

Nose wheel version

and

Tail wheel version

FLIGHT MANUAL

EUROFOX

Ultralight

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The Netherlands

**LAA TECHNICAL BOARD OF THE SLOVAK
REPUBLIC**

REPRESENTED BY

Mr..... Ing.P.Tonček, M.Sc.

hereby confirms, on the basis of commission to verify airworthiness of ultralights granted by Ministry of Transport of the Slovak Republic, that this ultralight meets requirements of UL-2 regulation as for its structure, used material, performance and qualities and has been classified with ultralight category, class:

ULLa**Aerodynamically Operated Ultralight
Aircraft**

Aircraft Name - Type:

EUROFOX 912

Serial Number:

Registration Mark:

Date of Issue:

Stamp, Signature

**This ultralight has not been registered by state administration and is
to be operated at operator's own responsibility.**

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

0.1 RECORD OF REVISIONS

Any revisions or amendments to the present 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 left page margin and the page shall bear revision number and date of its issue.

Rev. No.	Chapters Affected	Pages Affected	Date of Issue	Bulletin Number	Bulletin Approved On	New Page Inserted On, Signature

0.2 LIST OF EFFECTIVE PAGES

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CHAPTER 1

1. GENERAL

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- 1.1 Introduction
- 1.2 Certification Basis
- 1.3 Warning, Caution and Note
- 1.4 Brief Description
 - 1.4.1 Aircraft Type
 - 1.4.2 Power Unit
 - 1.4.3 Propeller
 - 1.4.4 Aircraft Dimensions
 - 1.4.5 Deflections of Control Surfaces
 - 1.4.6 Landing Gear
- 1.5 Three-View Drawing

1.1 Introduction

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

This manual contains instructions necessary for pilots. Further it contains additional data supplied by the aircraft manufacturer.

1.2 Certification Basis

This type of ultralight has been approved by Technical Board of LAA of the Slovak Republic in compliance with UL-2 regulation and it has been issued Type Certificate No. ULL 03/96.

Airworthiness Certificate: **P**

1.3 Warning, Caution and Note

The following definitions apply to warnings, cautions and notes in the flight manual:

WARNING

Means that the non-observation of the corresponding procedure leads to an immediate or important degradation of the flight safety.

CAUTION

Means that the non-observation of the corresponding procedure leads to a minor or to a more or less long term degradation of the flight safety.

NOTE

Draws the attention of any special item not directly related to safety but which is important or unusual.

1.4 Brief Description

1.4.1 Aircraft Type

EUROFOX is an ultralight designed as a high-wing monoplane supported by struts. A two-spar wing is provided with flaperon. Fuselage is a lattice-work of steel tubes. Tail unit is formed of a lattice-work tube frame. Landing gear is of a conventional type, with a tail wheel.

1.4.2 Power Unit

The EUROFOX ultralight is powered by ROTAX 912 UL engine. It is a four-cylinder, four-stroke, opposed-cylinder, centre-camshaft engine with overhead 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.

WARNING

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

1.4.3 Propeller

The V230C propeller made by VZLU Praha is a two-bladed, right-handed, tractor, wooden, fixed-pitch propeller with a strengthened leading edge.

1.4.4 Aircraft Dimensions

Wing span.....	9.125 m
Length.....	5.605 m
Height.....	1.8 m
Wing area with flap.....	11.4 m ²
Chord length without flap.....	1.12 m
with flap.....	1.3 m
Wing loading.....	39.47 kgm ⁻²
Aspect-ratio.....	7.3
Propeller clearance (in flight position).....	0.22 m

1.4.5 Deflections of Control Surfaces

Elevator.....	up	35° ± 2°
	down	27° ± 2°
Trim tab.....	up	15° ± 3°
	down	50° ± 3°
Rudder.....		±27° ± 3°
Ailerons.....	up	18° ± 2°
	down	8.5° ± 1°
Wing flaps.....		0 + 20° + 5°

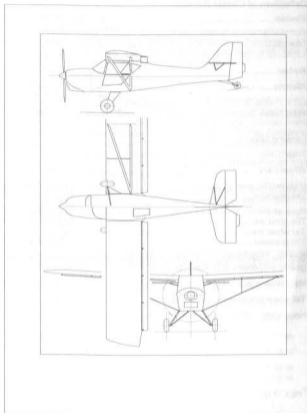
1.4.6 Landing Gear

Track.....	1.6 m
Wheel base.....	4.12 m
Main landing gear wheel tire.....	15x6.00-6
Tire pressure.....	150 kPa
Nose wheel.....	4 x 4 / 290
Tire pressure.....	160 kPa
Tail wheel tire.....	210 x 65 mm
Tire pressure.....	150 kPa

Both the main landing gear, nose landing gear and the tail-wheel landing gear is suspended by rubber ropes.

Main landing gear rubber rope, number of coils	8+7+6, (21 coils)
Tail wheel rubber rope, number of coils.....	4
Nose wheel rubber rope, number of coils.....	6

1.5 Three-View Drawing



2.3 Airspeed Indicator Marking

CHAPTER 2

2. OPERATING LIMITATIONS**TABLE OF CONTENTS**

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| 2.2 | Speed Limitations |
| 2.3 | Airspeed Indicator Marking |
| 2.4 | Engine Instruments Marking |
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| 2.12 | Fuel |
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| 2.14 | Other Limitations |
| 2.15 | Limitation Placards |

2.1 Introduction

Chapter 2 contains operating limitations, instrument markings and basic placards necessary for safe operation of the ultralight, its engine, standard systems and equipment.

2.2 Speed Limitations

Speed limits are given in the synoptical table below.

Speed		km/h IAS	Remarks
V_{ME}	Never exceed speed	185	Do not exceed this speed in any operation.
V_{NO}	Normal operating limit speed	160	This speed may be exceeded under smooth air only, do not apply deflections of control surfaces over one third.
V_A	Manoeuvring speed	140	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	110	Do not exceed this speed with wing flaps extended.
V_{SO}	Minimum steady flight speed solo double	60	with extended wing flaps
		65	
V_{S1}	Minimum steady flight speed solo double	70	wing flaps retracted
		75	

2.3 Airspeed Indicator Marking

Marking	km/h IAS	Signification
White arc	65 + 110	Range of wing-flaps use.
Green arc	85 + 160	Normal range of operation.
Yellow arc	160 + 185	Manoeuvres must be conducted with special caution and in smooth air
Red line	185	Never exceed speed

2.4 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 temperature [°C]	60	60 + 95	95 + 110	110
Oil pressure [kPa]	150	150 + 400	400 + 500	700 at cold start
Fuel pressure [kPa]				40
Fuel quantity [l]	5 signal warning	sight check	sight check	55

2.5 Power Unit

Engine manufacturer.....	BOMBARDIER - ROTAX, AUSTRIA
Representation for the Czech Republic.....	TEVESO Škroupova 9, 501 97 Hradec Králové
Engine model.....	ROTAX 912 UL2
Max. power	- take-off.....59.6 kW / 80 HP - continuous.....58.0 kW / 77.8 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.....	22.7 l/h
Consumption at 75% of power rating.....	16.2 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.

Propeller manufacturer	Kremen, Praha, Czech Republic
Propeller type.....	SR200B
Propeller diameter	1700 mm
Max. propeller speed	2600 r.p.m.
Max. flight speed.....	185 km/h
Blade angle at 75%	15 °
Max. out-of-balance	0.5 g/600 mm
Propeller purpose	tractor

2.6 Weights

Empty weight (standard version)	265 kg
Max. take-off weight.....	450 kg
Max. landing weight	450 kg
Max. fuel weight.....	45 kg
Max. baggage weight in baggage compartment.....	10 kg

2.7 Centre of Gravity Position

Prescribed range of C.G. position.....	18 + 29 % MAC
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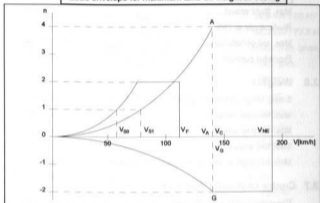
2.8 Operating Load Factors

At take-off weight of 450 kg

Maximum positive centre of gravity load factor + 4 g

Maximum negative centre of gravity load factor - 2 g

Load envelope for maximum take-off weight of 450 kg



2.9 Manoeuvres

This aircraft has been certified in normal category.

Permissible manoeuvres and manoeuvre entry speeds are given below.

Turn, bank of 60° 140 km/h

Side slip 120 km/h

WARNING

Aerobatics, intentional stalls and spins are prohibited.

2.10 Crew

Number of seats	2
Minimum crew weight	55 kg
Max. crew weight	180 kg
Max. crew weight at 28 l of fuel and zero baggage.....	160 kg
Max. crew weight at 55 l of fuel and zero baggage.....	140 kg
Maximum permissible cockpit load.....	185 kg

2.11 Kinds of Operation

Only VFR day flights (under condition of ground contact) at ambient temperature over 0° C are permitted.

WARNING

IFR flights and flying in clouds are prohibited.

2.12 Fuel

Fuel tank capacity - wing tanks.....	2 x 25 l
- link tank	5 l
Max. fuel quantity.....	55 l
Usable fuel quantity	54 l
Unusable fuel quantity	1 l
Fuel specification	unleaded EUROSUPER ROZ 95
	in accordance with DIN 51607

Type recommended in the Czech Republic.....BA 95 Natural

The fuel system includes two wing tanks of 25 l fuel capacity each, a link tank of 5 l capacity, drain cock, fuel cocks, a fuel filter, an engine fuel pump and 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. 4 l, is in that 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.

It is not advisable to change the used type of gasoline during engine operation. 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. Fuel dumping is performed similarly as sampling by means of a drain cock. When filling fuel into tanks, be careful to avoid staining of cockpit window panels and glass with fuel as it contains corrosive components that will cause a fast deterioration and damage to cockpit glazing.

2.13 Oil

Oil tank capacity	3.0 l
Oil charge	2.5 l
Minimum oil quantity	2.0 l
Oil specification	API SF, SG
	for 4-stroke motorcycle engines
First charge	Mogul forte GX

2.14 Other Limitations

NO SMOKING aboard the aircraft.

2.15 Limitation Placards

Manufacturer:	AEROPRO, Nitra	
Max. take-off weight:	450 kg	
Empty weight:	265 kg	
Never exceed speed	V_{NE}	185 km/h
Max. Flap Extended speed	V_{FE}	110 km/h
Stalling speed	V_{S0}	65 km/h

**AEROBATICS, INTENTIONAL STALLS
AND SPINS ARE PROHIBITED**

CHAPTER 3

3. EMERGENCY PROCEDURES

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- 3.1 Introduction
- 3.2 Engine Failure
 - 3.2.1 Engine Failure at Take-Off Run
 - 3.2.2 Engine Failure at Take-Off
 - 3.2.3 In-Flight Engine Failure
 - 3.2.4 Carburettor Icing
- 3.3 In-Flight Engine Starting
- 3.4 Engine Fire, Fumes in the Cockpit
 - 3.4.1 Ground Fire
 - 3.4.2 Take-Off Fire
 - 3.4.3 In-Flight Fire
- 3.5 Descent, Gliding
- 3.6 Emergency Landings
 - 3.6.1 Precautionary Landing
 - 3.6.2 Blown-Out Tire Landing
 - 3.6.3 Damaged Landing Gear Landing
- 3.7 Vibrations

3.1 Introduction

Chapter 3 contains procedures for various emergencies which may occur. A thorough performance of maintenance system should prevent occurrence of such extreme cases.

The chapter describes basic emergencies and procedures for their solving. 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.

3.2 Engine Failure

3.2.1 Engine Failure at Take-Off Run

- | | |
|----------------|----------------|
| - throttle | reduce to idle |
| - ignition | switch off |
| - apply brakes | |

3.2.2 Engine Failure at Take-Off

- | | |
|--------------------------|---|
| - speed | 110 km/h IAS |
| - choice of landing area | - after take-off and up to 50 meter land in straight direction ahead, if possible |
| | - over 50 m: choose landing area |

The landing area is to be preferably chosen in direction of free runway or a free clear area, upwind, if possible.

- | | |
|-------------------|------------------------------|
| - master switch | switch off |
| - ignition | switch off |
| - main fuel cock | shut |
| - tank fuel cocks | change over to shut position |
| - wing flaps | extend as needed |
| - safety belts | tighten |

3.2.3 In-Flight Engine Failure

- airspeed	110 km/h IAS
- area selection	depending on flight altitude
check	
- master switch	switched on
- ignition	switched on
- main fuel cock	open
- wing tank fuel cocks	open to tank with more fuel
- throttle	set to 1/3 of travel
- starter	start the engine

if the engine cannot be started up, proceed in accordance with 3.2.2. procedure.

3.2.4 Carburettor Icing

Carburettor icing mostly occurs when getting into an area of ice formation. The carburettor icing shows itself through a decrease in engine power and an increase of engine temperatures. To recover the engine power, the following procedure is recommended:

- airspeed 80 - 90 km/h IAS
- throttle max. at 1/3 of power \approx (3500 r.p.m.)
- if possible, leave the icing area
- increase gradually the engine power to cruise conditions after 1-2 minutes
- if you fail to recover the engine power, land on the nearest airfield (if feasible), or, depending on circumstance, off-airfield, following the procedure given under 3.2.2.

3.3 In-Flight Engine Starting

- airspeed 110 km/h IAS
- area selection depending on flight altitude
- 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 adjust to 1/3 of travel
- ignition switch on
- starter start up
- if the engine cannot be started up, increase the flight speed to 140-160 km/h so that air flow can rotate the propeller, thus enabling engine starting.

CAUTION

Loss of height needed for in-flight engine starting is about 150 - 200 m.

3.4 Engine Fire, Fumes in the Cockpit

Recommended procedures to follow, when fire or fumes in engine compartment and cockpit are detected.

3.4.1 Ground Fire

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

3.4.2 Take-Off Fire

- | | |
|-------------------|--|
| - throttle | idle |
| - main fuel cock | shut |
| - tank fuel cocks | shut |
| - airspeed | 110 - 120 km/h and land |
| - brakes | stop |
| - throttle | full travel |
| - ignition | switch off after using up fuel in carburettors and engine stopping |
- abandon the aircraft and extinguish fire (if possible)

3.4.3 In-Flight Fire

- | | |
|--|--|
| - main fuel cock | shut |
| - tank fuel cocks | shut |
| - throttle | full travel |
| - landing area selection | guide the aircraft to an airfield, or choose an area for emergency landing |
| - ignition | switch it off after using up fuel in carburettors and engine stopping |
| - master switch | switch off |
| - airspeed | 110 - 120 km/h |
| - wings flaps | extend as needed |
| - safety belts | tighten |
| - perform emergency landing | |
| - abandon the aircraft and extinguish fire (if possible) | |

NOTE

Time needed to pump fuel out of carburettors is around 30 sec.

3.5 Descent, Gliding

- | | |
|----------------------|--------------------------------|
| - airspeed | 110 km/h |
| - throttle | increased idle |
| - wing flaps | retracted |
| - engine instruments | values within permitted limits |

CAUTION

At long final and when descending from a considerable height, it is not advisable to reduce the engine throttle control to minimum. In such case the engine becomes undercooled and a loss of power occurs. When descending, apply increased idle so that engine instrument readings range within the limits for normal use.

gliding ratio	1 : 11
optimum gliding speed.....	95 km/h IAS
sinking	2.3 m/s

3.6 Emergency Landings

Recommended procedures for various types of emergency landing.

3.6.1 Precautionary Landing

- choose landing area, evaluate wind direction and speed, area surface, surrounding obstacles and total safety of the manoeuvre under consideration
- perform approach and fly-over at a speed of 95 km/h along the deliberate area at a height of 50 m to estimate the area condition, obstacles and to determine magnetic course of landing
- make orbiting approach to land
- perform landing from the very beginning of the chosen area

3.6.2 Blown-Out Tire Landing

- carry out normal approach-to-land
- when floating at landing, keep the damaged wheel above ground as long as possible using ailerons
- maintain the direction at landing run, applying foot control

3.6.3 Damaged Landing Gear Landing

- carry out a normal approach-to-land
- if the tail wheel is damaged, perform a touch-down on wheels and hold the aircraft on wheels as long as possible till the speed is lost
- if the main landing gear is damaged, perform touch-down at the lowest speed possible and maintain direction at landing run, if possible

3.7 Vibrations

If any forced vibrations appear in the aircraft, it is necessary:

- to set engine speed to such power rating where the speed is lowest
- to land on the nearest airfield, or to perform a precautionary landing off-airfield
- if the vibrations are increasing, carry out an emergency landing off-airfield, following procedures given under 3.2.2.

CHAPTER 4

4. NORMAL PROCEDURES**TABLE OF CONTENTS**

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- 4.2 Outfit and Equipment
- 4.3 Daily Preparation, Pre-Flight Preparation
 - 4.3.1 Engine Warm-Up, Power Check
- 4.4 Pre-Flight Check
- 4.5 Normal Procedures and Checklists
 - 4.5.1 Prior to Engine Starting (After Entering Cockpit)
 - 4.5.2 Use of External Power Supply
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 - 4.5.4 Prior to Taxiing
 - 4.5.5 Taxiing
 - 4.5.6 Prior to Take-Off
 - 4.5.7 Take-Off
 - 4.5.8 Climbing
 - 4.5.9 Cruise Flight
 - 4.5.10 Descent
 - 4.5.11 Downwind
 - 4.5.12 After Base Leg
 - 4.5.13 Before Final
 - 4.5.14 Bailed Landing
 - 4.5.15 Landing
 - 4.5.16 After landing
 - 4.5.17 Engine Stopping
 - 4.5.18 Post-Flight Check
 - 4.5.19 Rain

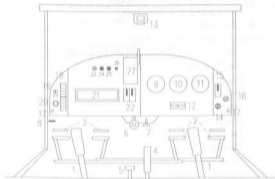
4.1 Introduction

Chapter 4 contains procedures for normal aircraft operation.

4.2 Outfit and Equipment

It includes a basic set of instruments to monitor flight and power unit parameters. Further equipment is offered as optional.

It holds the following as minimum: airspeed indicator, altimeter, vertical speed indicator, bank indicator, magnetic compass and FLYDAT combined indicator.



I. LAYOUT OF CONTROLS AND INSTRUMENTS

- | | | |
|-----------------------|------------------------------|--------------------------------|
| 1. Control stick | 10. Altimeter | 19. 12 V socket switch |
| 2. Rudder pedals | 11. Vertical speed indicator | 20. 12 V socket |
| 3. Brake pedals | 12. Bank indicator | 21. FLYDAT |
| 4. Wing flaps | 13. Magnetic compass | 22. Ignition |
| 5. Trim | 14. Switch box | 23. Recharge signal light |
| 6. Throttle lever | 15. Switch master | 24. FLYDAT signal light |
| 7. Choke | 16. Starter | 25. Minimum fuel warning light |
| 8. Fuel cock | 17. Ventilation | 26. Min. fuel push-button |
| 9. Airspeed indicator | 18. Fuse panel | 27. GPS Garmin 90 |

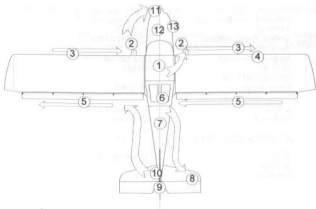
II. INSTRUMENTS

	Type	Serial No.
Airspeed indicator		
Altimeter	UL 10-10	
Vertical speed indicator	LUN 1147.10-8	
Bank indicator		
Magnetic compass	LUN 1221-8	
FLYDAT	ROTAX	
GPS 90 GARMIN		
Miniintercom	MG 2000	
Engine	ROTAX 912 UL2	
Propeller	SR 200 B	

III. STORAGE BATTERY

Type	FIAMM GS FG22803
Voltage	12 V
Capacity	18 Ah

4.3 Daily Preparation, Pre-Flight Preparation



1. Cockpit
 - master switch switched off
 - ignition off
 - fuel cocks - shut, fuel quantity check
 - instruments, check of condition
 - safety belts, condition, no damage
 - check of flaperon tie rods connection
 - hand control, condition and free running
 - foot control, condition and free running
 - brakes, condition and function
 - trimming, free running
 - engine control, free running
 - loose articles
 - cleanness of window panels
 - door, shut and locked.

2. Main landing gear - landing gear legs, condition, attachment, undamaged state
 - condition of damping rubber ropes
 - wheels, condition, tire pressure 110 kPa
 - brake condition
3. Wings
 - check of wing and struts suspensions and clamping bolts
 - 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. Stabiliser and elevator - condition of hinges, attachment of stabiliser 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. Tail wheel
 - condition and function of swinging arm
 - condition of damping rubber ropes
 - arrestment, free control
 - pressure tire of 110 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, carburetors and controls
 - condition and attachment of exhaust manifold
 - cooling, liquid condition and quantity
 - check of fuel system, filter and carburetors
 - draining off water and dirt from the link tank
 - check of electrical system, ignition, cable connections,
13. Fuels - replenish as needed.

4.3.1 Engine Warm-Up, Power Check

- wheels chocked, brakes on.
- warming-up to operating temperature - first at 2000 r.p.m. for 2 minutes,
 - then at 2500 r.p.m. to warm up oil at temperature of 50 °C
- temperature and pressure values - within operating limits
- set maximum power - speed of about 5000 r.p.m. (3 + 5 sec.)
- check of ignition - speed of 3850 r.p.m., r.p.m. drop at cutting off one circuit must not exceed 300 r.p.m.
 - speed difference between the circuits 115 r.p.m. maximum
- check of idling 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!
NOTE	<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>

4.4 Pre-Flight Check

- | | |
|----------------------|--|
| cockpit, check | - cockpit interior equipment. |
| | - safety belts, their undamaged condition. |
| | - control system, free running. |
| | - controls, free running and undamaged condition. |
| wings, check | - wing surfaces for undamaged condition. |
| | - wing and struts suspensions |
| | - flaperons, undamaged condition. |
| fuselage, check | - 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. |

4.5 Normal Procedures and Checklists

4.5.1 Prior to Engine Starting (After Entering Cockpit)

- foot control	free motion
- brakes	check function
- hand control	free motion
- trim	free running and functional check
- wing flaps	free motion, retracted
- engine control + choke	free running
- 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

4.5.2 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.

4.5.3 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 stick | pulled backwards, clamped between legs |
| - brakes | braked, 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 |

4.5.4 Prior to Taxiing

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

4.5.5 Taxiing

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

4.5.6 Prior to Take-Off

- brakes	brakes on
- speed	3500 r.p.m.
- trim	neutral
- wing flaps	take-off position
- master switch	switched on
- ignition	switched on
- main fuel cock	open
- tank fuel cocks	fuel quantity check, open to tank with more fuel quantity
- instruments	check of readings
- door	shut, locked
- safety belts	fastened, tightened
- control	check of free motion
- check of runway	

4.5.7 Take-Off

Continuously increasing engine power to maximum (max. 5800 r.p.m.), bring the aircraft into motion. Slightly pushing the control stick forward, unstick the tail wheel off ground. At a speed of 70 km/h, slightly pulling the control stick backward, unstick the main landing gear. Hold acceleration after unsticking till increase of speed to 90-100 km/h. Slowly pulling the control stick backwards, get the aircraft to climbing at a speed of 100 - 110 km/h.

- airspeed	100 - 110 km/h IAS
- speed	max. cont. power, max. 5500 r.p.m.
- engine instruments	within limits
- wing flaps	retract them at a height of 50 m
- trimming	trim

WARNING

Take-off is forbidden - if engine running is not smooth.
- if runway is not clear.

4.5.8 Climbing

- | | |
|----------------------|------------------------------------|
| - speed | max. cont. power, max. 5500 r.p.m. |
| - airspeed | 100 - 110 km/h IAS |
| - engine instruments | within limits |

4.5.9 Cruise Flight

- | | |
|---|--------------------|
| - bring the aircraft into horizontal flight | |
| - speed | 4000 - 5000 r.p.m. |
| - airspeed | 110 - 160 km/h IAS |
| - engine instruments | within limits |

4.5.10 Descent

- | | |
|----------------------|----------------|
| - speed | increased idle |
| - airspeed | 110 km/h IAS |
| - engine instruments | within limits |

CAUTION

At long final and when descending from a considerable height, it is not advisable to reduce the engine throttle control to minimum. In such case the engine becomes undercooled and a loss of power occurs. When descending, apply increased idle so that engine instrument readings range within the limits for normal use.

4.5.11 Downwind

- | | |
|--------------------------------------|--|
| - speed | 4000 - 5000 r.p.m. |
| - airspeed | 110 - 160 km/h IAS |
| - engine instruments | within limits |
| - fuel | fuel quantity check, switch to tank with more fuel |
| - brakes | check their function by depressing brake pedals |
| - safety belts | tighten |
| - base leg and before final space | check of free space |
| - at base leg and before final space | check free space |

4.5.12 After Base Leg

- speed 3000 r.p.m.
- airspeed 110 km/h IAS
- engine instruments within limits
- wing flaps take-off
- trimming trim
- space before final check of free space

4.5.13 Before Final

- airspeed 110 km/h IAS
- speed adjust as needed
- engine instruments within limits
- wing flaps for landing
- trimming trim
- engine instruments within limits
- check of clear landing strip (people, obstacles).

4.5.14 Balked Landing

- speed max.take-off power, max. 5800 r.p.m.
- airspeed 100 - 110 km/h IAS
- engine instruments within limits
- wing flaps take-off
- trimming trim
- wing flaps retract at a height of 50 m
- trimming trim
- speed max. cont. power, max. 5500 r.p.m.
- climb 100 - 110 km/h IAS

4.5.15 Landing

At a height of about 10 m reduce the engine speed to idle. Maintain speed of 90-100 km/h till flattening-out. When floating at a height of 0.5 -1 m above ground, decelerate gradually by pulling the control stick backward. At a speed of about 55-60 km/h the aircraft touches-down at three points. At landing run it is necessary to hold the elevator up and to apply brakes with feeling, keeping in mind a potentiality of turning the aircraft over on propeller. At wind speed over 7 m/sec it is advisable to land with increased idle and on the main landing gear.

4.5.16 After landing

- | | |
|-------------|---|
| - brakes | finish braking slowly, may also be applied for control of direction of move |
| -wing flaps | retract |
| - balancing | balanced tail heavy |

4.5.17 Engine Stopping

- | | |
|---------------------------|-------------------------------------|
| - speed | cool down the engine at 2000 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 |
| - tank fuel cocks | switch to shut position |

4.5.18 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
 - landing gear
 - fibreglass covers
- wash down the aircraft, clean it of dirt
- cover the cockpit with a protective cover

4.5.19 Rain

When flying in the rain, no additional steps are required. Aircraft qualities and performance are not substantially changed.

CHAPTER 5

5. PERFORMANCE

TABLE OF CONTENTS

5.1	Introduction
5.2	Performance
5.2.1	Position Error
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5.3	Further Information
5.3.1	Cruise Flight
5.3.2	Endurance
5.3.3	Take-off from Grass Surface
5.3.4	Rain Effect on Flight Characteristics
5.3.5	Crosswind Effect
5.3.6	Other Data

5.1 Introduction

Chapter 5 contains data on airspeed calibration (position error of airspeed indicator), on minimum flying speeds and data on take-off characteristics.

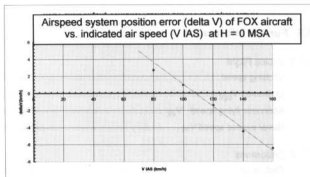
The data are based on particular flight measurements undertaken with the aircraft of this type under normal conditions and with application of average piloting technique.

5.2 Performance

5.2.1 Position Error

The table below gives data on calibrated airspeed CAS and indicated airspeed IAS. Delta V indicates an airspeed system position error.

V CAS km/h	V IAS km/h	delta V km/h
75.83481	70	5.834813
82.72482	80	2.724817
100.9777	100	0.977747
118.6061	120	-1.39388
135.5541	140	-4.44588
153.5682	160	-6.43182



5.2.2 Minimum Speed

Minimum speed	solo	70 km/h IAS
.....	double	75 km/h IAS

5.2.3 Take-Off Characteristics

Take-off distance over a 15 m obstacle	solo	190 m
.....	double	210 m

5.2.4 Landing

Landing distance over a 15 m obstacle	solo	280 m
.....	double	330 m

5.2.5 Climbing

Rate of climb	solo	7.0 m/s
.....	double	4.5 m/s

Gliding ratio at stopped engine 1 : 11

Optimum gliding speed 95 km/h

Sinking at stopped engine 2.3 m/s

5.3 Further Information

5.3.1 Cruise Flight

Cruising speed 110 - 160 km/h

Optimum V_{opt} 120 km/h

Economic flying speed V_{ek} 110 km/h

Never exceed speed V_{NE} 185 km/h

5.3.2 Endurance

Endurance 4.5 hod

Ceiling 4500 m

Flying range 540 km

5.3.3 Take-off from Grass Surface

Take-off distance over a 15 m obstacle..... solo	210 m
..... double	250 m

5.3.4 Rain Effect on Flight Characteristics

Flying qualities and characteristics are not substantially changed.

5.3.5 Crosswind Effect

Maximum permitted wind speed components for take-off and landing:

aligned with runway axis	12 m/s
perpendicular to runway	5 m/s
tail wind	2 m/s

5.3.6 Other Data

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CHAPTER 6

6. WEIGHT AND C.G. POSITION

TABLE OF CONTENTS

- 6.1 Introduction
- 6.2 Table of Weights
- 6.3 Weight and C.G. Position
- 6.4 Weight and C.G. Position Record (specimen)

6.1 Introduction

This chapter contains values of payload at which the aircraft can be safely operated.

Aircraft weighing procedures and computations to determine range of safe payload are included under item 6.4.

6.2 Table of Weights

Max. Take-Off Weight	No Baggage	5 kg Baggage	10 kg Baggage
450 kg	Max. Crew Weight	Max. Crew Weight	Max. Crew Weight
Empty 265 kg	185 kg	180 kg	175 kg
+ Fuel 50 %	165 kg	160 kg	155 kg
+ Fuel 100 %	145 kg	140 kg	135 kg

6.3 Weight and C.G. Position

Minimum crew weight55 kg

Max. crew weight at 30 l of fuel and zero baggage.....165 kg

Max. crew weight at 55 l of fuel and zero baggage.....145 kg

Maximum weight of baggage behind pilot's seat10 kg

The weight and C.G. position found:

Weight:

265 kg

C.G. Position:

20,2 % B_{MAC}

Date:

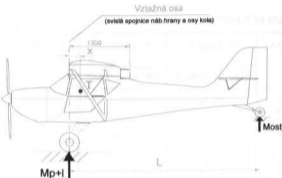
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6.4 Weight and C.G. Position Record (specimen)

Serial Number

Registr. Mark:

Aircraft Levelling:



Values Weighed:

Main wheels

right-hand

MRH =

With a pilot

left-hand

MLH =

m =

Tail skid

MTS =

Resulting weight

Mres =

C.G. position

$$X = \frac{M_{ts} \cdot L}{M_{res}} = \dots \text{ mm} = \dots \text{ mm}$$

$$\bar{X} = \frac{X}{1300} \cdot 100 = \dots \% B_{MAC} = \dots \% B_{MAC}$$

Date:

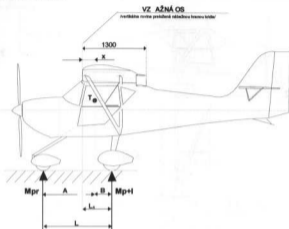
Performed by:

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

Serial Number

Registr. Mark:

Aircraft Levelling:



Values Weighed:

Main wheels

right-hand

MRH =

With a pilot

Tail skid

left-hand

MLH =

m =

MTS =

Resulting weight

Mres =

C.G. position

$$X = L_1 \cdot \frac{MTS + L}{Mres} = \dots \text{ mm} \quad \dots \text{ mm}$$

$$\bar{X} = \frac{X}{1300} \cdot 100 = \dots \% B_{MAC} \quad \dots \% B_{MAC}$$

Range of empty aircraft C.G. position:

$$\bar{X} = 20 + 29 \% B_{MAC}$$

Date:

Performed by:

7.4 Three-View Drawing

