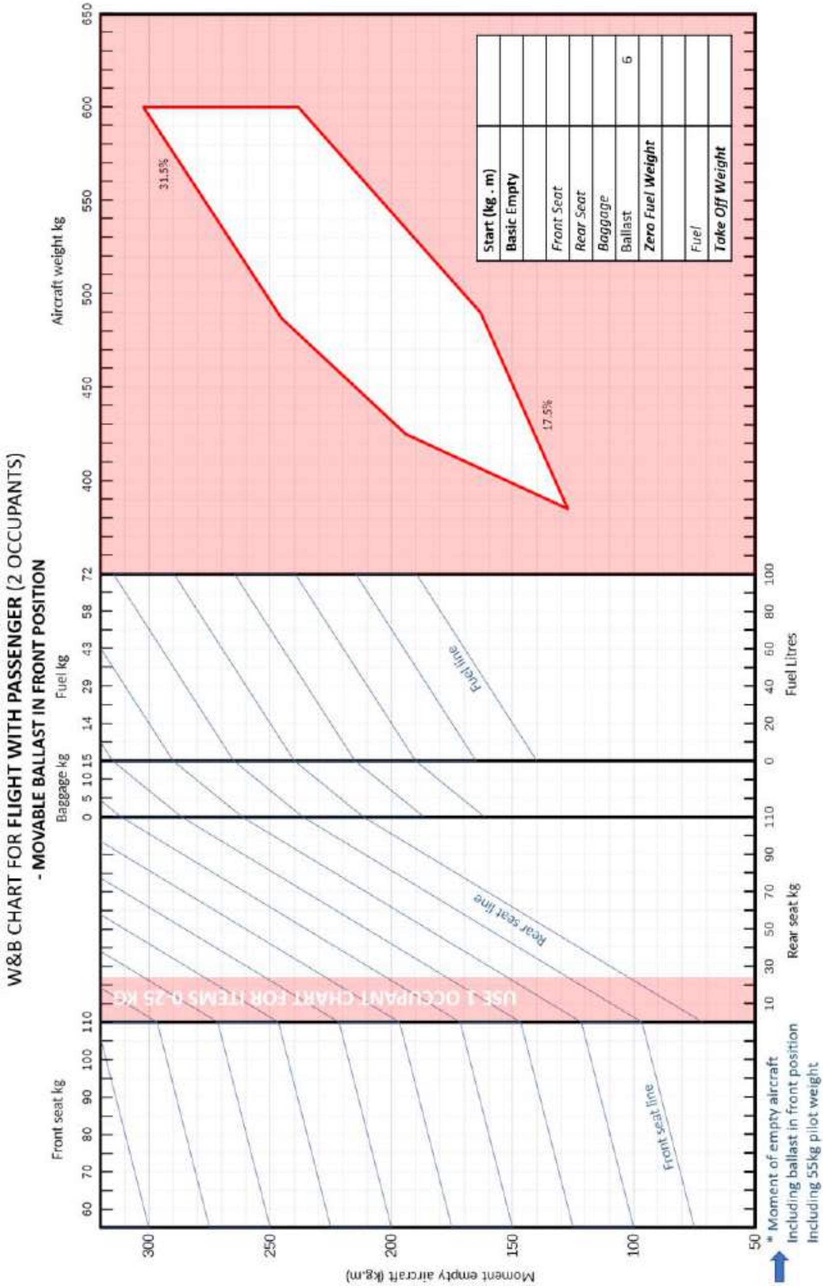

W&B CHART FOR FLIGHT WITH PASSENGER (2 OCCUPANTS)
- MOVABLE BALLAST IN FRONT POSITION
Aircraft weight kg
400
450
500
550
600
650
31.5%
17.5%
Start (kg . m)
Basic Empty
Front Seat
Rear Seat
Baggage
Ballast
6
Zero Fuel Weight
Fuel
Take Off Weight
Fuel kg
14
29
43
58
72
Fuel line
Fuel Litres
0
20
40
60
80
100
Baggage kg
0 5 10 15
Rear seat line
Rear seat kg
10
30
50
70
90
110
USE 1 OCCUPANT CHART FOR ITEMS 0-25 KG
Front seat kg
60
70
80
90
100
110
Front seat line
Moment empty aircraft (kg.m)
50
100
150
200
250
300
* Moment of empty aircraft
Including ballast in front position
Including 55kg pilot weight

TABLE OF CONTENTS

7 Airplane Description

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7.1 Introduction

Shark 600 is a composite high-performance low-wing airplane with tandem seats and retractable tricycle type landing gear, designed according to European UL and US Light Sport Airplane criteria.

The airplane is powered by 100HP Rotax 912ULS with a variable-pitch propeller and 100 litres integral fuel tanks in the wings with an option for 150 litres integral tanks.

Equipment

Shark 600 is designed as two-seat tandem cockpit aircraft with upholstered adjustable seats, full dual control (with side sticks on the right) and throttle and propeller levers on the left panels.

Integrated in the side-sticks are buttons for: elevator trim tab, radio and autopilot.

Front instrument panel

Front EFIS/EMS is a standard display for Pilot, with integrated flight data, engine data, and map/GPS = navigation data. The pilot station is as well equipped with control panels for landing gears, flaps, transceiver, movable ballast, optionally electric propeller, ELT, autopilot, CO detector and backup flight instruments.

Rear instrument panel

Rear instrument panel is an integral part of canopy frame. Optionally, it can contain EFIS/EMS display, transceiver, flaps and landing gear control panels.

Canopy

The single-piece canopy opens towards starboard (to the right hand side) and is supported by gas struts for easy opening and closing.

Baggage compartment

A baggage compartment is located behind the rear seat, accessible from the rear pilot seat or through a lockable baggage door on the left side of the plane.

7.2 Airframe

Carbon composite airframe

The airframe is primarily made of carbon-epoxy composite with small amount of glass and aramid fibres, with PVC foam and aramid honeycomb core in sandwich panels. Composite wing with carbon main spar and an auxiliary spar carrying ailerons hinges and flaps have a 60% of trailing edge employed as Fowler flap . Wings and stabilizer are dismountable.

Fuselage

The self-supporting monocoque fuselage with integral fin is made as one piece with integral interior, armrests, and floors. Interior shell has aramid-carbon layer for better passive safety and it is integrated into the middle part of the fuselage with added ribs. It creates integral ergonomic cabin structure for two crew members sitting in tandem configuration. The luggage space is located behind the rear seat, accessible from inside, or from left side of the fuselage. Part of central fuselage creates a 1,73m long center-wing, used for main undercarriage retraction.

The fuselage airframe includes firewall with four engine mounting stations, Ballistic Recovery System and front landing gear mounting points, main landing gear and cockpit mounting points, 2+1 hinges of horizontal stabilizer, 2 rudder mounts at the hear, together with a bottom fin, optionally with integrated structure for a glider towing mechanism.

Canopy

A one-piece cockpit canopy consists of a carbon fibre frame with a Plexiglas windscreen. The canopy is supported by gas strut and hinged on the right side (starboard) by two hinges. The canopy is locked from inside by a single point lock system, accessible by both pilots.

Engine cowling

The cngine cowling is fixed to the fuselage by cam-locs. The lower cowling has large NACA air intake, with adjustable flap, for cooling the water and oil radiators. An adjustable flap is used during low speeds and taxiing. The top cowling has a small air intakes for direct cylinder cooling on both sides of the spinner. Air from engine compartment is exhausted through gills placed on the sides. Top cowling has a door for the oil check, which can also serve as an air exhaust hole on hot environments by leaving it open in flight.

A slot for movable ballast is positioned on the top cowling.

Wing

The Shark 600 has a composite wing with trapezoidal root, and elliptically shaped tip. Wing planform and airfoil is optimized for fast cross-country flights.

The wing structure consists of a carbon-fibre/epoxy monocoque, with a PVC foam sandwich. The Carbon-fibre main spar is placed at 25% of the chord and the rear spar carries the flap levers and aileron hinges. 60% of the trailing edge is equipped by very efficient single-slotted flaps.

There is an integral fuel tank in each wing (optionally 50 or 75 litres) positioned between the main and rear spar. Fuel gauges, fuel lines (feed and return line) are installed in the structure. Drain valves are positioned on the lowest point. Fuel tank ventilation lines are integrated in the most outbound flap hinges.

The wing is optionally equipped by integral position lights at the leading edge of wing tips. The wings can be dismounted for transport or storage by removing two main pins and one rear wing pin, dismounting flaps drive, ailerons control, fuel hoses and electrical connectors.

Ailerons

The 40% differential ailerons with carbon monocoque structure are hinged on three carbon hinges attached to the top wing shell. A push-pull tubes and bellcrank are used for control.

Aerodynamic forces are relieved by automatic trim tabs.

Flaps

Fowler flaps with monocoque sandwich design are hinged on three lever-hinges and driven by root-rib lever. The flap system is driven by an electric motor and 4 positions are pre-programmed:

- **FLAPS 0** **0°** flaps up
- **FLAPS I** **20°** take-off
- **FLAPS II** **30°** short take off/ landing
- **FLAPS III** **38°** landing

Horizontal stabilizer

The stabilizer has carbon monocoque sandwich design with continual rear spar and auxiliary front spar. Hinges for the elevator are attached on the top shell. The stabilizer is attached to fuselage by two hinges on the rear fin frame and by one on the rear fuselage bracket.

Elevator

The split monocoque elevator is attached to the stabilizer by 3 hinges. The left part is equipped with an electric trim-tab controlled by a three position centrally-sprung switch on the side-stick.

Rudder

The carbon monocoque rudder is hinged by two hinges and controlled through steel wires by a lever placed below the root rib.

Airplane exterior surface painting;

White two-component acrylic polyurethane topcoat is used.

7.3 Landing gear

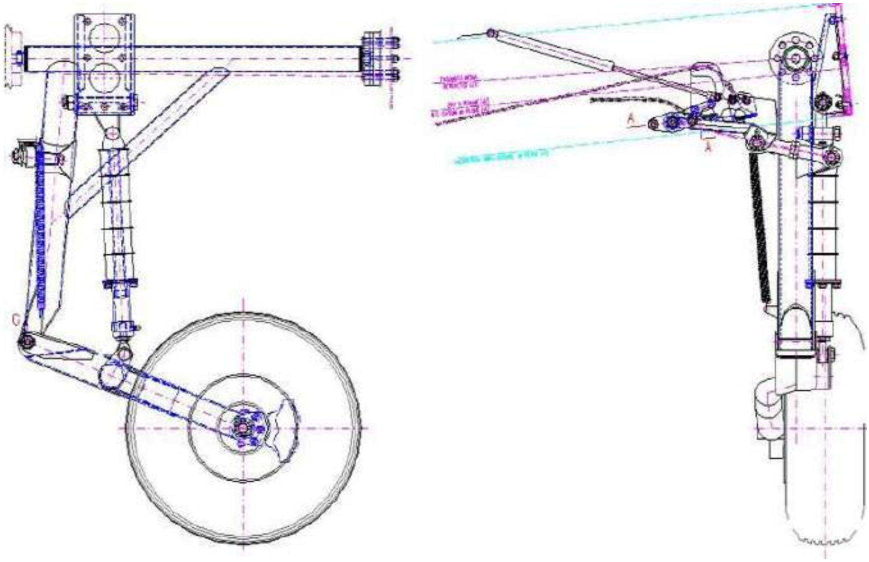
A retractable tricycle type landing gear is used, equipped by steerable 11x4" nose wheel and a 14x4” Beringer main wheel with hydraulic disc brakes.

The front undercarriage is retracted backwards into a wheel-well behind the firewall. The main landing gear is retracted into the center-wing.

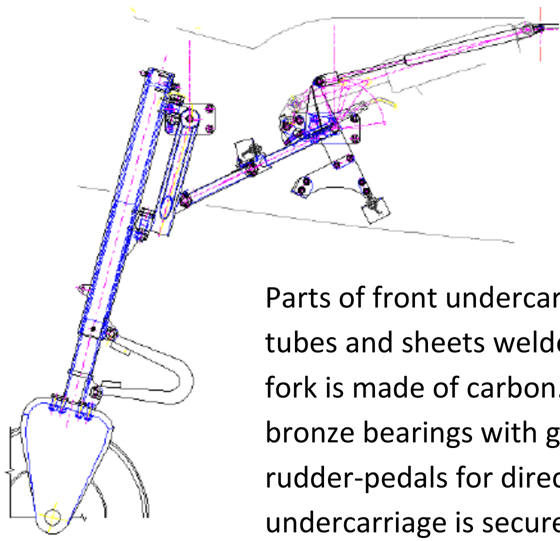
Main landing gear

The legs of main landing gear are composed of steel tubes and sheets welded together. The main steel parts are hardened. The legs are hinged on two brackets with ball bearings between center-wing spars. The legs are retracted to fuselage bays.

The main undercarriage hinge joints are equipped with bronze bearings with grease-caps. Shock absorbers are attached to the root ribs. The trailing arm is twisted towards the main leg on retraction, resulting in reduced center-wing span.



Front landing gear



Parts of front undercarriage are composed of steel tubes and sheets welded together. The front wheel fork is made of carbon. The front gear leg has bronze bearings with grease-caps. It is connected to rudder-pedals for directional control. The undercarriage is secured in the down position by lock-struts and held in locked position by two gas springs. The damping is controlled by a U shaped composite spring.

Assembly

The shock absorbers are assembled from five elastomer polyurethane blocks, which are hinged between lever and root rib of center-wing by gimbals.

The legs are secured in extended position by folding struts and each one held in locked position by gas strut and steel spring.

The main wheels are made by Beringer with Aero Classic (or Mitas, Sava) tires. Hydraulic disc brakes are controlled by toe-sections on the front rudder pedals.

Landing gear retraction and extending

Main landing gear extension and retraction

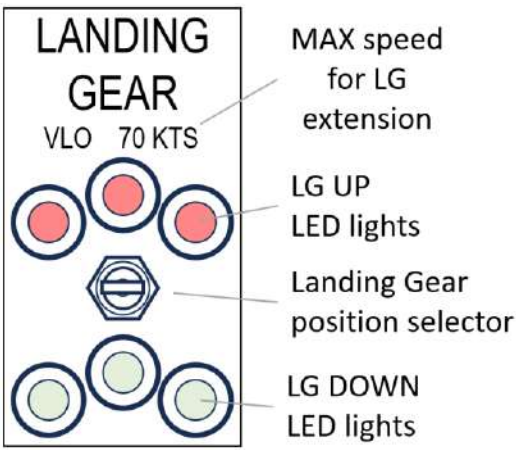
At retraction, a 2,5 mm steel cable routed through pulleys is pulled by a LINAK LA30 electromechanical strut mounted on the rear cockpit floor. Retraction takes approximately 15 seconds.

Gears are opened by weight and force from gas and steel springs, the electric strut controls the speed with extension taking approximately 10 seconds.

Locking

Landing gear legs are secured in the retracted position by self-locking electromechanical struts, in the down position by gas struts and springs. Strut movement is stopped by proximity inductive sensors when the required position is reached. In case of failure of these sensors, the strut actuation is stopped by its integrated end switches.

Landing gear control panel



Landing gear function and indication

When the landing gear module is activated, and all legs are at their fully extended end switches, the red and green LEDs on the control panel flash slowly four times (1Hz).

The landing gear electrical circuit is connected to the pitot-static circuit via a pressure sensor. The pressure sensor is adjusted to activate at speeds of 100 km/h (55 KIAS) or slower. When activated the control system prevents the retraction of the gear below 100 km/h (55 KIAS), thereby preventing the unintentional retraction of the landing gear whilst the aircraft is on the ground.

When “LG UP” is selected the landing gear will retract if the speed is greater than 100 km/h (55 KIAS). The red LEDs will flash slowly at 1Hz until the gear legs are up and locked in the retracted position. If the landing gear fails to reach the end switch within 25 seconds the red LEDs will flash rapidly at 3.3Hz.

At the end of the gear retraction cycle, and when all end switches have been reached, the RED LEDs will remain on (solid) for 10 seconds and then turn off. The landing gear control system module functionality can be checked in flight by selecting “LG UP”, the red LEDs will flash 3 times slowly at 1Hz and then turn off.

When “LG DOWN” is selected the landing gear will deploy at airspeeds up to V_{LO}, 130 km/h (70 KIAS). During gear extension the green LEDs will flash slowly at 1Hz until the gear is down and locked, when down and locked the green LEDs will remain lit. If the gear does not fully deploy and actuate the end switches after 25 seconds, the green LEDs will flash rapidly at 3.3Hz.

The aural warning “CHECK GEARS” activates when the speed is below 120 km/h (65 KIAS) and the landing gear is not extended.

Emergency landing gear extension

Three mechanical locks placed on locking struts are activated by three separate Bowden cables, connected to a T-handle accessible from the front pilot seat. Each leg has its own handle with the left and right leg handles each on the side wall of the cockpit just outboard of the knee position and the front leg handle position on the inner dividing wall below the instrument panel, just inboard of the right knee position.

If airspeed reduces to below 120 km/h (65 kts) and any of the undercarriage legs stay retracted or unlocked, an aural warning “CHECK GEARS” is given via the intercom system and a flashing LED is activated. When all three leg struts are down and locked, their status should be confirmed by visually inspecting their respective plat flags through the viewing windows on both top wing surfaces and in the forward foot well. The plate-flags, with yellow surfaces and black arrows are placed on each leg and locking strut and illuminated by LED lights.

With the gear in the the down and locked position, the arrows are tip-to-tip, indicating a safe and locked position of the landing gear. Visual inspection is always prioritized over the electrical signal and pilots should use it routinely after gear operation or if a malfunction in the electronic system is suspected.

Landing gear doors can be installed optionally on the gear legs. Doors on the main legs are composed of 2 parts. Larger doors are fixed to the main leg with 3 flexible joints. Smaller doors are fixed to the bigger ones with hinges. A steel spring pulls them into the correct position when closed. In addition, if doors are in the retracted position, they are locked with hooks and brackets to prevent them from being sucked out of the closed position at higher airspeeds. The proper closed position is indicated by a green LED visible in the gear inspection windows. When operating in mud, snow, or in wet and freezing conditions it is recommended to remove the doors and fly without them. If there are any doubts about the correct adjustment and function of the doors, operations shall cease, or the doors shall be removed, as malfunctions of the doors may pose a risk of causing malfunctions in the landing gear locking mechanism.

Extension, retraction and Indications of the landing gear

The Landing Gear is controlled by an electronic module placed behind the instrument panel on the BRS wall together with other electronic modules. Other components of the system are:

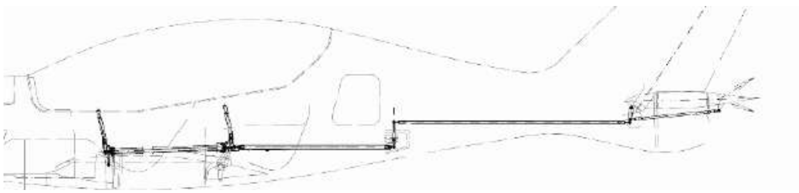
- relay switching voltage to the servo of the main landing gear
- control and display panel, on the instrument panel, associated with flaps control panel
- pressure sensor set to 120km/h (65 kts), providing signal to control unit
- warning horn
- contactless inductive position sensors, placed in the landing gear bays, providing information about landing gear status
- a second control and display panel can be optionally placed on the rear instrument panel

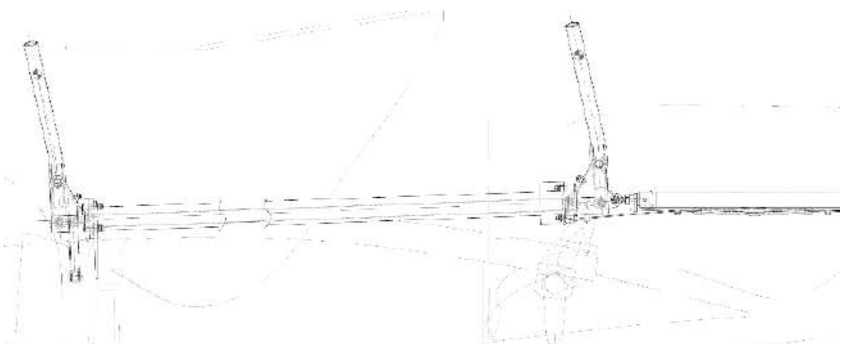
7.4 Flight control system

Both occupants have access to a side-stick positioned on their right armrest. Front rudder pedals are adjustable and equipped with toe-brakes. Flaps and landing gear are operated by switches on panel on pilot Instrument Panels, optionally on the rear panel. Trim switches, radio buttons and autopilot switches are located on the side-stick.

Elevator Control

The elevator is controlled by two sidesticks, hinged in a control column through a system of push-pull rods and levers connected directly to the two-piece elevator. The pushrod in the baggage compartment is connected by cable and spring system to the flap control system. This improve trimming on low speeds with flaps and and it reduces the need for trimming when flaps are extended.

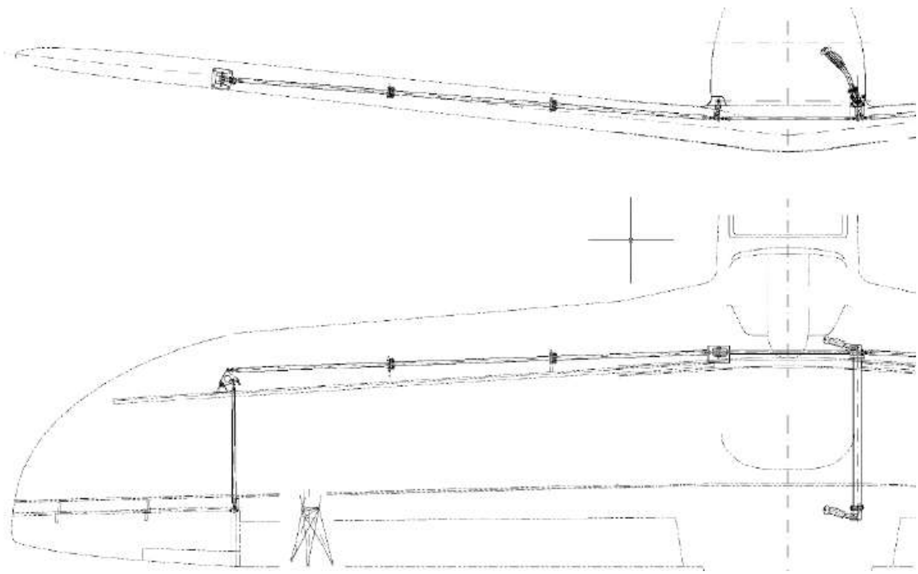




Aileron control

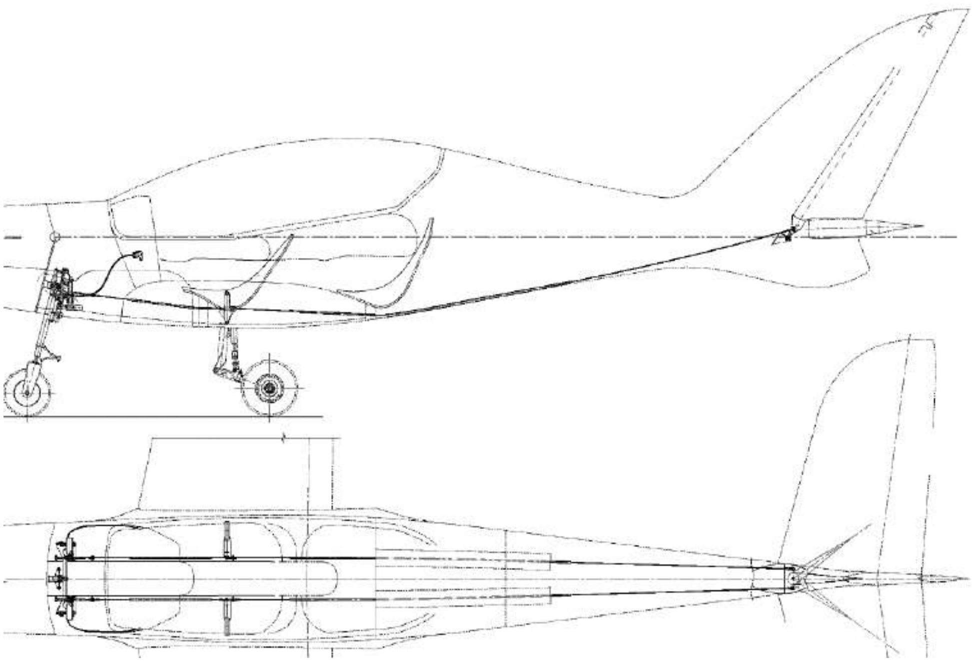
The ailerons are controlled by side movements of sidesticks hinged in control column, through system of rods and levers.

Automatic tabs attached on trailing edge of the ailerons deflect in opposite direction to the ailerons in order to reduce control force.



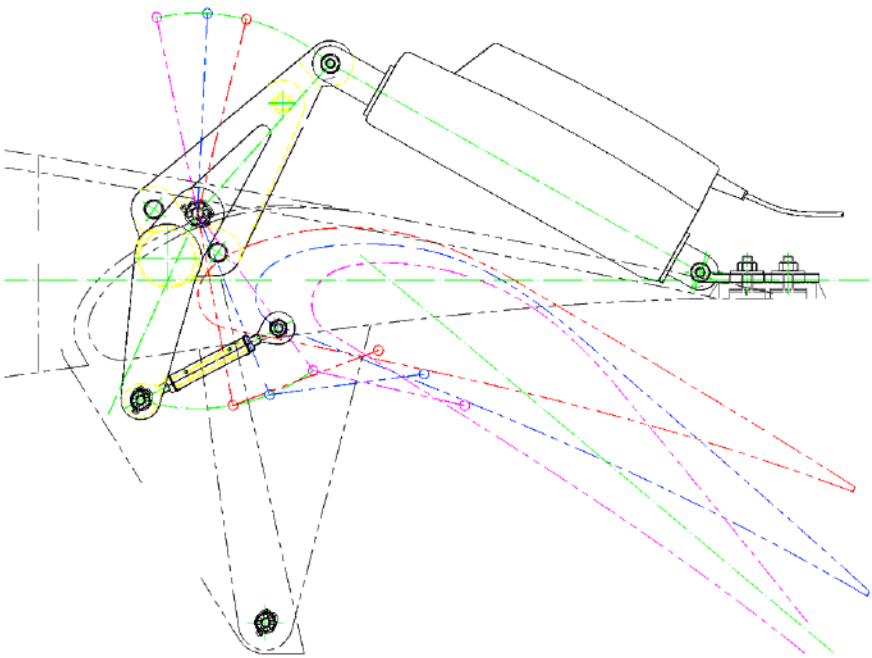
Rudder control

The rudder is controlled by two steel cables, connected to the rudder lever and front pedals. They also turn the front wheel when extended, and thus steer the airplane on the ground. Rear pedals are connected to the same system. The system steering the front wheel is automatically disconnected when the landing gear is retracted. The system is closed-loop, turnbuckles are behind the pedals, adjusted to 300N force.

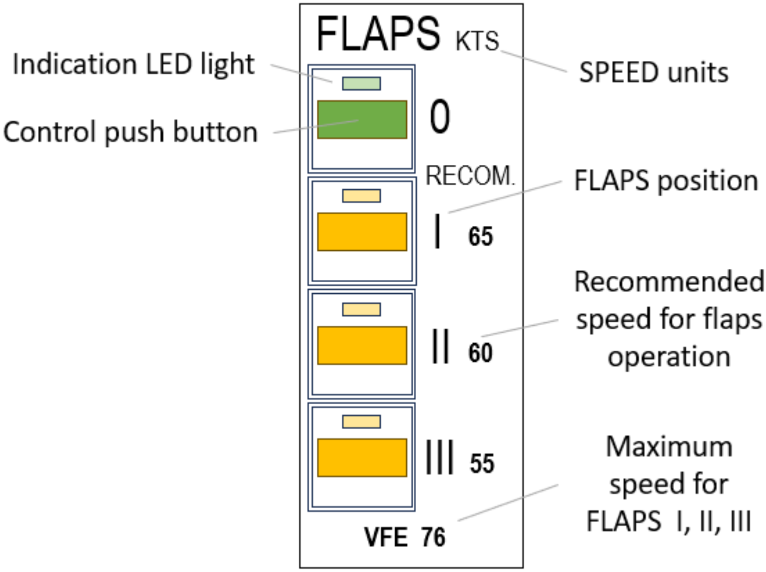


Flaps

The flaps are controlled by a LINAK LA12 electric actuator placed under the left armrest of the rear seat. A short rod at the root rib controls the flaps through the torsion tube with the lever placed on the first flap hinge. The system is controlled by an Arduino electronic module which has a control and indication panel on the front instrument panel. As an option, an additional panel can be placed on the rear instrument panel.



Flaps control panel



Flaps system start up

When the Flaps Module is turned on, the FLAPS 0 LED button will flash rapidly at 5hz, and the LED of the last known flaps position will illuminate. The FLAPS0 LED will continue to flash until it is pressed, the flaps will then retract to the FLAPS 0 position and the FLAPS 0 LED will illuminate.

Flaps functions and indication

When any of the FLAPS position control buttons are pressed, the corresponding LED will flash until the flaps reach the selected position. While in transit the LED corresponding to the current position of the flaps will remain illuminated. If front and rear control systems are installed, the latest command takes precedence.

The flaps deployment system is linked to the pitot-static system to prevent flaps deployment at speeds exceeding V_{FE} 141 km/h (76 KIAS). At speeds higher than 130 km/h (70 KIAS), the pilot is notified by the flashing of the FLAPS 0 LED about the approaching the flaps limit V_{FE}.

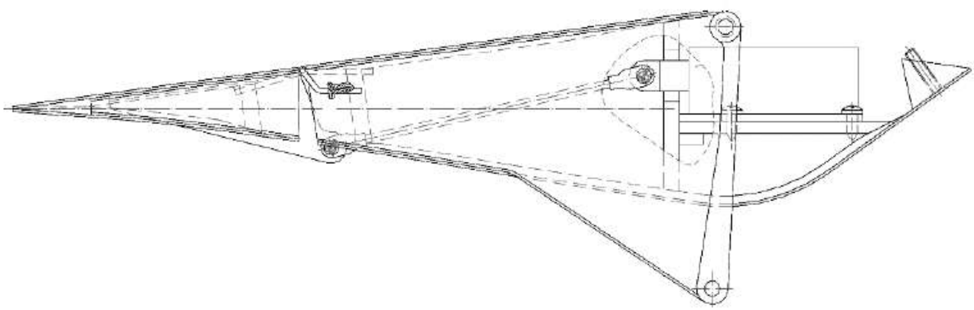
Flaps emergency control

If an error is detected during the flaps extension or retraction, the system switches to emergency mode. FLAPS 0 and I will illuminate. In this mode, the FLAPS 0 button is used for manual retraction, and the FLAPS I button for extension. The flaps only move while the respective button is pressed.

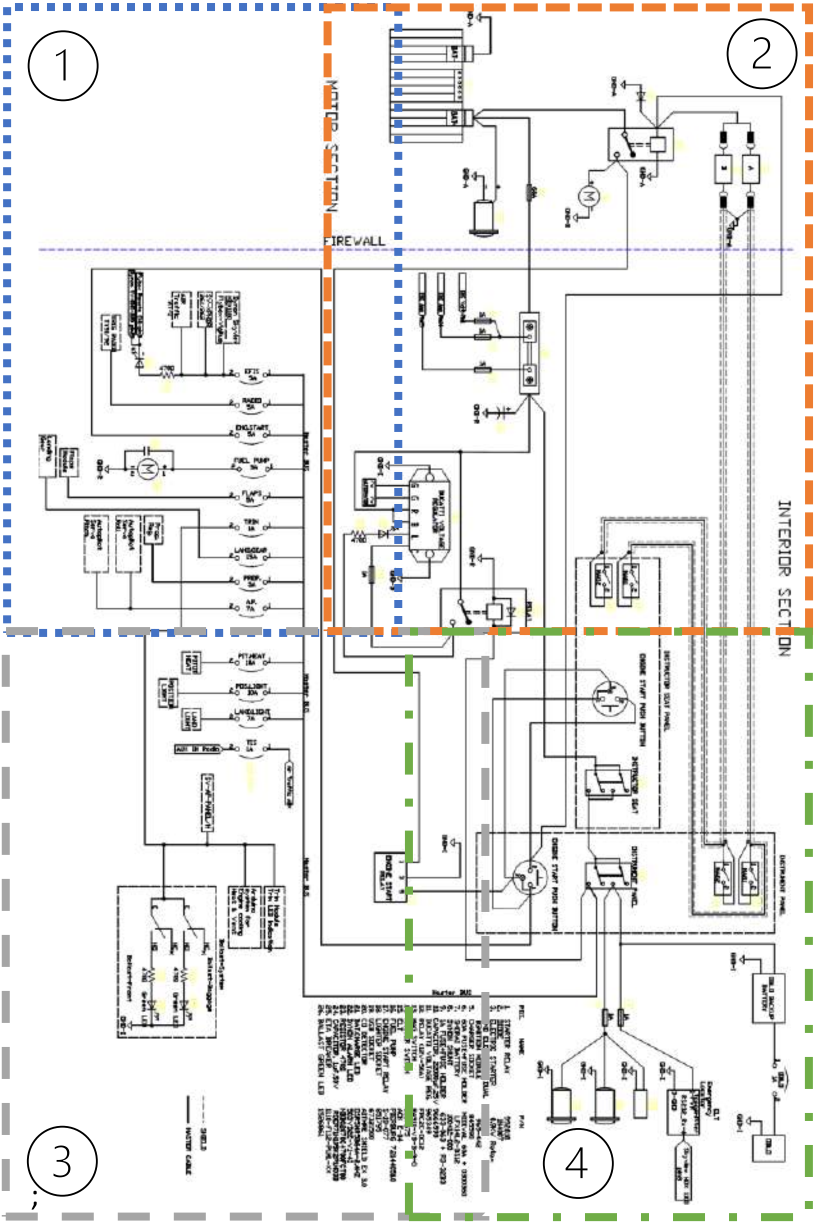
Elevator trim tab control

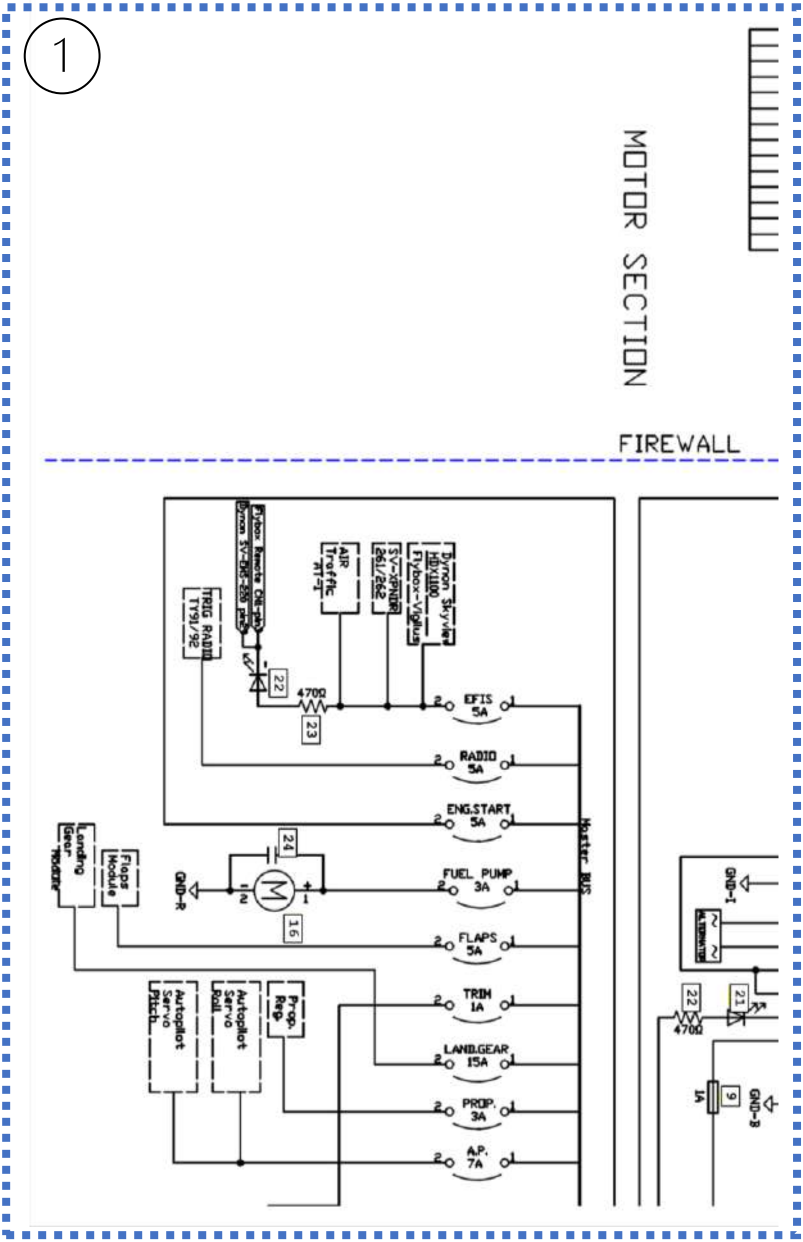
The Trim Tab of the Elevator is controlled by a Ray Allen servo.

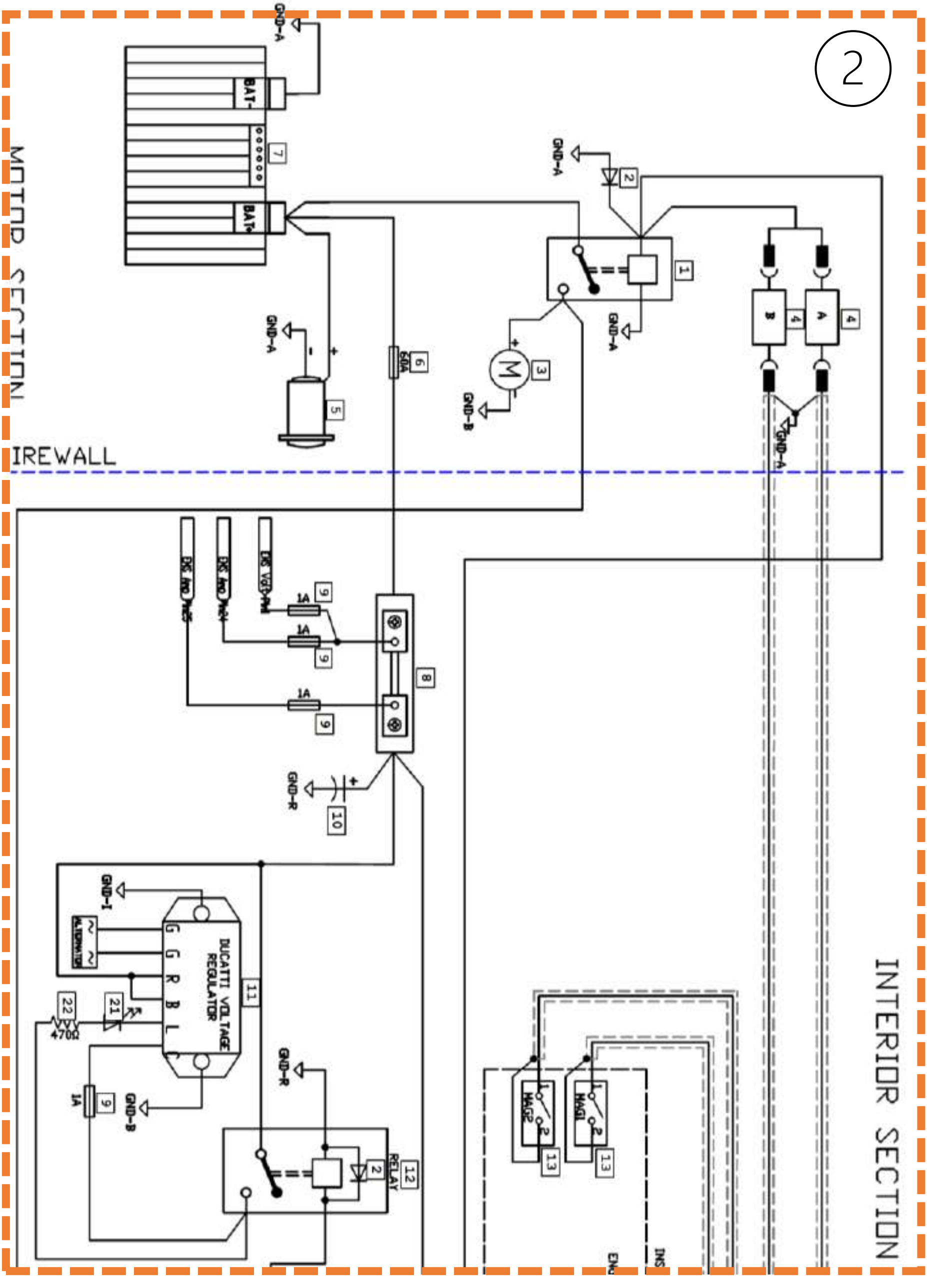
It is controlled by three position, center-sprung switches on the Side-Sticks.

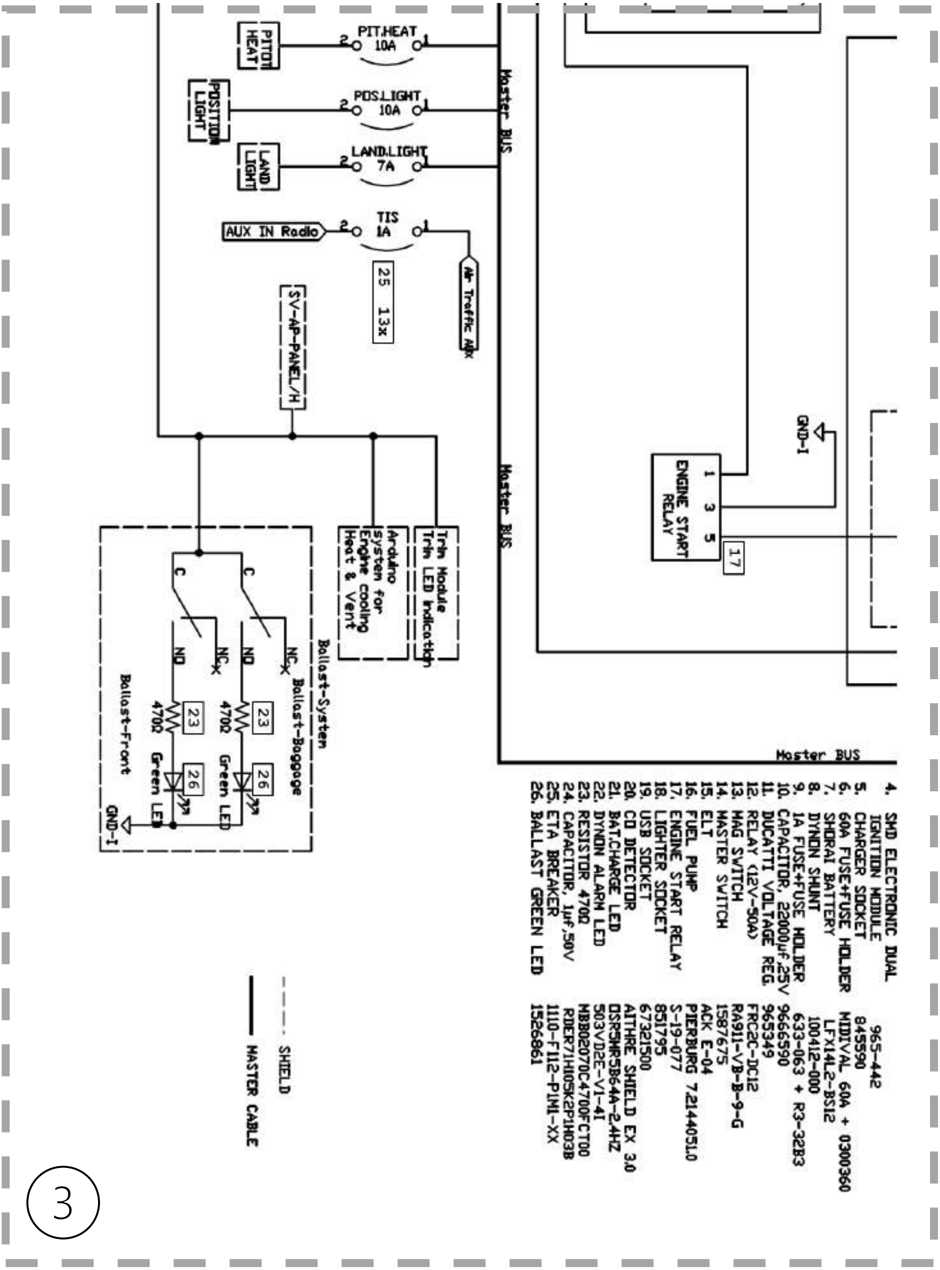


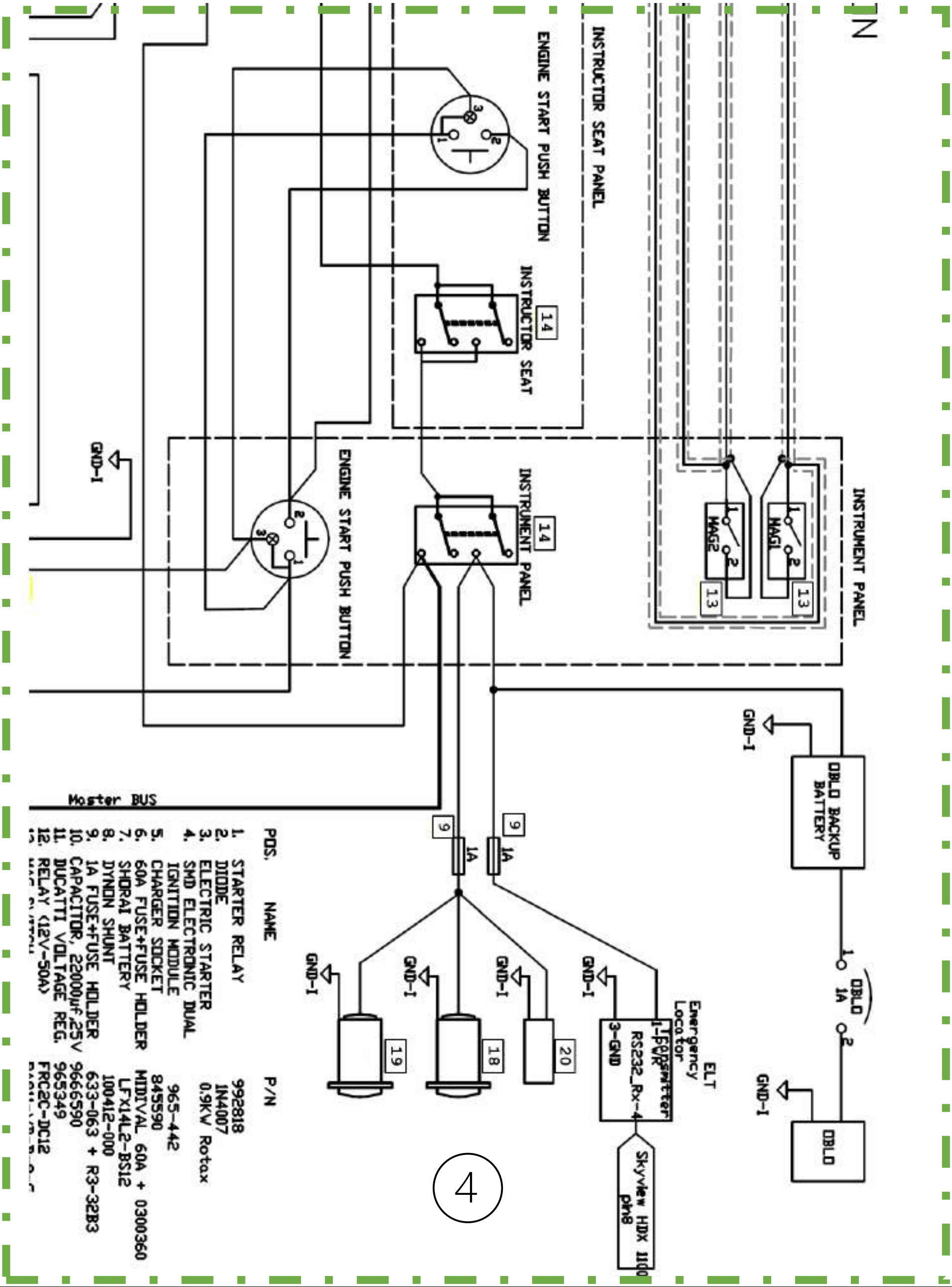
7.5 Electric system



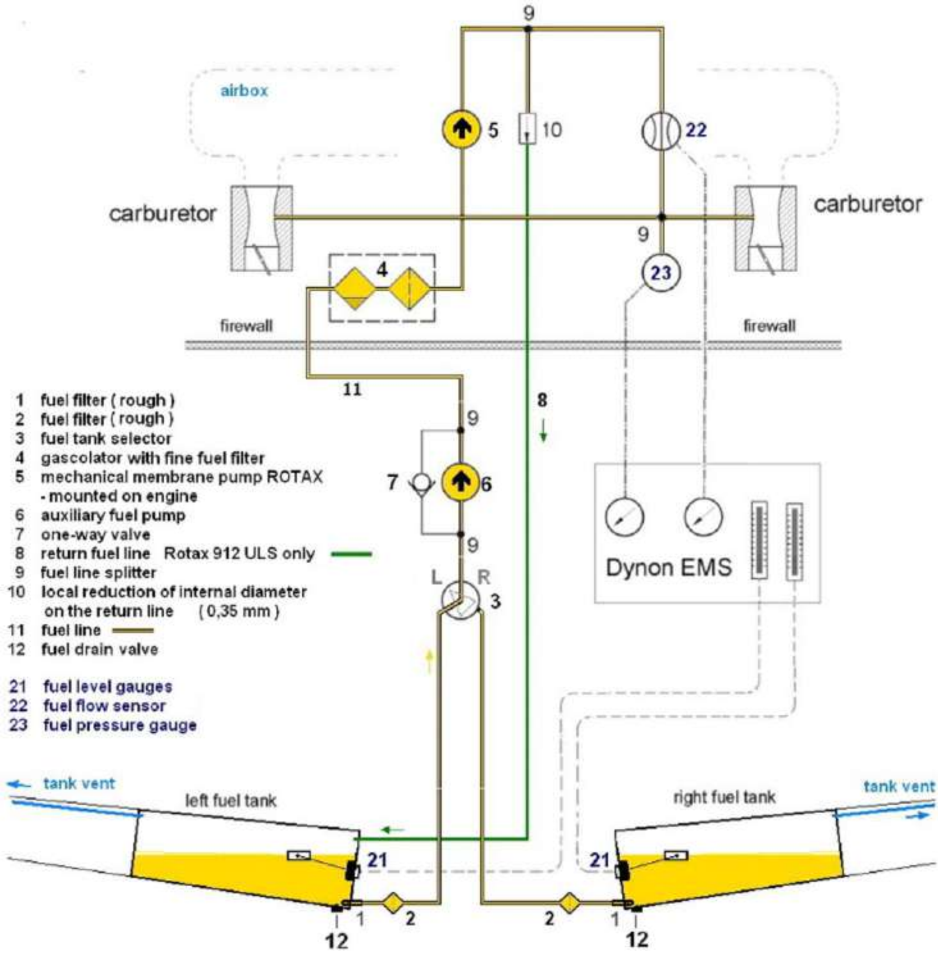

1
MOTOR SECTION
FIREWALL
Dynon Skyview HDX1100
Flybox-Vigilus
SV-XPNDR 261/262
AIR Traffic AT-1
TRIG RADIO TY91/92
470Ω
EFIS 5A
RADIO 5A
ENG.START 5A
FUEL PUMP 3A
FLAPS 5A
TRIM 1A
LAND.GEAR 15A
PROP. 3A
A.P. 7A
Master BUS
Landing Gear Module
Flaps Module
GND-R
Autopilot Servo Pitch
Autopilot Servo Roll
Prop. Reg
GND-I
GND-B
1A


2
BAT-
BAT+
GND-A
GND-B
GND-R
60A
IREWALL
INTERIOR SECTION
DUCATI VOLTAGE REGULATOR
RELAY
1A
470Ω
MAG1
MAG2


PITOT HEAT
PIT.HEAT 10A
POSITION LIGHT
POS.LIGHT 10A
LAND LIGHT
LAND.LIGHT 7A
AUX IN Radio
TIS 1A
Air Traffic AUX
25 13x
SV-AP-PANEL/H
Master BUS
Trim Module
Trim LED indication
Arduino system for Engine cooling Heat & Vent
Ballast-System
Ballast-Baggage
Ballast-Front
C
NC
NO
23
470Ω
26
Green LED
GND-I
ENGINE START RELAY
1 3 5
17
4. SMD ELECTRONIC DUAL IGNITION MODULE 965-442
5. CHARGER SOCKET 845590
6. 60A FUSE+FUSE HOLDER MIDIVAL 60A + 0300360
7. SHORAI BATTERY LFX14L2-BS12
8. DYNON SHUNT 100412-000
9. 1A FUSE+FUSE HOLDER 633-063 + R3-32B3
10. CAPACITOR, 22000µf,25V 9666590
11. DUCATTI VOLTAGE REG. 965349
12. RELAY (12V-50A) FRC2C-DC12
13. MAG SWITCH RA911-VB-B-9-G
14. MASTER SWITCH 1587675
15. ELT ACK E-04
16. FUEL PUMP PIERBURG 7.21440510
17. ENGINE START RELAY S-19-077
18. LIGHTER SOCKET 851795
19. USB SOCKET 67321500
20. CO DETECTOR AITHRE SHIELD EX 3.0
21. BAT.CHARGE LED OSR5MR5B64A-2.4HZ
22. DYNON ALARM LED 503VD2E-V1-4I
23. RESISTOR 470Ω MBB02070C4700FCT00
24. CAPACITOR, 1µf,50V RDER71H105K2P1H03B
25. ETA BREAKER 1110-F112-P1M1-XX
26. BALLAST GREEN LED 1526861
SHIELD
MASTER CABLE
3


INSTRUCTOR SEAT PANEL
ENGINE START PUSH BUTTON
INSTRUCTOR SEAT
14
INSTRUMENT PANEL
ENGINE START PUSH BUTTON
14
INSTRUMENT PANEL
MAG1
MAG2
13
GND-I
DBLD BACKUP BATTERY
DBLD 1A
DBLD
Master BUS
9
1A
ELT Emergency Locator Transmitter
1-PWR
RS232_Rx-4
3-GND
Skyview HDX 1100 pin8
18
19
20
POS. NAME P/N
1. STARTER RELAY 99281
2. DIODE 1N4007
3. SMD ELECTRONIC STARTER 0.9KW Rotax
4. IGNITION MODULE DUAL 965-442
5. CHARGER SOCKET 845590
6. 60A FUSE+FUSE HOLDER MIDIVAL 60A + 0300360
7. SHORAI BATTERY LFX14L2-BS12
8. DYNON SHUNT 100412-000
9. 1A FUSE+FUSE HOLDER 633-063 + R3-32B3
10. CAPACITOR, 22000uF,25V 9666590
11. DUCATTI VOLTAGE REG. 965349
12. RELAY (12V-50A) FRC2C-DC12
4

7.6 Fuel system



The Air Vent of each fuel tank is incorporated in the most outbound flap hinge.

CAUTION

Clogging or obstructing the fuel vent could cause fuel supply problems and as well the wing surface to implode, caused by fuel pump creating a vacuum.

7.7 Cockpit - interior and instruments

EFIS/EMS/GPS DYNON SKYVIEW HDX + OBLO

7.8 Cockpit arrangement

- Access to the seats through a right-side hinged canopy. Enter by stepping on the left wing
- Two composite height adjustable seats have adjustable headrests and a four-point harness each
- Dual controls with two sidesticks on the right side**,** dual rudder control pedals connected to the front wheel. Throttle, hydraulic prop and choke lever are positioned on left panel, engine cooling flap control panel in the front cockpit
- The main wheels are equipped with hydraulic brakes, controlled by the toe brakes placed on the front pedals and parking brake lever on the left side of the tunnel. The front pedals are adjustable, pin controlling levers are on both sides of the interior panel. A central brake lever for rear pilot is on the left panel below the throttle a prop lever is optional
- 2+2 Air vents are placed on the sides of instrument panel.
- Flaps and landing gear control panel, electric propeller control panel and radio panel are located on left side of the instrument panel. If the propeller is hydraulic, a controlling lever for both pilots is to the side of the throttle lever
- The right side of instrument panel is used for backup instruments, GPS
- The middle panel is used for EFIS (Dynon SKYVIEW or GARMIN G3X)

- Below the EFIS screen there are switch/circuit breakers. The autopilot panels and starter, magnetos and master switches are below the breakers
- The trim switch, radio button and autopilot on/off buttons are placed on top of the side-sticks
- A fuel selector valve is positioned in front of the left armrest behind the throttle
- The fuel quantity indicator is shown on the EFIS/EMS display
- The ventilation and heating control knobs are located in the front tip of the right armrest panel. Seat adjustment buttons are located behind the side-sticks
- Red handles for emergency release of landing gear are located in front of the front seat on the side panel and to the right side of the middle tunnel
- Windows allowing to check properly locked gear struts with the landing gear position indicators are situated on the root of wings and on center panel
- A baggage compartment is situated behind the rear seat is accessible from inside or from outside through a lockable door
- The Ballistic Recovery System has 2 independent **RED** activation handles installed on the middle panel between pilot legs.
- Small storage compartments are provided beneath each armrest

Rear instrument panel

- The rear instrument panel is part of a canopy frame, optionally equipped with EFIS/EMS screen connected to the main device
- The Instructor configuration option gives the rear pilot the possibility to control flaps and landing gear from the rear position. Engine start, magnetos and master switches are located on the central panel. A single brake-lever activating both main wheels is located on the left panel
- A slave radio control panel can be installed optionally

Cabin fire extinguisher (optional)

A portable fire extinguisher is installed on the side wall of central tunnel under the pilot's left leg. The extinguisher is readily accessible in case of fire. The extinguisher should be checked prior to each flight to ensure that its bottle pressure, as indicated by the gage on the bottle, is within the green arc and the operating lever lock pin is securely in place.

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To operate the fire extinguisher:

1. Loosen retaining clamp and remove extinguisher from bracket
2. Hold extinguisher upright, pull the operating lever lock pin, and press lever while directing the discharge at the base of the fire at the near edge. Progress toward the back of the fire by moving the nozzle rapidly with a side-to-side sweeping motion.

CAUTION

Care must be taken not to direct the initial discharge directly at the burning surface at close range because the high velocity stream may cause splashing and/or scattering of the burning material.

WARNING

VENTILATE THE CABIN PROMPTLY AFTER SUCCESSFULLY EXTINGUISHING THE FIRE TO REDUCE THE GASES PRODUCED BY THERMAL DECOMPOSITION.

7.9 Powerplant

Engine

Rotax 912 ULS, 4 cylinder, 4 stroke engine, horizontally opposed, liquid cooled cylinder heads, air cooled cylinders.

Propeller is driven through an integrated reduction gear.

Technical data

Performances figures are valid for standard conditions (MSA/ISA).

Engine Model	**912 ULS D.C.D.I.**
Engine power Max. 5 min.:	69.0 kW (95 hp) @5500 RPM 73.5 kW (100 hp) @5800 RPM
Torque	128 Nm @ 5100 RPM
Maximum speed	5800 RPM
Bore:	84.0 mm
Stroke:	61.0 mm
Cylinder capacity:	1352.0 cm^3
Compression ratio:	10,5:1
Ignition:	DUCATI double CDI
Ignition timing:	4° to 1000 RPM / above 26°
Sparking plugs:	ROTAX part no. 297 940
Generator output:	250 W DC @ 5500 RPM
Voltage:	13,5 V

Propeller

Shark can be equipped by different propellers:

- Woodcomp SR 3000 2WN - 2 blade, in flight electrically adjustable
- Woodcomp KW20W - 2 blade, in flight hydraulically adjustable
- Neuform TXR2-V-70 - 2 blade, in flight electrically adjustable

Woodcomp SR 3000 2W

SR 3000/2; An Electrically In Flight Adjustable propeller with two wood-composite blades, designed for Rotax 912 UL, Rotax 912 ULS and Rotax 914. Diameter is 1700 mm.

Blades angle is controlled by an electric servo mechanism and can be adjusted from minimum to maximum pitch within approximately 8 seconds.

Constant speed unit

The unit sets and maintains the desired propeller speed. It Is mounted on the instrument panel.

Woodcomp KW 20W

Propeller has identical blades and same performance as the electrically adjustable SR 3000 2W propeller described above.

Blades pitch is controlled by a hydraulic regulator using oil from engine lubrication system. Oil goes through a hollow shaft in the gearbox to the piston inside propeller hub. Regulator is controlled by a lever placed next to the throttle lever.

Neuform TXR2-V-70

Neuform TXR2-V-70 is an electrically in-flight adjustable propeller with two composite blades. The blades are made of glass-fiber and are hollow. The root of the blade is made of duralumin. Outside part of blade leading edge is cast of plastic material with improved resistance to abrasion.

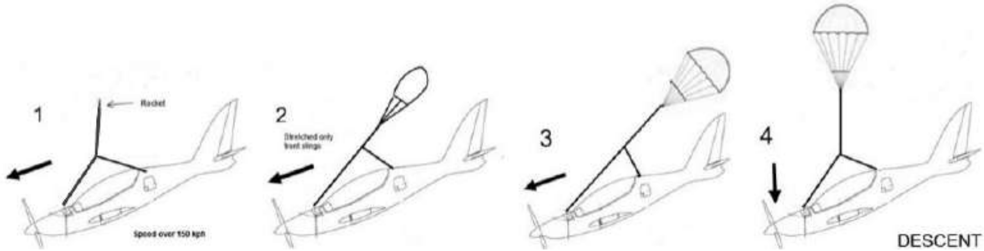
An electric servo located on the engine gearbox controls the pitch of the blades.

Mechanical stops and micro switches of maximum and minimum angle of attack are situated on the servo brackets.

A Flybox unit is used to set the required propeller RPM

7.10 Ballistic Recovery System

Shark 600 is equipped with **Stratos Magnum 601 LSA Ballistic Recovery System** with 2 independent release handles.



Description of the rescue system Stratos Magnum 601 LSA

The rocket engine is placed in the rocket case. After activation by pulling one of the release handles, this movement is mechanically transported by a Bowden cable to a percussive device. It activates two percussion caps which ignite the rocket box. After ignition, the rocket escapes under high pressure from the rocket box, towing the rope which releases the cap of the parachute container, and the parachute is pulled out of the container. Thereafter the bag of parachute is discarded, and parachute canopy is filled with air.

CAUTION

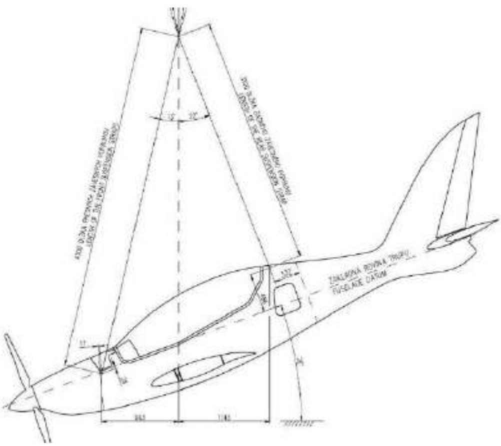
The minimum recommended altitude for system activation is 200 m (660 ft). However, there are known cases of successful application in less than 80 m. Successful activation also depends also depends on the horizontal and vertical component of velocity. System lifetime is 18 years, the revision and repackaging have to be performed every 6 years

The activation mechanism

The activation mechanism is made of a Teflon coated steel cable and an outside sleeve (Bowden type). Each activation handle has double safety mechanism to prevent accidental launch and lock mechanism for storage and transport.

The mechanism is designed to have minimal activation forces under all circumstances. This minimal resistance remains throughout the life of the system.

Rescue system installation



The rescue system is installed on all Sharks Aircraft between the firewall and the canopy/instrument panel.

Two rescue system belts are mounted to the top of the engine mounting and are folded inside of rescue system box. A third belt is guided under left cockpit-frame to the rear of the cabin. There it is mounted to the top of the baggage space frame. When the system is activated, the parachute compartment cover is broken in defined places and a strip of fuselage skin is ripped open under the left side of the cabin/canopy frame.

7.11 Towing system

Not Installed

7.12 Position lights (optional)

The airplane can be optionally equipped by position and strobe lights. Lights are made of streamlined transparent material with integrated LED lights.

Position lights (Red / Green / White LEDs) operate constantly. Lights are designed according to the regulations with defined angles and colors. The strobe lights flash continuously.

The left wing tip has a red position light combined with white strobe. The right wing tip has a green position light combined with white strobe. There also is a white strobe light on the top of vertical fin, the rudder has a “rearview” white position light plus white strobe in trailing edge.

The strobe flashes are synchronized, three flashes followed by a time break.

7.13 Landing light (optional)

Landing LEDs light can be optionally installed in NACA intake.

7.14 ELT (optional)

The ELT unit is installed on a bracket behind the rear baggage bulkhead. It’s accessible by removing the cover of rear baggage bulkhead. There is small window for an easy ELT check. An antenna is placed on the upper rear part of the baggage bulkhead and it is extended above the fuselage surface.

The ELT is controlled via a control panel on the instrument panel.

7.15 Autopilot (optional)

The Autopilot is dual-axis, controlling ailerons and elevator.

The Control System is integrated in all modern EFIS systems.
Position of the two Servos is:

- behind baggage compartment
- fuselage, right side stub wing in front of spar channel

The system is activated via separate Autopilot (AP) switch/fuse on the forward instrument panel.

The autopilot can be controlled via the main EFIS screen or alternatively via the panel/s placed on the instrument panel.

Autopilot (de)activate buttons are located on both sidesticks.

For autopilot operation manual see Amendment 1.

7.16 First aid kit (optional)

The first aid kit is located in the upper pocket inside the baggage compartment.

Access to the first aid kit is available both from the cockpit and through the door of the baggage compartment.

7.17 Camera mounts

Camera mounts are on the upper surfaces of the wing and horizontal tail. They have an M6 thread flush with the surface.

The mount is approved for a GoPro-sized camera in a waterproof case, with a maximum weight of 300g.

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8 Handling, servicing and maintenance

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8.1 Wing removal procedure

Wing removal is an option for storage in a limited space or for transport.

The step-by-step procedure to disconnect both wings can be found in the Shark Aircraft Maintenance Manual. (Chapter 3.2)

8.2 Stabilizer disassembly

The step-by-step procedure do disconnect the Stabilizer can be found in the Shark Aircraft Maintenance Manual. (Chapter 3.3)

8.3 Parking and mooring

8.3.1 General

Always secure the airplane during parking. It is always recommended to moor airplane due to the chance of unexpected adverse weather. During overnight parking add the following:

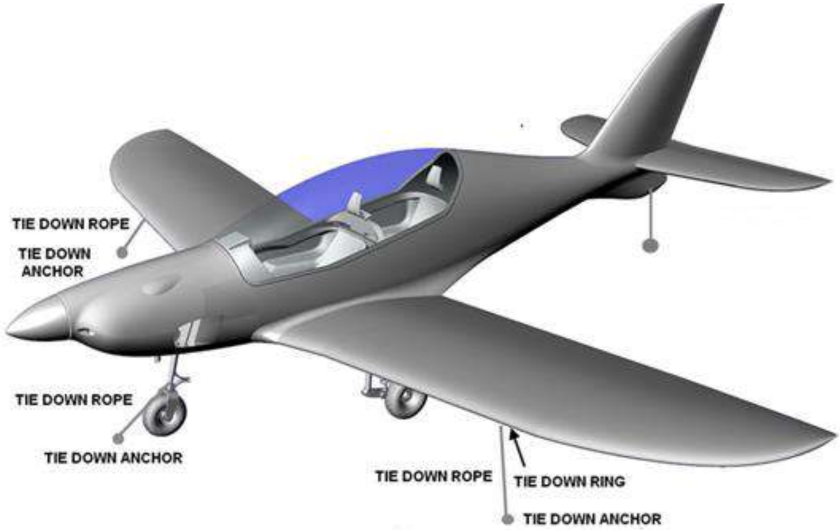
- pitot tube cover
- canopy covers
- wing covers, if available

8.3.2 Pitot tube cover

Use the Pitot tube cover for protection of the pitot static system, a cover with a red warning flag is supplied with each airplane.

8.3.3 Mooring

- Consoles for M8 eyebolts used for mooring are fitted on the wing spars close to the inspection rings. Other mooring points are the front leg and the hole in the bottom fin.



8.4 Hangaring, ground handling

Only move the airplane during hangaring, parking, etc. only when it is empty.

It is permitted to attach a steering rod to the front wheel axle.

The following list and sketch show the position of reinforced areas to prevent surface dimples caused by ground handling.

Reinforced surfaces:

- Fuselage-fin connection. Circle with radius 350 mm, where fuselage can be pushed down to lift the front wheel
- Leading edge of fin up to 500 mm height, 100 mm wide on each side
- Top part of the wing leading edge, 200 mm wide area
- Top part of the stabilizer leading edge, 150 mm wide area
- Area around fuel caps
- Stepping surface on left wing root - fuselage part
- Whole upper surface of the wing is reinforced, but maximum load is still limited
- Spinner
- Root part of propeller blades can be used for towing, don't push or pull on the tip!

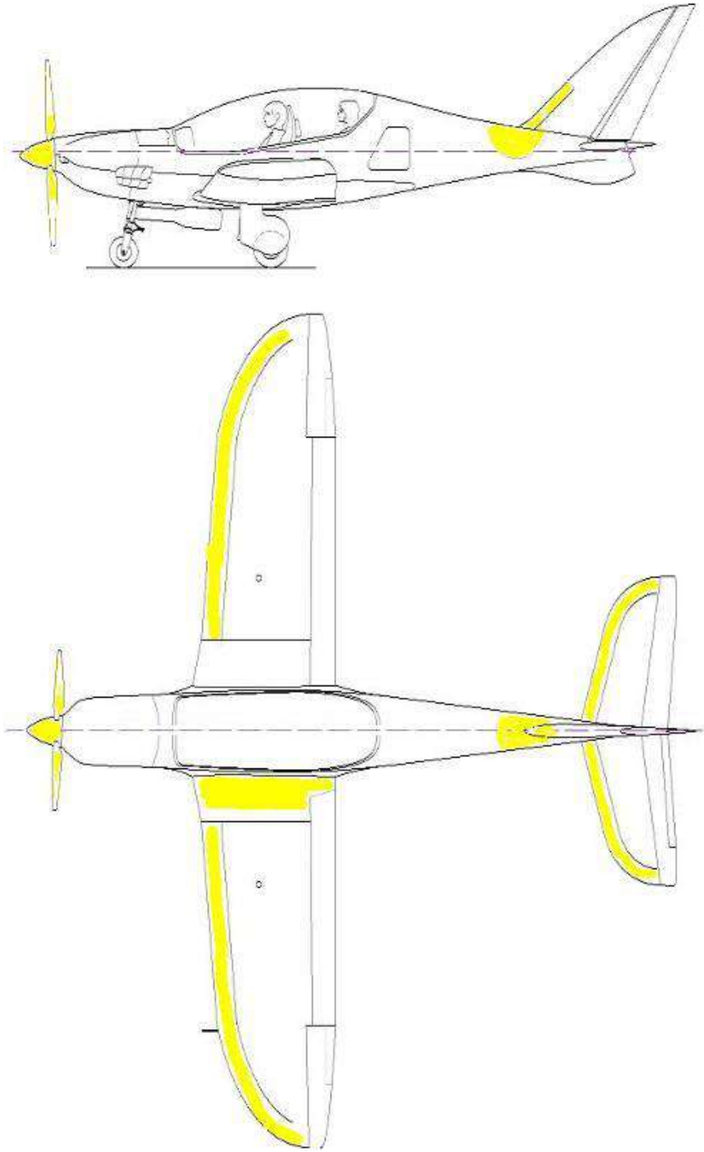
CAUTION

The Shark 600 composite surface is created by thin layer of carbon fabric, to keep the lowest possible weight. Under the carbon fibre layer is a layer of PVC foam with relatively low firmness and stiffness. Common hand pressure can result in surface damage and complicated repair. Gentle ground handling is therefore highly recommended.

CAUTION

The airframe has integrated lifting points for landing gear maintenance - metal brackets with nuts are bolted on front wall of fuselage main spar.

If the plane is lifted by the wings, it is necessary to follow these basic rules: supported area should be below the wing spar, close to inspection window of the aileron bellcrank. The lower wing surface can easily be damaged!



Sketch of reinforced surfaces for ground handling

8.5 Towing

Towing the airplane by car is not allowed.

8.6 Tyre pressures

Nose Gear Tire	11 x 4	3.0 bar	44 psi
Main Gear Tires	14 x 4	3.0 bar +/- 0,3	44 psi

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9 Supplements

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9.1 Aircraft documentation

The SHARK 600 is provided with a set of documents in hardcopy format and/or on a USB key. The composition of the document set may vary depending on the type/model/variant of the SHARK 600 and the country of registration. The prescribed composition of the document set is outlined in the form SHARK.AERO_FT_116 Aircraft Documents Checklist.

9.2 Serial numbers of components

The list of installed components and their serial numbers is detailed in protocol S600_TP_052.

9.3 Manuals

List of 3rd party manuals corresponds to airplane equipment:

- Engine manual
- Propeller manual
- EFIS / EMS manual
- Rescue system manual
- ELT manual
- OBLO, backup EFIS manual
- VHF radio manual
- Transponder manual

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