

MAINTENANCE MANUAL

Apollo FOX

Aerodynamically Operated Ultralight

Aircraft Name - Type:

Apollo Fox

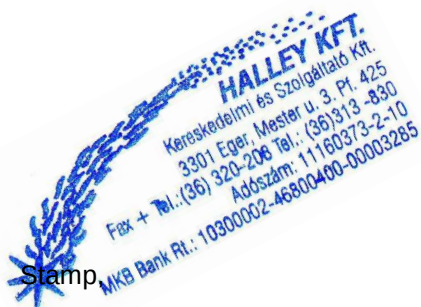
Serial Number:

Registration Mark:

Date of Issue: 29.09.2014

Signature 

Stamp



This aeroplane can be operated in compliance with information and limitations contained herein.

DATA OF THE AEROPLANES

	Type	Production	Serial Number:	Destination and year of production
Fuselage	Apollo Fox	Halley Ltd		
Engine	ROTAX 912 UL/S	BOMBARDIE R-ROTAX GMBH AUSTRIA		
PROPELLER	Dm –prop dmp-3/3	Dusan Mihalides		
Parachute	BRS GALAXY 5/472,5 SOFT	GALAXY Holdig s.r.o.		

0.1 RECORD OF REVISIONS

Any revisions or amendments to this manual shall be issued in the form of bulletins with attached new pages. It is in the interests of every user to enter such revision into the table of revisions and to replace the existing page by the new one. The revised or corrected text shall be indicated by a vertical line on page left margin and the page shall bear revision number and date of its issue.

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0.2 LIST OF EFFECTIVE PAGES

Chap.	Page	Date	Chp.	Page	Date	Chap.	Page	Date
0	1	03.12.10	4	4-4	03.12.10		6-12	03.12.10
	2	03.12.10		4-5	03.12.10		6-13	03.12.10
	3	03.12.10		4-6	03.12.10		6-14	03.12.10
	4	03.12.10		4-7	03.12.10		6-15	03.12.10
	5	03.12.10					6-16	03.12.10
	6	03.12.10	5	5-1	03.12.10		6-17	03.12.10
1	1-1	03.12.10		5-2	03.12.10		6-18	03.12.10
	1-2	03.12.10		5-3	03.12.10		6-19	03.12.10
2	2-1	03.12.10	6	5-4	03.12.10			
	2-2	03.12.10				7	7-1	03.12.10
	2-3	03.12.10		6-1	03.12.10		7-2	03.12.10
	2-4	03.12.10		6-2	03.12.10		7-3	03.12.10
	2-5	03.12.10		6-3	03.12.10		7-4	03.12.10
	2-6	03.12.10		6-4	03.12.10		7-5	03.12.10
	2-7	03.12.10		6-5	03.12.10		7-6	03.12.10
	2-8	03.12.10					7-7	03.12.10
3	3-1	03.12.10		6-6	03.12.10		7-8	03.12.10
	3-2	03.12.10		6-7	03.12.10		7-9	03.12.10
	3-3	03.12.10		6-8	03.12.10			
4	4-1	03.12.10		6-9	03.12.10			
	4-2	03.12.10		6-10	03.12.10			
	4-3	03.12.10		6-11	03.12.10			

0.3 TABLE OF CONTENTS

Chapter	
General	1
Technical Description.....	2
Basic Technical Data	3
Operating Limitations	4
Normal Procedures	5
Servicing and Maintenance	6
Supplements	7

CHAPTER 1

1. GENERAL

TABLE OF CONTENTS

1.1 Introduction

1.2 Certification Basis

1.3 Warning, Caution and Note

1.1 Introduction

This manual is designed to acquaint personnel with information towards increasing safe and efficient operation of the aircraft.

This manual contains information regarding ground servicing and maintenance of the aircraft, information necessary for pilots and engineers and additional data supplied by the manufacturer.

1.2 Certification Basis

This airplane approved by Aviation Authority of Hungary according Type of certificate airworthiness 9451/1999....., It is can be equipped with special equipment for towing gliders with **MTOW 450 kg**.

1.3 Warning, Caution and Note

The following definitions and text formats apply to warnings, cautions and notes given throughout this manual:

WARNING	Non-observance or neglecton of such warning may lead to an immediate or grave reduction of flight safety level.
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CAUTION	Non-observance or neglecton may lead to a minor or major reduction of flight safety level, or to a long-term degradation of flight safety.
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NOTE	<i>Draws attention to such items which do not directly relate to flight safety, however are important or unusual.</i>
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2. TECHNICAL DESCRIPTION

TABLE OF CONTENTS

2.1 Introduction
2.2 Aircraft Framework
2.2.1 Fuselage
2.2.2 Wing
2.2.3 Tail Unit
2.3 Control System
2.4 Instrument Panel
2.5 Landing Gear
2.6 Seats and Safety Belts
2.7 Baggage Compartment
2.8 Door
2.9 Powe Unit
2.10 Fuel System
2.11 Elecrical System
2.12 Pitot-Static System
2.13 Equipment, Outfit

2.1 Introduction

This chapter contains description of the ultralight and its systems. Furthermore, Chapter 7 includes diagrams of individual parts.

2.2 Aircraft Framework

2.2.1 Fuselage

The main supporting structure of the fuselage is a lattice-work welded of steel tubes. In its middle section is located a crew compartment , accessible through large, upward-opening door hinged on both fuselage sides. A two-member crew sits side by side on an upholstered bench-seat the body of which is formed by a fiberglass skeleton. The crew members are fastened with four-point automobile safety belts anchored to the fuselage framework. The engine bay in the forward fuselage is divided from the crew compartment by firewall. Engine cowlings and the forward fuselage skin are made of fiberglass.

Rear fuselage bears hinges and attachments of horizontal tail surfaces and an integral tail fin of vertical tail surfaces. On the upper fuselage behind the wing is located a detachable cover allowing to fold the wings backward. The whole fuselage surface except for the forward section is fabric-covered. Cockpit canopy and entrance door glazing is of MAKROLON material.

2.2.2 Wing

The rectangular-plan wing is of a frame structure. It is composed of two aluminium carrying tubes and a system of aluminium ribs and diagonal stiffeners. The aluminium rib system comprises full ribs and false ribs stiffening the skin in the area of leading-edge assembly. As for its horizontal plane, the wing is strengthened with a system of steel diagonal tubular stiffeners. There is a 30 l fuel tank built in the wing root section. The tank is made of fuel and alcohol proof composite material. Proper shape of the wing leading edge is guaranteed owing to a die-formed part glued on the fore carrying tube. The trailing edge is formed of a duralumin shaped piece. The wing is fabric-covered.

Below the wing trailing edge are located flaperons incorporating both function of ailerons and wing flaps; they are attached to the rib ends by means of hinges. The flaperon structure consists of a aluminium load-carrying tube swinging in the hinges and a fiberglass sandwich part itself of inversely moulded airfoil.

The wings are attached to the fuselage in suspension points of load-carrying tubes in their upper section and are anchored by „V“ struts to

the bottom fuselage edge. The system of attachment featuring an axle common for the wing rear suspension and the strut makes it possible to fold simply the wings backward lengthwise the fuselage, thus reducing demands on storage space and road transport.

2.2.3 Tail Unit

The tail unit is of a conventional cross arrangement with its load-bearing frame welded of steel tubes. A fabric-covered rudder is hinged on three hinges. The control lever situated in its lower end serves also to steer the tail-wheel landing gear. Stabilizer of horizontal tail surfaces is braced (both sides) with two struts leading to the bottom of the fuselage. The elevator with its non-divided leading edge (a tube) is attached on suspension points as a total, with drive in the middle. Surface of all horizontal tail unit is fabric-covered.

2.3 Control System

The control system is of a dual type. Both pilot seats are provided with complete primary controls (lateral, longitudinal and directional control), with shared access to controls of trim, wing flaps, throttle lever and choke.

Lateral control - lateral control column is located on cockpit floor and its motion (to the left, to the right) is transferred by a system of levers and tie rods to control surfaces.

Longitudinal control - longitudinal control column is located on cockpit floor and its motion (forward, backward) is transferred by a tie rod system to the appropriate control surface.

Directional control - rudder pedals are located in the front of the cockpit on the floor. The pedal motion is transferred by steel cables to the rudder. Also the tail wheel steering is spring-controlled from rudder drive control lever.

Wing flaps - the wing flap control lever is located on the floor in the central part of the cockpit. Its motion is transferred via a tie rod to the countershaft of lateral control in the control system of ailerons - flaperons.

Trim - the aircraft trim control wheel is located on the floor on a longitudinal tube and its motion is directed by means of cables and bowden cables to elevator trim tab.

Engine controls are concentrated in the central part below the instrument panel. Throttle control: the motion of a double-function throttle lever is transferred to cables with bowden wires actuating vacuum-controlled carburetors. Choke: motion of choke rod with arrestment device is transferred by cables with bowden wires to choke control levers at carburetors.

2.4 Instrument Panel

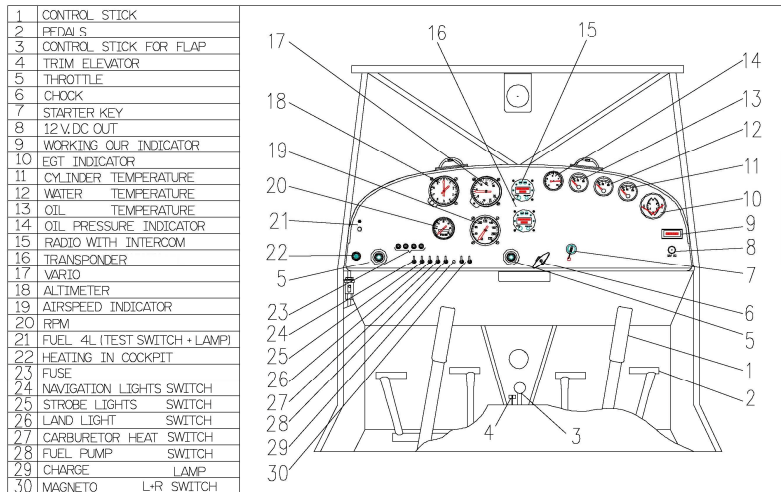
The instrument panel includes a basic set of instruments to monitor flight and power unit parameters. It may be extended to other instruments offered as options.

(It holds the following: airspeed indicator, altimeter, vertical speed indicator, bank indicator and engine instruments. As optional it is complemented by pointer tachometer, sensor and temperature indicator of carburettor intake air.)

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II. INSTRUMENTS

	Type	Serial No.
Airspeed indicator		
Altimeter		
Vertical speed indicator		
Slip indicator		
Compass		
Engine RPM		
CHT		
EGT		
Water temperature		
Oil temperature indicator		
Oil pressure indicator		
Charge indicator lamp		
Intercom		
Radio		
Transponder		

Engine	ROTAX 912 UL-ULS		
Propeller	dm-prop	dmp -3/3	1700 mm

III. STORAGE BATTERY

Type		
Voltage	12 V	
Capacity	8 Ah	

NOTE	The storage battery is located in the fuselage.
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2.5 Landing Gear

Landing device is a type of trigear undercarriage with a controllable nose wheel.

The main landing gear is formed of lever-type swinging conventional type legs. Wheels with low-pressure tires are provided with hydraulic disc brakes.

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The nose-wheel landing gear is welded of steel tubes.

2.6 Seats and Safety Belts

The seats are of a side-by-side arrangement, situated in fuselage centre section. They consist of an upholstered fiberglass skeleton. Each pilot's seat is equipped with four point belts anchored in the fuselage lattice-work.

2.7 Baggage Compartment

The baggage compartment is located behind the bench-seat. It is accessible from above and can hold baggage up to 10 kg.

2.8 Doors

Entrance to the cockpit and way out is through hinged door suspended from upper part of the cockpit doorway. In its open position it is retained by a gas pressure spring. The door is glazed all over and equipped with lockable locks.

NOTE	<i>The glazing material is susceptible to damage when exposed to gasoline and agents containing benzene nuclei.</i>
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2.9 Power Unit

The Apollo Fox ultralight is powered by ROTAX 912 UL/S engine. It is a four- cylinder, four-stroke, opposed-cylinder, centre-camshaft engine with over-head valves. Engine cooling is of a combined type, cylinder heads are water-cooled, while cylinders are air-cooled. Dry sump lubrication. The ignition system is of a dual, distributorless and capacitor flywheel magneto type. The engine is equipped with an electric starter, AC generator and a mechanical fuel delivery pump. The propeller is powered from an integrated reduction gear with mechanical damping.

The engine is controlled by throttle lever. To monitor engine data, round instruments which displaying engine speed, exhaust gas temperature, oil temperature, oil pressure and a number of engine hours.

The propeller is two/three/four bladed, right-handed, tractor, wood, plastic or composite, propeller with strengthened leading edge.

WARNING

This engine has not been certified as an aircraft one and its failure may occur at any time! The ultralight pilot is fully responsible for consequences of such failure.

2.10 Fuel System

The fuel system includes two wing tanks of 30 l fuel capacity each, a link tank of 6 l capacity, a drain cock, fuel cocks, a fuel filter, an engine fuel pump and a connecting line.

The fuel is gravity flown from the right-hand or left-hand wing tank into the link tank depending which wing tank fuel cock is open. The fuel is then further directed from the link tank via the main fuel cock and fuel filter into the mechanical fuel pump on the engine which delivers the fuel to carburettors.

The amount of fuel in tank is indicated by a fuel gauge which is a part of every tank. Minimum fuel quantity in the link tank is indicated visually by lighting up a warning light on the instrument panel. The remaining fuel, i.e. 6 l, is in such case enough for 15 minutes of flight.

The drain cock outlet is behind the left seat on the outside bottom side of the fuselage; to drain off water and dirt, the drain pipe is to be pressed into fuselage and subsequently a fuel sample is to be taken.

2.11 Electrical System

The electrical system is a single-conductor system of cabling with earth negative pole. The power is supplied from alternator with a rectifier of 250W output and an internal 2x 12V/7Ah storage battery. The individual circuits of appliances are switched by individual switches and protected by corresponding fuses.

An independent part of the electrical system is represented by the engine dual ignition circuit. Each ignition circuit is switched off by a separate switch.

2.12 Pitot-Static System

The aircraft Pitot-static pressure system consists of a Pitot pressure head located in the right-hand wing. Static pressure for the instruments is drawn from the inside of the cockpit.

2.13 Equipment, Outfit

Engine tools, auxiliary struts for attachment of wings in folded position and a set of fuses are delivered together with the aircraft as its standard equipment.

This aircraft can be equipped with a hang glider release which can be used for pulling of the advertisement flag or glider aircraft.

3. BASIC TECHNICAL DATA

TABLE OF CONTENTS

- 3.1 Introduction
- 3.1 Aircraft Dimensions
- 3.2 Deflections of Control Surfaces
- 3.3 Landing Gear
- 3.4 Three-View Drawing

3.1 Introduction

This chapter contains basic technical data on aircraft type.

3.2 Aircraft Dimensions

Wing span.....	9.200 m
Length.....	5.750 m
Height	2.39 m
Wing area with flap	11.5 m ²
Chord length without flap	1.12 m
with flap.....	1.3 m
Wing loading	39.13 kgm ⁻²
Aspect-ratio.....	7.36
Propeller clearance (in flight position).....	0.23 m

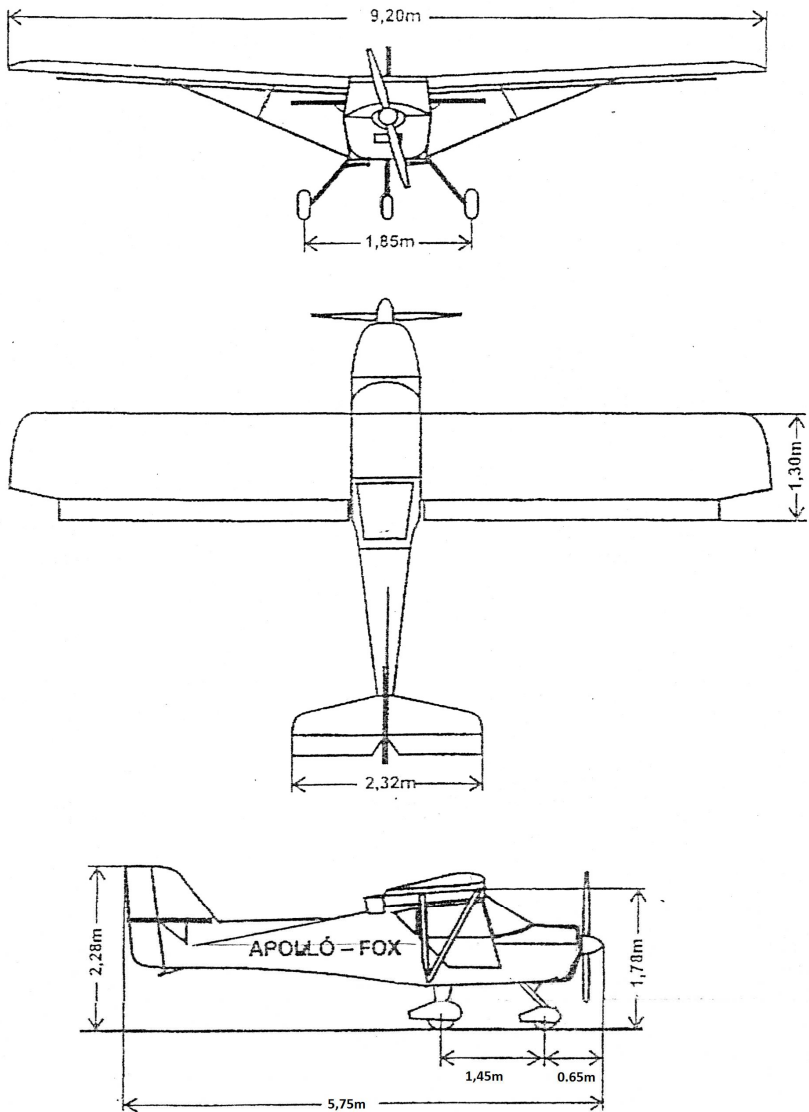
3.3 Deflections of Control Surfaces

Elevator.....	up	$30^{\circ} \pm 2^{\circ}$
	down	$27^{\circ} \pm 2^{\circ}$
Trim tab.....	up	$30^{\circ} \pm 3^{\circ}$
	down	$30^{\circ} \pm 3^{\circ}$
Rudder		$\pm 27^{\circ} \pm 3^{\circ}$
Ailerons.....	up	$16^{\circ} \pm 2^{\circ}$
	down	$8^{\circ} \pm 1^{\circ}$
Wing flaps.....		$0 \div 20^{\circ} \pm 2^{\circ}$

3.4 Landing Gear

Track.....	1.85 m
Wheel base.....	1,45 m
Main landing gear wheel tire	14 x 4 4.00-6
Tire pressure.....	200 kPa
Tail- wheel landing gear tire	12 x 4 3.00-4
Tire pressure.....	200 kPa

1.4.4 Three view drawing of the aircraft



4. OPERATING LIMITATIONS

TABLE OF CONTENTS

- 4.1 Introduction
- 4.2 Speed Limitations
- 4.3 Airspeed Indicator Marking
- 4.4 Engine Instrument Marking
- 4.5 Power Unit
 - 4.5.1 Engine
 - 4.5.2 Propeller
- 4.6 Weights
- 4.7 Crew
- 4.8 Centre of Gravity Position
- 4.9 Operating Load Factors
- 4.10 Fuel
- 4.11 Oil
- 4.12 Other Limitations
- 4.13 Limitation Placards

4.1 Introduction

Chapter 4 contains operating limitations, instrument markings and basic placards necessary for safe operation of the ultralight, its engine, standard systems and equipment.

4.2 Speed Limitations

Speed limits are given in the synoptical table below.

Speed		km/h IAS	Remarks
V _{NE}	Never exceed speed	200	Speed never be exceeded.
V _{NO}	Normal operating limit speed	180	This speed may be exceeded under smooth air only, do not apply deflections of control surfaces over one third.
V _A	Manoeuvring speed	124	Do not apply full or steep deflections of control surfaces above this speed. The aircraft might be overloaded!
V _{FE}	Maximum wing-flaps extended speed	130	Do not exceed this speed with wing flaps extended.
V _{S0}	Minimum steady flight speed	60	with extended wing flaps
V _{S1}	Minimum steady flight speed	65	wing flaps retracted

4.3 Airspeed Indicator Marking

Marking	km/h IAS	Signification
White arc	65 ÷ 130	Range of wing-flaps application.
Green arc	90 ÷ 180	Normal range of operation.
Yellow arc	180 ÷ 200	Manoeuvres must be conducted with special caution and in smooth air only.
Red line	200	Never exceed speed

4.4 Engine Instruments Marking

Instrument	Red line, bottom limit	Green arc normal operation	Yellow arc caution range	Red line, upper limit
Tachometer [r.p.m.]	1400	1400 ÷ 5500	5500 ÷ 5800	5800
Oil temperature [°C]	50	90 ÷ 110	110 ÷ 140	140
Cooling liquid temper. [°C]	60	60 ÷ 95	95 ÷ 110	110
Oil pressure [kPa]	150	150 ÷ 400	400 ÷ 500	700 at cold start
Fuel pressure [Bar]	0,0÷0,2	0,2÷0,45	0,45÷1	1
Fuel quantity [l]	4 visual warning	sight check	sight check	55

4.5 Power Unit

4.5.1 ENGINE

Engine manufacturer	ROTAX GmbH., Austria
Engine model.....	ROTAX 912 UL/S 80/100hp
Max. power	- take-off.....80 / 100 HP
	- continuous 79 / 89 HP
Max. engine speed (MSL)	- take-off..... 5800 r.p.m. (max. 5 min)
	- continuous 5500 r.p.m.
Max. cylinder head temperature	150 °C
Max. cooling liquid temperature	110 °C
Max. oil temperature	140 °C
Oil pressure	- minimum 150 kPa
	- maximum 500 kPa
Oil consumption	max. 0.1 l/h
Fuel pressure	- minimum not set
	- maximum 40 kPa
Consumption at starting.....	16.2 l/h
Consumption at 75% of power rating.....	12.1 l/h
Specific consumption.....	285 g/kWh

WARNING

This engine has not been certified as an aircraft one and its failure may occur at any time! The ultralight pilot is fully responsible for consequences of such failure.

4.5.2 PROPELLER

Propeller manufacturer	
Propeller type.....	DM-Prop , DMP-1
Propeller diameter	1700 mm
Max. propeller speed	2600 r.p.m.
Max. flight speed (V_{NE}).....	200 km/h
Blade angle at 75% setting pitch propeller.....	18°
Max. out-of-balance	0.5 g/600 mm
Propeller purpose	tractor

4.6 Aircraft Weight

Empty weight (standard version)	275 kg
Max. take-off weight with emergency parachute.....	472,5 kg
Max. take-off weight without emergency parachute.....	450 kg
Max. landing weight	472,5 kg
Max. fuel weight	48 kg
Max. baggage weight in baggage compartment.....	10 kg

4.7 Crew

Number of seats	2
Minimum crew weight	55 kg
Max. crew weight	180 kg
Max. crew weight at 30 l of fuel and zero baggage.....	154 kg
Max. crew weight at 60 l of fuel and zero baggage.....	133 kg
Maximum permissible cockpit load	180 kg

4.8 Centre of Gravity Position

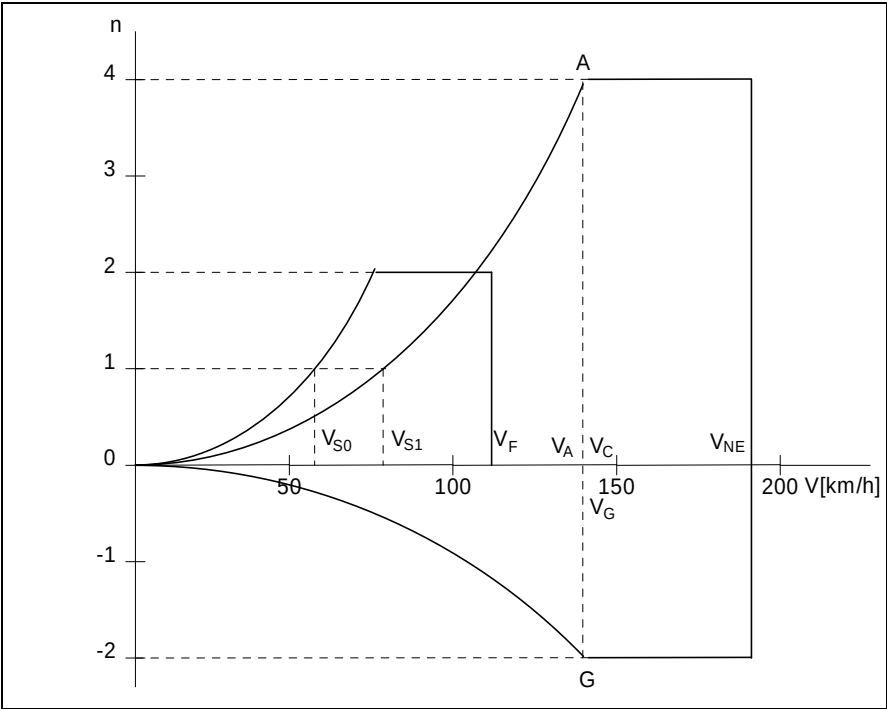
Prescribed range of C.G. position..... +0.31 ÷ +0.49m

4.9 Operating Load Factors

At take-off weight of 472,5 kg

Maximum positive C.G. load factor + 4 g

Maximum negative C.G. load factor..... - 2 g



4.10 Fuel

Fuel tank capacity - wing tanks.....2 x 30 l

- link tank 6 l

Max. fuel quantity.....66 l

Usable fuel quantity on ground 60 l

Unusable fuel quantity in the air 2 l
Fuel specification unleaded EUROSUPER ROZ 95
in accordance with DIN 51607

4.11 Oil

Oil tank capacity 4.0 l
Oil charge 2.5 l
Minimum oil quantity 2.0 l
Oil specification.....API, SG, JASO MA
for 4-stroke motorcycle engines

4.12 Other Limitations

There is **NO SMOKING** aboard the aircraft.

4.13 Limitation Placards

Manufacturer: Halley Ltd, Hungary		
Max. take-off weight:		450/472,5 kg
Empty weight:		275 kg
Never exceed speed	V_{NE}	200 km/h
Max. wing-flaps extended speed	V_{FE}	130 km/h
Min. steady flight speed	V_{S0}	60 km/h

**THIS ULTRALIGHT IS NOT SUBJECT TO COMPULSORY
REGISTRATION WITH STATE AVIATION INSPECTORATE AND
FLYING IT IS AT OWN OPERATOR'S RESPONSIBILITY.**

5. NORMAL PROCEDURES

TABLE OF CONTENTS

- 5.1 Normal procedures and Checklists
 - 5.1.1 Prior to Engine Starting (After Entering Cockpit)
 - 5.1.2 Use of External Power Supply
 - 5.1.3 Engine Starting
 - 5.1.4 Prior to Taxiing
 - 5.1.5 Taxiing
 - 5.1.6 Engine Stopping
- 5.2 Engine Fire, Fumes in the Cockpit

5.1 Normal Procedures and Checklists

5.1.1 Prior to Engine Starting (After Entering Cockpit)

- foot control	free motion
- brakes	check function
- hand control	free motion
- trimming	check for free motion and function
- wing flaps	free motion, retracted
- engine control + choke	free motion
- master switch	off
- ignition	off
- sectionalizing switches	off
- main fuel cock	shut
- wing tank fuel cocks	shut, fuel quantity check
- instruments	check of values, settings
- safety belts	fasten, tighten
- door	shut, locked
- transceiver and intercom	check of condition

5.1.2 Use of External Power Supply

The aircraft is not provided with connection for external power supply. In case of emergency, the external power supply may be connected to battery contacts.

5.1.3 Engine Starting

- master switch switch on
- main fuel cock open
- wing tank fuel cocks open to tank with more fuel
- choke switch on (cold engine only)
- throttle idle
- control lever pulled backwards, clamped between legs
- brakes on, with chocks under wheels, if necessary
- engine and propeller check of clearance
- ignition switch on
- starter switch on (10 sec as maximum)
- after starting the engine, adjust speed to idle
- instruments check of values
oil pressure in 10 sec 20 kPa as minimum
- choke switch off
- sectionalizing switches switch on (transceiver, IC, turn and slip indicator))

5.1.4 Prior to Taxiing

- check of free space in direction of contemplated taxiing
- brakes check function
- stop watch switch on, record time

5.1.5 Taxiing

- taxiing speed is 15 km/h maximum. Steering is performed by foot control and deceleration of main wheels.
- at crosswind hold ailerons „against the wind“, using the control stick.
- at strong crosswind perform taxiing with an assistant holding the wing by its windward side.

5.1.6 Engine Stopping

- | | |
|---------------------------|--------------------------------------|
| - RPM | cool down the engine at 2 000 r.p.m. |
| - engine instruments | within limits |
| - transceiver | switch off |
| - ignition | switch off |
| - master switch | switch off |
| - sectionalizing switches | switch off |
| - main fuel cock | shut |
| - wing tank fuel cocks | switch to shut position |

5.2 Engine Fire, Fumes in the Cockpit

This item describes fundamental emergencies on ground and recommended procedures how to solve them. Not all emergencies that may occur can be listed here in full, therefore their solution depends on experience of the crew controlling course of such events.

- | | |
|--|---|
| - main fuel cock | shut |
| - wing tank fuel cocks | shut |
| - throttle | full power |
| - ignition | switch off after using fuel in carburettors and engine stopping |
| - master switch | switch off |
| - abandon the aircraft and extinguish fire (if possible) | |

<i>NOTE</i>	Time needed to pump fuel out of carburettors is around 30 seconds.
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6. SERVICING AND MAINTENANCE

TABLE OF CONTENTS

- 6.1 Introduction
 - 6.1.1 Maintenance System
 - 6.1.2 Maintenance Instructions
- 6.2 Routine Maintenance
 - 6.2.1 Pre-Flight Preparation
 - 6.2.2 Pre-Flight Check
 - 6.2.3 Post-Flight Check
 - 6.2.4 Engine Warm-Up, Power Check
- 6.3 Scheduled Maintenance
 - 6.3.1 Inspection after First 25 Hours of Operation
 - 6.3.2 Inspection after 50 Hours of Operation
 - 6.3.3 Inspection after 100 Hours of Operation
 - 6.3.4 Inspection after 200 Hours of Operation
 - 6.3.5 Inspection after 600 Hours of Operation
 - 6.3.6 Lubrication Chart
- 6.4 Changes and Repairs of Aircraft In Operation
- 6.5 Ground Handling and Transportation
 - 6.5.1 Towing, On-Ground Manoeuvres.
 - 6.5.2 Parking and Housing Aircraft in Hangar
 - 6.5.3 Mooring
 - 6.5.4 Jacking and Shoring
 - 6.5.6 Transportation
- 6.6 Aircraft Cleaning and Servicing
 - 6.6.1 Outer Surface
 - 6.6.2 Propeller
 - 6.6.3 Engine
 - 6.6.4 Aircraft Interior, Seats, Upholstery
 - 6.6.5 Fuel Filling and Dumping

6.1 Introduction

This chapter contains instructions for ground aircraft servicing and maintenance. It defines inspections, maintenance and repairs necessary to be carried out in order to maintain airworthiness of the aircraft and its parts.

It provides instructions for performing routine scheduled maintenance and preventive inspections depending on aircraft condition.

6.1.1 Maintenance System

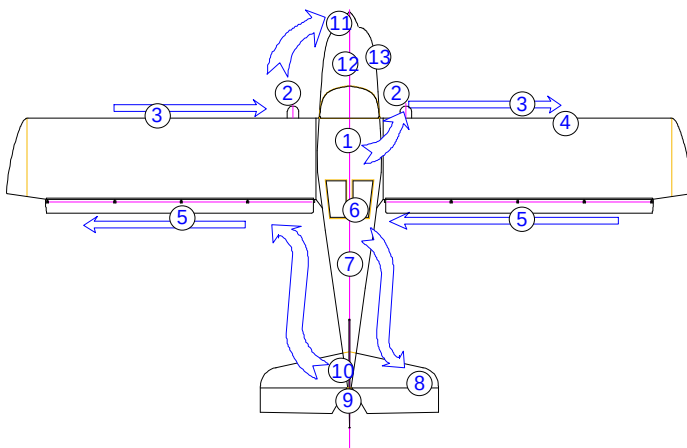
The aircraft is kept under airworthiness condition through a system of periodic maintenance and inspections depending on aircraft condition as described in this chapter. The present manual does not include maintenance of units that make up independent assemblies (such as engine, propeller, instruments,.....) with a developed maintenance system of their own determined by their manufacturer.

6.1.2 Maintenance Instructions

Aircraft maintenance work may only be carried out by personnel that have received appropriate qualifications and have been acquainted with conditions for servicing and maintenance of this aircraft type.

6.2 Routine Maintenance

6.2.1 Pre-Flight Preparation



-
-
1. Cockpit
 - master switch off
 - ignition off
 - fuel cocks - shut, fuel quantity check
 - instruments, check of condition
 - safety belts, condition, no damage
 - check of connection of flaperon tie rods
 - hand control, condition and free motion
 - foot control, condition and free motion
 - brakes, condition and function
 - trimming, free motion
 - engine control, free running
 - free articles
 - cleanness of window panels
 - door, shut and locked.
 2. Main landing gear - landing gear legs, condition, attachment, undamaged state
 - wheels, condition, tire pressure 200 kPa
 - brake condition
 3. Wings bolts
 - check of suspensions and wing and strut attachment
 - condition of wing surface and skin
 4. Pitot tube
 - condition and direction
 5. Flaperons
 - condition of attachment, hinges, flaperon surface
 - free motion of flaperon
 - check of counterweights attachment.
 6. Rear cockpit cover
 - condition and attachment
 7. Fuselage
 - condition, undamaged condition of lattice members and skin.
 8. Stabilizer and and elevator - condition of hinges, attachment of stabilizer struts
 - free motion of elevator and trim tab.
 9. Fin and rudder
 - condition and attachment, free motion
 - condition and attachment of rudder balance tab.
 10. Nose wheel
 - condition
 - pressure tire of 200 kPa.

-
-
11. Propeller - condition of blades, propeller driver, check of locking propeller nuts (if propeller spinner is not installed).
 12. Engine
 - condition and attachment of engine mount
 - condition and attachment of suction piping, carburettors and controls
 - condition and attachment of exhaust manifold
 - cooling, liquid condition and quantity
 - check of fuel system, filter and carburettors
 - link tank drained off
 - check of electrical system, ignition, cable connections,
 13. Fuels - replenish as needed.

6.2.2 Pre-Flight Check

- Cockpit, check of
 - cockpit interior equipment.
 - safety belts, undamaged condition.
 - control system, free running.
 - controls, free running and undamaged condition.
- Wings, check of
 - wing surfaces for undamaged condition.
 - wing suspensions, struts.
 - flaperons, undamaged condition.
- Fuselage, check of - undamaged condition of fuselage, lattice members and skin.
- Tail unit - check of its condition, surface and attachment.
- Landing gear - check of its condition and attachment.
- Engine and propeller - check of their condition and attachment.

6.2.3 Post-Flight Check

- check of drive for - damage of fuel system. fuel leakage
- damage of oil system, oil leakage
- damage of cooling circuit, liquid leakage
- damage of electrical system, ignition
- check of aircraft exterior for damage
- fuselage

- wings, flaperons
- tail unit
- fiberglass covers
- wash down the aircraft, clean it of soil
- cover the cockpit with a protective cover

6.2.4 Engine Warm-Up, Power Check

- wheels chocked, brakes on
- warming up-up to operating temperature - first at 2000 r.p.m. for 2 minutes, - then at 2 500 r.p.m. to oil temperature of 50 °C
- temperature and pressure values - within operating limits
- set maximum power - speed of about 5 000 r.p.m. (3 ÷ 5 sec.)
- check of ignition - speed of 3 850 r.p.m., r.p.m. drop at cutting off one circuit must not exceed 300 r.p.m.
speed difference between circuits 115 r.p.m.
maximum
- check of idle speed - 1400 r.p.m.
- temperature and pressure values must not exceed operating limits under any rating

CAUTION	Perform the engine check heading upwind! Do not carry it out on loose terrain! Nobody is allowed to stand within dangerous proximity and, in particular, within propeller level!
<i>NOTE</i>	<i>After check of engine power, cool down the engine for a short time to avoid evaporation of the cooling liquid in cylinder heads.</i>

6.3 Periodic maintenance

AIRFRAME

Maintenance Interval	Time Limitation
- after first 25 ± 2 hours	when reached
- after 50 ± 3 hours	every time when reached
- after 100 ± 5 hours	every time when reached, or once a year
- after 200 ± 5 hours	every time when reached, or after 2 years
- after 600 ± 5 hours	every time when reached, or after 6 years

ENGINE (maintenance in accordance with engine manufacturer's manual)

Maintenance Interval	Time Limitation
- after first 25 ± 2 hours	when reached
- after 100 ± 5 hours	every time when reached, or once a year
- after 200 ± 5 hours	every time when reached, or after 2 years
- after 1,200 hours	every time when reached, or after 15 years

PROPELLER (maintenance in accordance with propeller manufacturer's manual)

Maintenance Interval	Time Limitation
- maintenance per condition	
- after 100 hours	

NOTE	<i>The periodic maintenance procedure charts given below are designed for copying and serve as work sheets of the maintenance involved. We recommend to enter minor repairs carried out beyond maintenance framework, damages and way of remedy, replacements of separate parts, units..... Completed forms are recommended to be filed..</i>
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6.3.1 Inspection after First **25 Hours** of Operation

Pages:1

Aircraft:Apollo Fox 912 Ser.No: Registr.Mark:

Flight time as of: Hours flown: Number of take-offs:

No.	Step	Date	Carried Out by	Checked by
1.	check stiffness of controls running, slack or too stiff control action is to be adjusted			
2.	check condition and attachment of wing and strut suspensions and flaperon hinges			
3.	check tail unit condition and attachment			
4.	check landing gear condition and attachment			
5.	check damping rubber ropes condition			
6.	grease tail-wheel landing gear			
7.	check condition and attachment of fiberglass covers and cowling			
8.	check engine mounting, engine bed and silent-blocks			
9.	check carburettors and idle adjustment			
10.	check exhaust manifold for cracks			
11.	check propeller attachment, its run-out and its tightening			
12.	check condition of storage battery and its charging			
13.	check coolants and lubricants and their refilling			
14.	clean pilot compartment			
15.	check all joints for tightening and locking			

6.3.2 Inspection after **50 Hours** of Operation

Pages:1

Aircraft: Apollo Fox 912

Ser.No.:

Registr. Mark:

Flight time as of:

Hours flown:

Number of take-offs:

No.	Step	Date	Carried Out by	Checked by
1.	check as specified for 25-hour inspection			
2.	check aircraft surface for damage, distortion of lattice members, cracks in fabric, ...			
3.	check the following suspensions for fissures, proper clearance and damage ,... - engine mount - landing gear - struts - wings - tail unit			
4.	grease hinges and suspensions of: - landing gear - flaperons - rudder - elevator			
5.	grease bowden wires of throttle and choke control			
6.	check air filter condition - clean it or replace it			
7.	check fuel filter condition - replace it, if necessary			
8.	drain off water and dirt from link tank			
9.	check board documents for entirety and completeness including correct data			

6.3.3 Inspection after **100 Hours** of Operation

Pages:4

Aircraft: Apollo Fox 912

Ser. No.:

Registr.Mark:

Flight time as of:

Hours flown:

Number of take-offs:

No.	Step	Date	Carried Ou by	Checked by
1.	check as specified for 50-hour inspection			
2.	remove: - covers of engine cowling - covers of tail unit - detachable cockpit cover - bench-seat			
3.	check propeller run-out and its tightening on engine driver			
4.	check attachment of carburettors, replace rubber flange connections if necessary			
5.	check bowden wires of engine controls, grease and adjust running of both carburettors			
6.	check engine mount bar members for cracks, check rubber silent-blocks condition and attachment of engine mount, tightening of engine attachment screws			
7.	check condition of fuel supply line, interconnecting hoses and fuel filter			
8.	check coolers condition, clean the cooler louver of dirt			
9.	check connection of starter to the mains, condition of connecting cables			
10.	check airborne storage battery and perform its maintenance			
11.	check condition and attachment of control stick, control stops, deflections of control surfaces			
12.	check all controls in fuselage, grease movable parts of actuation and control, permitted clearance up to 3 mm on the upper part of the control stick			

13.	check attachment and function of foot control pedals and brake control			
14.	check condition of rudder and trim control cables			
15.	Check condition of fuel piping in the cockpit, fuel level gauges in tanks, tank fuel cocks, fuel supply line, fuel link tank. perform a function check of minimum fuel quantity warning			
16.	check condition and attachment of safety belts			
17.	check condition and attachment of door, its closing and locks			
18.	check floor condition and its attachment			
19.	check windshield, windows, door and cockpit canopy, cracks are to be drilled out			
20.	check condition of board instruments and electrical wiring			
21.	check condition and completeness of inside inscriptions, instrument colour coding and pilot's instructions			
22.	check condition of instrument board attachment, replace damaged rubber pads			
23.	check attachment of tail unit, struts and lattice members for damage and deformation			
24.	check attachment of tail unit control surfaces, their free motion, grease tail unit hinges and controls			
25.	check trim tab and its control			
26.	check landing gear legs, check them for deformation and damage			
27.	check condition and tension of landing gear rubber ropes, damaged ropes are to be replaced			
28.	check wheel and bearing condition, clean and grease them - smooth wheel rotation without undesired sounds			

29.	check tire condition for damage and wear			
30.	check brake lining condition, 1 mm as minimum			
31.	check brake system function, replenish brake fluid, if needed			
32.	check condition and attachment of tail-wheel landing gear leg			
33.	check tail wheel condition, tire wear, clean and grease bearings			
34.	check condition and wear of tail wheel arrestment device, clean and grease it			
35.	check condition of tail wheel, spring and control lever controls			
36.	check condition of wing and struts attachments for proper clearance, cracks, ...			
37.	check clamping bolts of wing suspensions			
38.	check wing surface for damage, deformation, surface buckling may signal inside wing damage, ...			
39.	check fiberglass wing tips for cracks			
40.	check flaperon hinges for damage and cracks			
41.	check free running of flaperons, grease hinges			
42.	check flaperon condition and surface, repair the damaged spots			
43.	check mass balance attachment			
44.	check condition of flaperon control arms			
45.	check condition of tank filler necks and filler caps			
46.	install bench-seat and check its attachment, clean the pilot's cockpit and fuselage compartment			
47.	clean the removed cowlings and reinstall them to the aircraft			
48.	check completeness of airframe and its equipment			
49.	wash down and preserve aircraft exterior			

6.3.4 Inspection after **200 Hours** of Operation

Pages: 1

Aircraft: Apollo Fox 912

Ser. No.:

Registr. Mark:

Flight time as of:

Hours flown:

Number of take-offs:

No.	Step	Date	Carried Out by	Checked by
1.	check as specified for 100-hour inspection			
2.	replace working liquid in cooling circuit			
3.	check condition of engine mount silent-blocks, replace the damaged ones			
4.	replace fuel filter, if necessary			
5.	replace air filter, if necessary			
6.	check condition of electrical system			
7.	check wear of tires, replace them if necessary			
8.	check condition and function of tail wheel arrestment device			
9.	drain fuel tanks: disconnect fuel system of wing tanks, rinse tanks with clean gasoline, rinse the fuel piping with clean gasoline and blow it through with pressure air drain off water and dirt from link tank connect the fuel piping			
10.	check condition of canopy glazing, cracks are to be drilled out			

6.3.5 Inspection after 600 Hours of Operation

We recommend the 600-hour inspection be carried out at the aircraft manufacturer's plant.

6.3.6 Lubrication Chart

Lubricated point	lubricate after hours				
	25	50	100	200	600
hand control - hinges, bearings and tie rod eyes		X1	X	X	X
foot control - hinges, control cables		X1	X	X	X
brakes - bowden wires and dual control cables		X1	X	X	X
engine control - bowden wires, cables		X1	X	X	X
trim - control wheel axle, cables		X1	X	X	X
storage battery - contacts (corrosion)	X	X	X	X	X
door locks - control mechanism		X1	X	X	X
tail unit - hinges of vertical and horizontal tail control surfaces		X1	X	X	X
- controls		X1	X	X	X
trim tab - hinge, bowden wires and control cables		X1	X	X	X
main landing gear - suspensions		X1	X	X	X
- wheel bearings			X	X	X
nose wheel		X1	X	X	X
- wheel axle, bearings			X	X	X
wing suspensions - front (at each assembly)	X	X	X	X	X
flaperons - hinges		X1	X	X	X

Explanatory notes: **X1** - several drops of oil may be used to lubricate

X - use grease to lubricate

6.4 Changes and Repairs of Aircraft in Operation

Minor damages, not affecting the aircraft airworthiness, may be repaired in operation provided the scope of work does not extend beyond cases described below:

1. Repair of aircraft skin

If damage occurs under operation, the skin can be repaired by replacing a whole part of the damaged fabric, or by a local repair using a patch. Such repairs may be carried out using the same materials as applied at aircraft fabrication. It is necessary proceed according manual of producer technologies for covering aeroplane POLYFIBR.

2. Repair of fiberglass parts

If a damage to these parts occurs, only a repair with use of epoxy resins and fiberglass cloth is applicable. It is necessary to clean thoroughly the surface of parts under repair up to the base material and to remove any grease and paint. When making repairs, keep to directions for use of epoxy materials.

3. Repairs of the lattice-work

The operator is allowed to carry out only such repairs of lattice-work in operation that do not require either use of a welding equipment or application of a thermal treatment at straightening.

Straightening of such structural members is permitted, deflection of which does not exceed 3% member length-member diameter ratio.

A **local** deflection (depression) not exceeding 5% of tube dimension in its diameter can still be considered admissible provided this tube is not damaged by cracks or some other non-reversible deformation.

4. Damages of larger extent.

When damages of larger extent are found, we recommend to consult the manufacturer. Only replacements of parts and components by parts and components of the same material specifications are allowed.

6.5 Ground Handling and Transportation

6.5.1 Towing, On-Ground Manoeuvres

The aircraft can be moved on airfield area by pushing, with assistance of 2-3 people. Two people can push the aircraft by struts in points of their attachment, either forward or backward, with the understanding that the direction of move is determined by the force intensity applied to move. The third person for aircraft move, if any, handles the aircraft by the grip rail located in fuselage tail section.

6.5.2 Parking and Housing Aircraft in Hangar

The aircraft may be parked both with folded and spread wings. To house the aircraft in a hangar, choose a suitable, less busy and dry place. We recommend to cover the aircraft with a protective tarpaulin to avoid its soiling with bird droppings.

6.5.3 Mooring

The aircraft is tied down in points of wing strut suspensions by built-in mooring rings and by tail wheel by means of ropes to anchors screwed in ground. It is advisable to cover the glazed cockpit canopy with a protective covering, if possible.

6.5.4 Jacking

The aircraft may be lifted in points designed for this purpose - the aircraft rear section may be lifted by hand by a grip rail on fuselage left side, or by fuselage lattice-work bottom side, preferably in points of tube gussets if possible, so that the fuselage part being lifted can be laid under with a soft pad on tubes of fuselage lattice-work, or on a stand under the tail-wheel landing gear. The aircraft must be secured to prevent its undesirable move by chocking its wheels.

- load relief of landing gear one side. Lift the aircraft up at the points of wing strut attachments up to complete lifting of one fuselage side. This method cannot be applied for a long-term aircraft supporting, it may be used for a momentary, short-term lifting of the aircraft only.
- jacking the whole aircraft up. Make ready a balk padded from one side with a soft material. We will use this balk to support transversely the front part of the fuselage and, using two jacks, jack the aircraft fuselage up to the required height. Further we will prepare a fixed stand to be located under the aircraft, thus assuring stable position of the whole aircraft. To jack the aircraft up, also special jacking stands designed for large aircraft may be used provided their frames are convenient.

6.5.5 Transportation

To transport the aircraft, it is necessary to fold it into transport position, i.e. to disconnect wing front suspensions, to fold wings and fix them to fuselage in transport position secured with connecting rods.

- for short distances the aircraft can be carried on landing gear of its own towed behind a vehicle by means of a simple tow bar attached to the suspension in fuselage rear part.
- for longer distances it is recommended to transport the aircraft on a two-wheel trailer, either open or covered.

To prepare the aircraft for transport:

1. Unlock and remove the rear cockpit cover, put it aside on seat.
2. Shut wing tank fuel cocks.
3. Discouple flaperon tie rods on both wings.
4. Unlock the front clamping bolt connecting wing to fuselage.
5. Slightly moving the wing, relieve the front clamping bolt and pull it out. Holding the wing by one hand, fold it carefully backwards, simultaneously checking move of flaperon by the other hand to prevent its striking on fuselage while being folded into transport position.
6. Repeat points 4 and 5 for the second wing.
7. Fix wings to fuselage by means of connecting rods.
8. Aircraft unfolding is to be carried out in converse sequence beginning from 6 to 1.

CAUTION	Incompetent folding and unfolding may damage flaperon which might result in loss of control functionality. Whenever unfolding the aircraft from transport position, be sure to check thoroughly of its control system. Folding and unfolding of the aircraft should be performed by two people as minimum.
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6.6 Aircraft Cleaning and Servicing

6.6.1 Outer surface

Cleaning of aircraft outer surface - To maintain proper aircraft surface properties, it is necessary to wash the skin with water first. Skin with heavy dirt can be degreased with addition of a car shampoo or a similar cleansing agent. Then wipe the skin dry and apply a polishing compound or a similar liquid agent. After drying up, repolish the surface with a soft cloth. It is necessary to see that wear-down of skin parts supported by aircraft structure and having relatively sharp edges is avoided. It is not advisable to wipe the skin with a dry cloth in any case not to damage the quality of applied exterior varnish.

Cleaning of window panes - smudged cockpit glass should be flushed off with a soft cloth, best with a chammy-leather in such a way so that its surface cannot be damaged. After wiping it dry, again with a chammy - leather as best, it is necessary to complete cleaning using a suitable window cleaner and a soft cloth. When performing maintenance of glass, never use greasy pastes or similar agents and compounds containing benzene.

6.6.2 Propeller

Propeller maintenance - Any work on propeller must be carried out in accordance with the propeller accompanying documentation. Soiled propeller should be washed down with water with added cleansing agents.

6.6.3 Engine

Engine maintenance - Any work on engine must be carried out in accordance with the accompanying engine documentation. Greasy spots in engine compartment should be cleaned with a rag or a brush dipped in gasoline. Let the engine compartment get aired properly.

6.6.4 Aircraft Interior, Seats and Upholstery

Cleaning aircraft interior - It is important to keep the aircraft interior clean, free from dust and dirt getting inside mainly when operating from grass airfields. Soil and dirt on upholstered surfaces, floor carpet, bench-seat and baggage compartment should be vacuum cleaned, or wiped off with a slightly damp cloth with addition of detergent..

6.6.5 Fuel Filling and Dumping

Since fuel will be in most cases refuelled from a barrel or a fuel can and not from the filling pump, it is necessary to pay a due attention to this activity. Refuelling should be carried out in places not endangering either the aircraft, its attendance or environment. Prior to refuelling it is always necessary to check gasoline for absence of water. Sampling should be done both from the transportation containers and from tanks and aircraft fuel system through drain sump. When refuelling, a funnel must be used provided with a strainer to trap impurities, or, even better, with a buckskin leather which can trap also eventual fuel moisture content. When filling fuel into tanks be careful to avoid staining of cockpit window panels and canopy glazing with fuel as it contains corrosive components that will cause a fast deterioration and damage to cockpit glazing. Fuel dumping is performed similarly as sampling by means of drain cock.

7. SUPPLEMENTS

TABLE OF CONTENTS

- 7.1 Introduction
- 7.2 List of Inserted Supplements
- 7.3 Weight and C.G. Position Record of FOX Ultralight
- 7.4 Measurement Record of FOX Control Surface Deflections
- 7.5 Hand Control Diagram
- 7.6 Foot Control Diagram
- 7.7 Fuel System Diagram
- 7.8 Oil System Diagram
- 7.9 Cooling Liquid Circuit Diagram

7.1 Introduction

This chapter contains supplements necessary to secure a safe and effective maintenance of the aircraft and equipment with various systems and outfit.

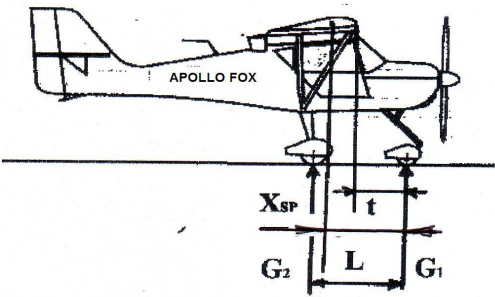
7.2 List of Inserted Supplements

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7.3 Weight and C.G. Position Record (specimen)

Serial Number

Registr. Mark:



Permitted first place of C.G.:	Desired place of C.G.:	Permitted rear place of C.G.:
0,31	0,42	0,49

$$X_{sp} = (G_2 * L) / (G_1 + G_2)$$

$$Sp = X_{sp} - t$$

Description	Sign	Aircraft weight		
		Empty aircraft	+ Radio, Transponder + Parachute	With max loading
Weight at first measuring point	G1 (kg)	39,0	37,0	49,5
Weight at rear measuring point	G2 (kg)	236,0	267,0	423,0
Aircraft weight	G (kg)	275,0	304,0	472,5
Distance between measuring points	L (m)	1,45	1,45	1,45
Leading edge distance	T (m)	0,87	0,87	0,87
C.G. from first measuring point	XSP (m)	1,24	1,27	1,30
C.G. from leading edge	Sp (m)	0,37	0,40	0,43

Date:

Performed by:

7.4 Measurement Record of FOX Control Surfaces Deflections

Serial Number:

Registration Mark:

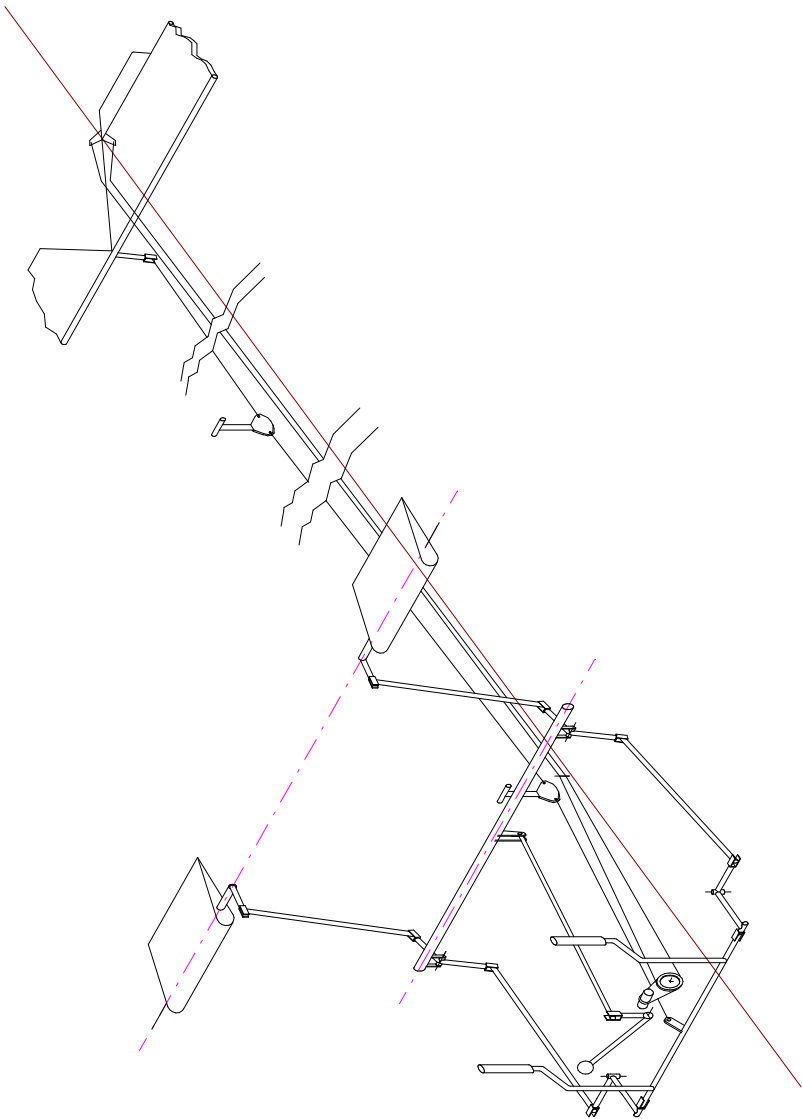
Deflections of Control Surfaces:

measured			prescribed
rudder:			$\pm 27^{\circ} \pm 3^{\circ}$ $^{\circ}$
elevator:	up	$30^{\circ} \pm 2^{\circ}$	 $^{\circ}$
	down	$27^{\circ} \pm 2^{\circ}$	 $^{\circ}$
trim tab	up	$30^{\circ} \pm 3^{\circ}$	 $^{\circ}$
	down	$30^{\circ} \pm 3^{\circ}$	 $^{\circ}$
ailerons:	left	up	$16^{\circ} \pm 2^{\circ}$ $^{\circ}$
		down	$8^{\circ} \pm 1^{\circ}$ $^{\circ}$
	right	up	$16^{\circ} \pm 2^{\circ}$ $^{\circ}$
		down	$8.^{\circ} \pm 1^{\circ}$ $^{\circ}$
wing flaps:	left	$20^{\circ} + 5^{\circ}$	 $^{\circ}$
	right	$20^{\circ} + 5^{\circ}$	 $^{\circ}$

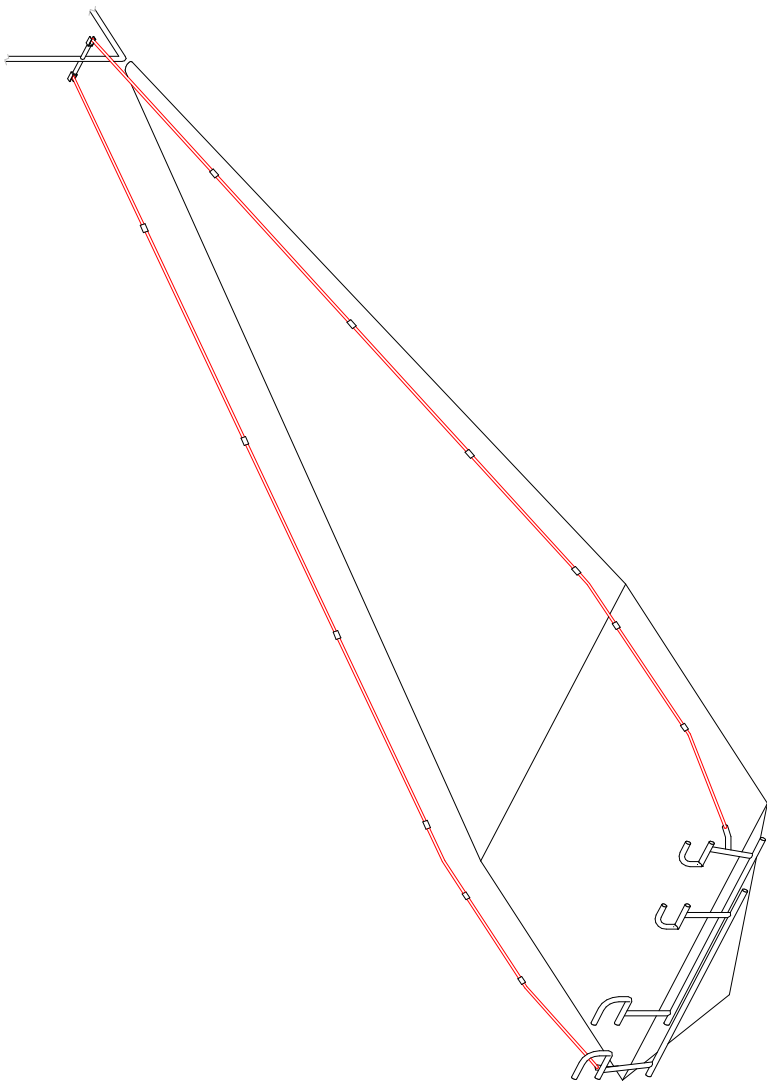
Date :

Performed by:

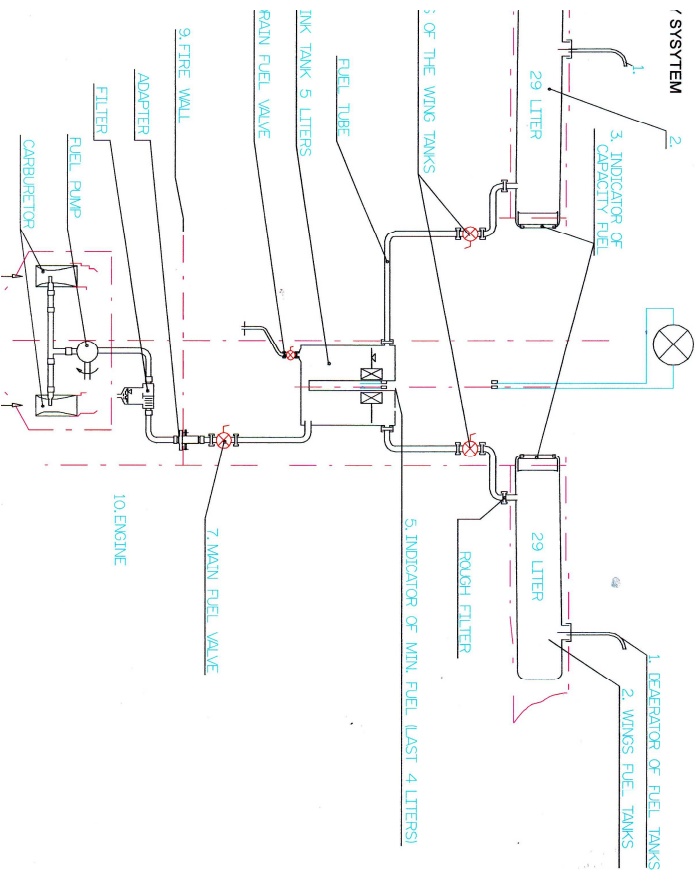
7.5 Hand Control Diagram



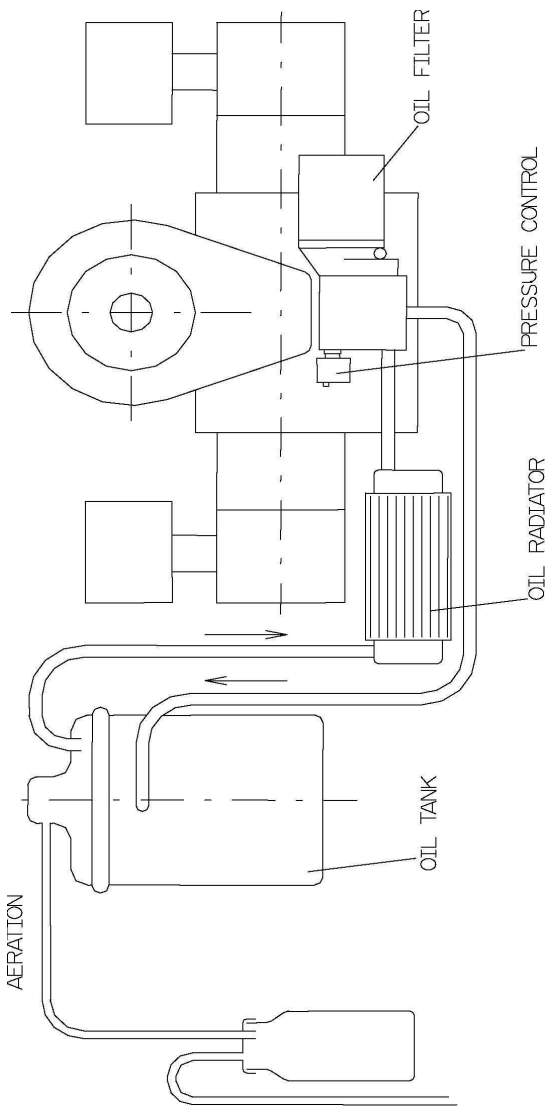
7.6 Foot Control Diagram



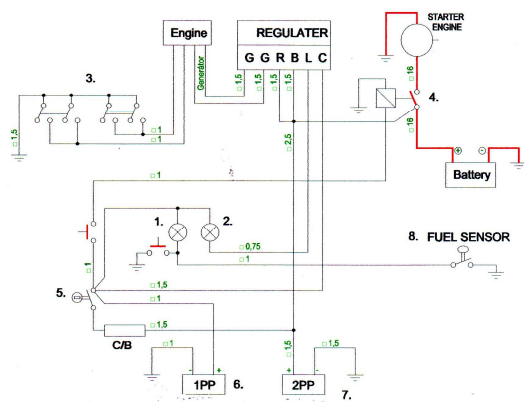
7.7 Fuel System Diagram



7.8 Oil system diagram



7.9 Wiring of electric system



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1. Control light of fuel reserve 5 l
 2. Charging of accumulator
 3. Ignitions
 4. Master switch
 5. Master switch
 6. Power for engine instruments
 7. Power for avionic
 8. Indicator of last 5 liters of fuel