AIRCRAFT MANUAL

ADVANCED ULTRALIGHT AIRCRAFT

TST – 10 M

SERIAL NUMBER: SAMPLE

REGISTRATION:

DATE OF ISSUE:

MANUFACTURER: TeST, spol. s r. o.

SIGNATURE:

REGISTERED COPY Nr.:

To ensure a safe flight, this aircraft must be operated according to the information and limits published in this document !

PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE OPERATING THE AIRCRAFT !

LIST OF CHANGES

No.	Description (modification)	Pages changed	Date

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1 GENERAL

1.1 INTRODUCTION

This manual contains the minimum required procedures that have to be followed in order for the aircraft to be operated safely. The owner of the aircraft must comply with all the regulations that apply to this type of aircraft. The user must respect also other rules generally valid for operation of the airplanes of this category.

1.2 CERTIFICATION

The glider has been designed and certified in accordance with the standard of the Aeroclub of the Czech Republic “Airworthiness Requirements ULK – Ultralight Gliders and Motorized Gliders”, registered by the Czech Air Office UCL under nr. TI-676/98 from 18th February 1998. The airplane with installed engine Rotax 447 UL-I S.C.D.I. complies with the standard UL-2 part I. for powered airplanes.

1.3 WARNINGS AND MISCELANEOUS

Expressions such as WARNING and ATTENTION, which appear in this document, are defined as follows:

WARNING: Ignoring recommended procedures could create dangerous or hazardous conditions in flight, which could cause serious injury or death.

ATTENTION: Ignoring recommended procedures could create dangerous or hazardous conditions in flight and could lead to damage to the aircraft and possible personal injury.

NOTE: explains an item, which does not affect safety directly, but is important or unusual.

2 DESCRIPTION OF SYSTEMS

The aircraft is a single-seat, high-winged monoplane with a cantilever wing, T-shaped tail and a classical one-wheel undercarriage. Its composite structure is made in negative moulds.

2.1 Wing

The wing with sandwich structure is equipped with ailerons and air brake on the upper surface. There are no ribs in the wing. The strength system of the wing is formed by the main spar, by the aileron spar and by the root rib. All the wing profile of the sanwich structure forms the torsion box. The wings are interconnected by fittings and two horizontal pins. The connection wing-fuselage is made by means of pins and fittings placed in the fuselage and the wing root rib. The composite ailerons are hung by four hinges with the turning axis on the upper side. Air brakes on the upper side of the wing are made of aluminium and are retracted into pits..

2.2 Fuselage

The fuselage with a shell structure is made in the negative mould together with the fin.

2.3 Tail

The tail is a T-shaped sandwich structure..

2.4 CONTROLS

The controls enabling pitch, roll, air brake and trim controlling, are of the lever design, with a push-pull rods system. The relevant backstops are placed on the stick. The yaw control with adjustable pedals is transmitted by cables. The airplane can be trimmed by a torsional member in the elevator drive that is controlled by a lever in the left of the cockpit.

2.5 UNDERCARRIAGE

The undercarriage consists of one unsprung wheel 300x100 mm mounted in a flexible fork. The brake handle is on the control stick. The tail wheel 80x30 mm is turnable.

2.6 PROPULSION GROUP

The aircraft is equipped with a two cylinder, two stroke engine Rotax 447 modified by TeST. The fuel tank is located behind the pilot's seat. The tank capacity is 12 litres. Fuel used is a mixture of gasoline and oil (50 : 1). Fuel is delivered to the engine by a vacuum pump.
The exhaust line is equipped with an efficient muffler. Power is transmitted from the engine to a two-blade wooden propeller through a reduction drive.
The whole power unit can be retracted into the fuselage behind the main baffle by means of

electric motor with gearbox and movement screw. The whole set is balanced by a gas strut. After switching off the ignition, the propeller is stopped in the vertical position by a special device.

2.7 DIMENSIONS

2.7.1 Wing:

Span	15,0 m (49,1 ft)
Area	10,033 m^2 (108,0 ft^2)
Aspect ratio	22,42
Root chord	0,93 m (3,0 ft)
Tip chord	0,35 m (1,1 ft)
Angle of Attack	$+4^0$
Dihedral	$+3^0$
Geometrical Torsion	0
Airfoil	Wortmann mod.
Aileron's deflection	$+12^o$ -24^o
Dive brakes on the upper side	0,16 m^2 (1.77 ft^2)

2.7.2 Horizontal Tail:

Span	2.4 m (7.9 ft)
Area	1.07 m^2 (11,5 ft)
Root chord	0,55 m (1,8 ft)
Tip chord	0,35 m (1.1 ft)
Elevator area	0.355 m^2 (3,82 ft^2)
Arm of the horizontal tail	4,18 m (13,7 ft)
Deflection Up	-20^o
Deflection Down	$+16^o$
Airfoil	NACA 0011
Angle of attack	0^o

2.7.3 Vertical Tail:

Height	1.19 m (3.9 ft)
Root chord	0,99 m (3.2 ft)
Tip chord	0.65 m (2.1 ft)
Area	0.949 m^2 (10.2 ft^2)
Rudder Area	0.294 m^2 (3,15 ft^2)
Deflections	$+/- 35^o$
Airfoil	E 474

2.7.4 Fuselage:

Length	6,86 m (22,5 ft)
Width	0,64 m (2,1 ft)
Height (cockpit)	0,84 m (2,7 ft)
Max. Cross Section	0,45 m^2 (4.8 ft^2)

2.7.5 Engine:

Type	Rotax 447 UL- SCDI mod. by TeST two cylinders, two stroke, pulling with reducer, cooling by propeller and air stream
Cylinder capacity	436.5 ccm (26.64 cu.in.)
Stroke	61 mm (2.40 in.)
Bore	67.5 mm (2.66 in.)
Performance	26 kW / 5500 rpm
Lubrication	by mixture with oil, 1 : 50
Starter	electric
Weight	40 kg (88 lbs)
Carburettors	membrane (floatless) type
Accumulator	12V / 14 Ah
Fuel	gasoline 95 octanes
Lubricant	Castrol TTS or equivalent

For further details, see the Operator's Manual of the engine.

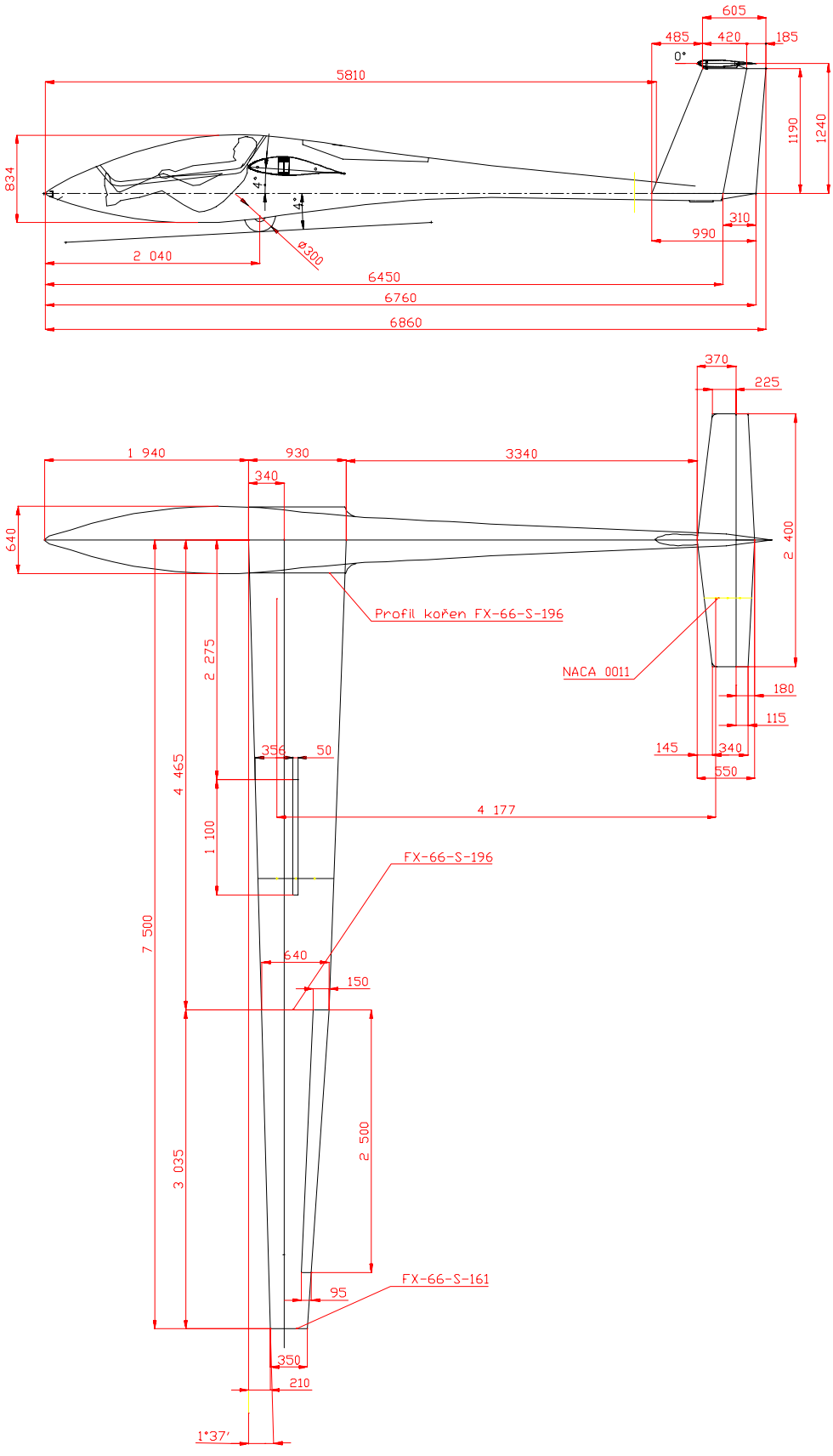
2.7.6 Weights

Max. take-off weight	300 kg
Empty weight	203 kg
Weight of pilot	70 – 95 kg

2.8 FLIGHT CHARACTERISTICS

Stall Speed v_{SO}	65 km/h [35.1 kt]
Max. design speed v_D	220 km/h [100,5 kt]
Max. Permissible Speed v_{NE}	180 km/h [97.2 kt]
Max. aerotowing speed v_T	140 km/h [75,6 kt]
Max. gust speed v_B	140 km/h [75,6 kt]
Max. glide ratio (teor.)	40 / 105 km/h [40 / 56,7 kt]
Operational loads	+4 / -2 at v_A = 140 km/h [75,6 kt]
	+4 / -1.5 at v_{NE} = 180 km/h [97.2 kt]

2.9 THREE VIEW DIAGRAM



3 OPERATIONAL LIMITS AND INFORMATION

3.1 GENERAL

In this section published limits for speed, mass, CG and other specifications are necessary for the safe operation of the aircraft.

WARNING: Ignoring any of the limits published below could result in damage to the aircraft and /or personal injury or loss of life.

3.2 SPEED LIMITATIONS

3.2.1 V_{SO} STALL SPEED 65 km/h [35.1 kt]

Stall speed in landing configuration as shown on the airspeed indicator to be corrected for the instrument installation error.

WARNING: In flight, do not fly the aircraft less than 10 km/h (4 kt) above the stall speed.

3.2.2 V_A DESIGN SAFETY SPEED 140 km/h [75.6 kt]

WARNING: Full deflections of all controls are not permitted at speeds above v_A.

3.2.3 V_B SPEED FOR MAX. GUST INTENSITY 140 km/h [75.6 kt]

This pertains to mechanical turbulence, gusting wind, and approaching thunderstorms.

WARNING: do not fly the aircraft over this speed limit in the above mentioned weather conditions.

3.2.4 V_{NE} NEVER EXCEED SPEED 180 km/h [97.2 kt]

WARNING: do not exceed the above speed limit in flight. When operating near this speed limit do not use more than 30% deflection of control surfaces.

3.2.5 V_T MAX. ALLOWED TOWING SPEED 140 km/h [75,6 kt]

WARNING: do not exceed the above speed limit while undergoing aerotow. Verify (before beginning aerotow), that the towing aircraft is able to tow safely at a speed lower than this maximal speed.

3.3 AIRSPEED INDICATOR MARKINGS

WHITE BAND	65-80 km/h	Speed from V_{SO} up to min. cruising speed
GREEN BAND	80-140 km/h	NORMAL cruising speed up to V_B speed
YELLOW BAND	140-180 km/h	Flight can be executed in calm air only up to V_{NE}
RED LINE	180 km/h	NEVER EXCEED SPEED V_{NE}
	65 km/h	STALL SPEED V_{SO}
YELLOW TRIANGLE	100 km/h	Landing approach speed with max. gross weight

WARNING: keep the marking visible and keep the recommended speed limits

3.4 ENGINE LIMITATIONS

Engine:	Rotax 447 UL-1V S.C.D.I. mod.
Max. take-off performance	26 kW / 5 500 rpm
max. take-off rpm	5 500
max. cylinders heads temperature	280°C
fuel	gasoline 95 octanes, synthetic oil 1:50
fuel tank volume	12 litres [3.1 US gal]
usable fuel	11 litres [2.7 US gal]

3.5 WEIGHT LIMITATIONS

3.5.1 MAX. TAKE OFF WEIGHT **300 kg**

Maximum weight at which the aircraft is legally operational.

3.5.2 EMPTY WEIGHT **203 kg**

Maximum weight of the aircraft and equipment without pilot.

3.5.3 MAX. WEIGHT OF PILOT **95 kg**

(including a parachute)

3.5.4 MINIMUM WEIGHT OF PILOT **70 kg**

(including a parachute).

ATTENTION: do not overload the aircraft

WARNING: Ensure that the minimum weight of the pilot including his parachute is not below 70 kg. If the pilot is lighter, add appropriate ballast under the pilot seat.

3.6 CENTRE OF GRAVITY (CG)

MAXIMUM FRONT	**2280**	**mm**	**from the datum line**
MAXIMUM AFT	**2350**	**mm**	**from the datum line**

Datum line is a vertical level perpendicular to the longitudinal axis of the airplane, touching the nose in the flight position. Pilot's weight (65 – 95 kg) is included.

WARNING: Any modifications done on the airplane, that can change the CG position, must be consulted with the manufacturer.

3.7 PERMITTED MANEUVRES

Permitted are steep turns of maximum 45° bank.

WARNING: Aerobatics, intentional falls and spins are prohibited !

At maneuvering, the following load factors cannot be exceeded:

at v_A = 140 km/h [75.6 kt] n = +4 and n = -2
at v_{NE} = 180 km/h [97.2 kt] n = +4 and n = -1,5

3.8 OPERATIONAL LIMIT

The aircraft shall be operated according to VFR regulations during daylight hours only. Flights in clouds are prohibited.

3.9 WIND VELOCITY

Maximum wind speed parallel to the line of take off: 8 m/s [15.5 kt]
Maximum wind speed for 90° crosswind: 4 m/s [7.8 kt]

ATTENTION: do not operate the aircraft if wind velocity exceeds the maximum permissible speed.

3.10 SIGNS AND PLACARDS

3.10.1 OUTSIDE SIGNS

Left side of the fuselage in close proximity to the landing gear: **TIRE 250 kPa [38 psi]**

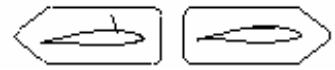
Trailing edges of the wings, ailerons and elevator: **DO NOT PUSH**
Trailing edge of the rudder on both sides: **DO NOT PUSH**
Pitot pressure tube: **red color**

3.10.2 INSIDE PLACARDS

On the instrument panel: **weight information**
On the instrument panel: **speed information**
Cockpit – right side: **compass deviation table**
Centre-section bulkhead: **name plate**

Used symbols:


Trim: heavy on tail – heavy on nose


Air brakes: extended – retracted


Fuel valve: closed – open

Main switch: ON – OFF

Throttle: idle – full

Canopy: open

3.11 CONTROLS AND LEVERS IN THE FRONT COCKPIT

A. The control stick is of usual type with handle and lever which controls the wheel brake.

B. The rudder pedals are adjustable on ground.

C. The lever for dive brakes control is located on the left side of the cockpit (blue color) and the positions **OPEN** and **CLOSE** are placarded.

D. The trim control (green color) is on the left side of the cockpit and **NOSE HEAVY** and **TAIL HEAVY** positions are placarded.

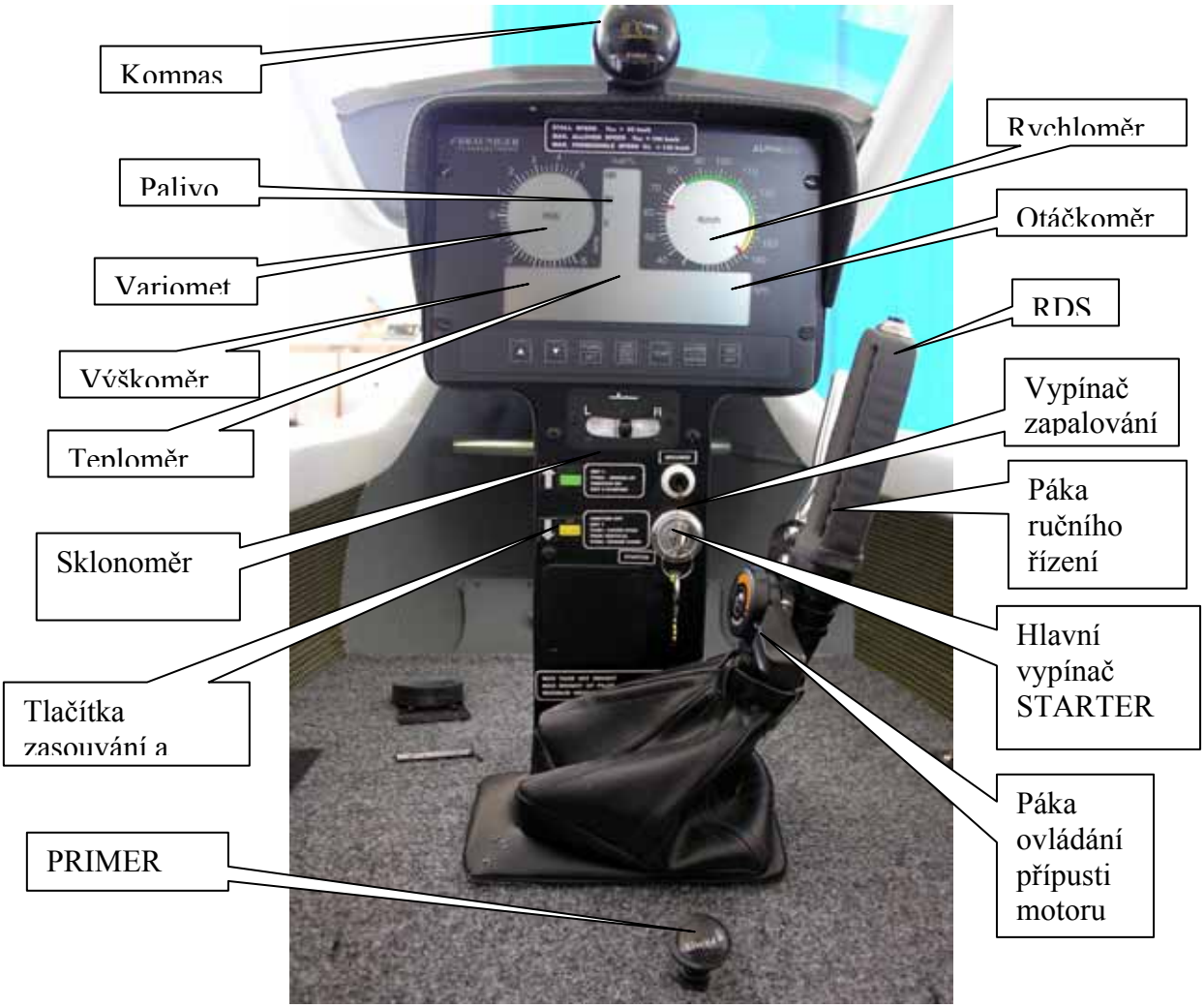
E. The canopy locks are located on the left and right side of the canopy.

F. The pull rod for the cockpit ventilation is placed on the right side below the canopy frame. The positions OPEN and CLOSED are placarded.

G. The throttle lever is located on the stick (when a power unit is installed).

H. The switches and push buttons for extracting / retracting the power unit are located on the instrument panel (see the following sketch), if a power unit is installed.

3.12 INSTRUMENT BOARD



4 STANDARD PROCEDURES

4.1 GENERAL

ATTENTION: The recommended procedures described in this section are important. Be sure to keep recommended speeds and follow all the prescribed procedures and inspections.

4.2 RIGGING AND DERIGGING OF THE AIRCRAFT

The rigging and derigging of the airplane to be done by three persons. After finishing the assembly, check all control suffaces for right directions and mobility along the whole range up to their stops.

4.2.1 Rigging of the wings

1. in inspectional regime of the engine (see below paragraph 4.12) open the engine doors and extract the engine
2. insert the left wing onto the fuselage so that the fuselage pins match the counterparts in the wing
3. insert the right wing onto the fuselage so that the fuselage pins match the counterparts in the wing
4. insert the main pins of the wings. Turn the main pins to enable their securing by clips
5. secure all the pins with their respective clips
6. connect the driving shafts of the ailerons and dive brakes with pins. Secure them in their positions by nuts and cotter pin
7. inspect deflections of ailerons and dive brakes
8. switch over to automatic regime, and extract or retract the engine if needed

NOTE: The wing pins are matching the openings of the fittings. To remove them, use a knock-out jig.

4.2.2 Rigging of the horizontal tail

1. place the horizontal tail on the fin and while moving it backwards insert its pins into the sleeves in the fin
2. screw down the vertical bolt connecting the elevator to the rudder and secure it with a safety wire
3. interconnect the control rod with the elevator lever and secure it
4. inspect the deflection of the elevator

WARNING: After each rigging of the airplane check again the right connection and securing of all pins and connections. This inspection, provided by an independent and experienced person is highly recommended.

4.2.3 **Derigging of the aircraft**

Derigging of the aircraft to be carried out in the reversed sequence.


4.3 MANIPULATION ON GROUND

Opening and closing of the canopy:
Holding the frame, lift up the canopy. Before the upper position is achieved, you will hear a clap - the support has locked into the secured position and this will keep the canopy open. Enter the cockpit. When closing the canopy, lift up the canopy (holding its frame) and simultaneously press the support by your shoe tip forwards. The support is so loosen and the canopy can be closed. On the end close both locks at cockpit sides.

The airplane is equipped with turning tail wheel, that enables easy manipulation of the ship on the ground. The airplane can be pushed backwards as well as turn on the spot without lifting. Towing behind a car is possible using a 5 m long cable (hinged like at the aerotowing), the speed shall not exceed fast walking velocity. An assistant keeps the wing tip off the ground. The canopy must be closed.
In case the engine is installed, taxiing under own power is possible. Pilot in the cockpit controls the engine, an assistant keeps the wing tip. On good surface, taxing without an assistant is also possible (wingtip wheels help).

NOTE: The undercarriage and most of all the tail wheel are designed for usual operation on a good surface. If the surface is not good, an assistant should lift the tail wheel or a suitable jig to be used.

4.4 PRE FLIGHT INSPECTION

Before each flight inspect the aircraft for general condition, damage, incorrect fitting of parts and equipment, dirt, ruptures, clearances and leaks.

WARNING: if any damage is found or if the condition of any part of the aircraft has been found unsatisfactory do not operate the aircraft.

Recommended pre flight inspection procedure: open the canopy and extend the dive brakes. Inspect the following:

1. Right side of the cockpit
2. Fuselage under the cockpit
3. Landing wheel from the right side
4. Leading edge and the bottom of the right wing
5. Inspection cup of the right wing-aileron control drive
6. Outer part of the right wing
7. Right aileron
8. Upper surface of the right wing and spoiler
9. Power-plant from the right side
10. Right side of the fuselage
11. Tail
12. Fairings of the tail section
13. Right side of the tail
14. Fin and rudder
15. Tail wheel
16. Left side of the stabilizer and elevator
17. Left side of the fuselage
18. Upper surface of the left wing and spoiler
19. Power plant from the left side
20. Aileron of the left wing
21. Outer part of the left wing
22. Leading edge and the bottom of the left wing
23. Landing wheel from the left side
24. Fuselage under the canopy on the left side
25. Both cockpits and their equipment
26. Instruments
27. Canopy
28. If the engine is installed, inspect all parts of the power unit

WARNING: do not operate the aircraft if any damage has occurred !

4.5 INTER FLIGHT INSPECTION

The following has to be checked:

1. Engine and its mounting brackets
2. Propeller
3. Fuel system
4. Undercarriage
5. Cockpit
6. Flight instruments
7. Surface of the airplane

WARNING: do not operate the aircraft if any damage has occurred !

4.6 POST FLIGHT INSPECTION

Wear and tear of single parts and groups to be inspected like at the pre-flight inspection. The found-out defects and wear must be repaired.

4.7 REGULAR INSPECTION

Carry out the following acts after every flight day:

a. **Surface of the airplane:** clean the entire surface.
b. **Electric system:** check the battery and its charging.
c. **Internal fixtures and emergency devices:** check the first-aid kit. Check the canopy release mechanism.
d. **Controls and Levers:** check all control devices, their function and condition, also check the engine control
e. **Instrument Panel:** check the fittings of the instrument panel and the instruments for potential damage
f. **Undercarriage:** check the condition of the landing wheel, check the brake, and check the tire pressure
g. **Flight Instruments:** check adjustment and zero values of the instruments
h. **Fuselage:** check the condition of the surface, the wing to fuselage pins connection.
i. **Tail:** check the skin surface, the deflections of the rudder and the elevator. Check the connecting pins to the fuselage.
j. **Canopy:** check the canopy, the locks and hinges. Clean the canopy.
k. **Wing:** check the skin surface, the ailerons and their hinges. Check the pins connecting the wings together.
l. **Power Plant:** check the condition of the engine fittings. Check the fuel tank, and the fuel line for leakage. Check all joints of the retracting mechanism. Check the engine itself in accordance with its manufacturer's instructions.
m. **Propeller: i**nspect the propeller for damage and check the condition of the bolts in the hub.
n. **Engine:** check all the pins and bolts connecting the engine to the airframe. Check the fixing of the engine cover.

4.8 FUELING AND ENGINE TEST

4.8.1 While refuelling, the following procedure must be kept:

1. The engine must be shut-off.
2. The ignition switch must be OFF.
3. Left wing tip on the ground.
4. The fueling is done using a funnel with appropriate fine screen installed to catch impurities.
5. Open the fuel tank nozzle and pour in the desired amount of fuel.
6. Close the filling nozzle.

The maximum tank volume is 12 litres (3.1 US gallons), non-exhaustible amount is 1 litre (about 0.25 US gallons). While fueling, observe standard precautions for handling combustibles.

WARNING: Fueling must ne done outside on the free air. Be aware of the handling with combustibles and keep them. A functional fire extinguisher must be available. Pay attention on the possible static electricity sparks originated by clothing made from synthetic fabric.

Pay attention in the last phase of the refuelling in order to prevent spilling.

4.8.2 While starting the engine and providing the engine test, the following procedure is to be followed:

1. Ignition switches and fuel valve ON
2. Activate three times the priming pump
3. Throttle 1/3, start the engine.
4. Let the engine warm up at higher rpm.
5. Full throttle, performance test – duration 30 seconds
6. Test the idle running
7. Test the engine shut off by a short switch OFF

WARNING: do not take-off if any of the above tests show failure of any of the engine controls, rough running engine at any power level or failure of the engine to develop fully rated power. Read the instructions from the engine manufacturer and follow them.

WARNING: While carrying out the engine test, sit in the cockpit. The canopy must be closed. The airplane must be secured with chocks. Pay attention – absolutely no one is allowed to be in the plane of the propeller rotation nor to be close to the fuselage to touch the propeller in any way. Protect the nose bottom against damage at full rpm (underlay it by soft material or anchor the tail wheel to the ground).

4.9 TAKE OFF

Prior to each take off execute the following steps:

1. Adjust the seat back support
2. Enter the aircraft
3. Adjust the rudder pedals
4. Check the zero values of instruments, adjust the altimeter
5. Adjust and tighten the seat belts
6. Close the cockpit canopy
7. Check the control stick and rudder pedals for full range of motion
8. Check the trim for the full range
9. Check the dive brakes and close them in the locked position
10. Set the trim to the take off position
11. Connect the towing rope or extract and start the engine

At the take-off line:

12. Check the engine temperature
13. Check whether the canopy is properly closed

WARNING: When flying over 300 m (984 ft) AGL, and when flying thermic flights, the use of the personal parachute is recommended.

4.9.1 AEROTOW TAKE OFF

While taking off by towing adhere to the following instructions:

1. The length of the towing rope must be at least 40 m (131 feet)

2. The tow rope or the tow rope weak link must have the minimal tensile strength 3 000 N. The minimal diameter of the pull rope end eye is 30 mm (1 3/16”).
3. The maximal allowed towing speed v_T = 140 km/h (75,6 kt). The pilot of the towing airplane must be informed not to exceed this speed.
4. Prior to the take off move the trim lever approximately 15 mm (5/8”) ahead of its neutral position, hold the control stick in the nose-up position. Your assistant keeps the wing in the neutral position. It is forbidden make an aerotow take off with the wing touching the ground. While stretching the tow rope brake lightly activate the gear brake to prevent looping of the rope. After the start ease the stick forward to put the glider into the "wheel" position. After leaving the ground at the speed 65-70 Km/h (acc. to weight of the pilot) trim the glider for the given flight regime and velocity. When releasing the tow rope pull the handle several times to its backstop. Do your further maneuvres only after you have made sure the rope has been disconnected.
5. In case of crosswind take off the glider at higher speed while controlling the direction by rudder.

WARNING: during take off keep the wings consequently levelled with ailerons. Use rudder only to eliminate crosswind. If the wing contacts the ground, abort the take off immediately. Release the tow rope and simultaneously smoothly but fully push down the nose with elevator. Wait until the glider stops. Before the new take off inspect the glider.

4.9.2 SELF LAUNCHING TAKE-OFF

Keep the following instructions:

1. Trim in the middle position, elevator in the full back position. The assistant keeps the wing in the horizontal position. Alternatively, the pilot can take-off independently (initially with one of wingtips on the ground.
2. Smoothly increase the engine rpm to set the airplane into motion. Smoothly set the airplane to the position on main wheel. Keep this position and smoothly increase the rpm to maximum.
3. In case of middle to front centre of gravity position (heavier pilot) or when taking-off on a softer terrain the airplane tends to tip up onto the nose when put into movement. However, this is no reason for aborting the take-off. Wait with the stick in the rear position until the speed has increased and then set the airplane into the wheel position.
4. Wait until the speed reaches 65-75 km/h (35-41 kt). Then by gentle backward pull of the stick raise the airplane into the air, up to 1 m (3 ft) above ground. Wait at this altitude until the speed reaches 85-90 km/h (47-49 kt), then by further gentle pull on the stick set the airplane into climb attitude.
5. At the altitude of about 50 m (150 ft) drop the engine rpm in order to climb about 1.5 m/s (3 kt) at 90-100 km/h (48-59 kt), if the air is turbulent, at 100-110 km/h (59-65 kt). Trim the airplane for this flight regime.

WARNING: When taking-off, keep the wings level with ailerons. Check any cross wind drift with rudder only. If a wing tip touches the ground, interrupt the take-off. Drop the rpm to idle run and simultaneously push the stick forward. Wait until the airplane stops and then switch-off the engine. Before new take-off check the airplane as per para 3.4. PRE FLIGHT INSPECTION.

NOTE: remember, that the engine is defined as an auxiliary one. Selflaunching is possible

only from a good quality and sufficiently long runway. From a soft surface, from high grass or against a slope, the take-off could be unsuccessful.

4.10 FLIGHT

WARNING: When flying over 300 m (900 ft) AGL or during thermic flights, the pilot should be equipped with personal parachute. This is not needed if the aircraft is equipped with integrated rescue system (BRS).

4.10.1 FLIGHT WITHOUT POWER UNIT

1. After releasing the tow rope trim the glider for the level flight at the speed desired.
2. The glider is fully trimable in the whole range of allowed speeds. All of the control surfaces are effective throughout the whole speed range, the dive brakes have essentially no influence on the trim. The view from the cockpit to the front and upper hemisphere is good. Down-left and down-right back view is partially limited by the wings. Use caution when maneuvering to these positions.
3. Recommended thermalling speed is 85-95 km/h (46-51 kt), acc. to flight weight of the glider. The glider keeps the required attitude and speed with minimal control intervention. The roll rate is approximately 3 seconds.
4. When flying close to the upper speed limit (yellow arc on the airspeed indicator), i. e. 140 - 180 km/h (76-97 kt), use maximally 1/3 deflections of the control elements. Deflect smoothly and carefully to avoid excessive loading of the airframe and control surfaces. Dive brakes must be extended slowly and smoothly, speed should be reduced to 140 km/h (76 kt) before their retracting.

4.10.2 FLIGHT WITH POWER UNIT

1. After the climbing is finished, go over to horizontal flight. Set the rpm in order to fly at desired speed. Trim the airplane for this speed.
2. The airplane is fully trimable in its full speed range. All of the control surfaces are effective throughout the whole speed range. The view from the cockpit to the front and upper hemisphere is good. The view to the left and right rear is partially covered by wings, therefore use caution when manoeuvering into these directions.
3. The recommended economy cruising speed is 90-110 km/h (49-59 kt).
4. Recommended circling speed is 90-100 km/h (49-56 kt) acc. to flight weight of the airplane. The airplane keeps the required attitude and speed with minimal control intervention. The roll rate is approximately 3 seconds. With extended engine, do not turn with a bank over 30^{o}.
5. When flying close to the upper speed limit (yellow arc on the airspeed indicator), i. e. 140 - 180 km/h (76-97 kt), use maximally 1/3 deflections of the control elements. Deflect smoothly and carefully to avoid excessive loading of the airframe and control surfaces. Dive brakes to be extended slowly and smoothly, speed should be reduced to 140 km/h (76 kt).
6. In case you wish to go on as a pure sailplane, switch off the engine and drop the air speed to 90 - 100 km/h (49-56 kt). Retract the engine after the propeller has stopped in the vertical position (see below Chapter 4.10.4)

7. When one has descended to an altitude unsafe for flying as a pure sailplane, adhere to the following procedure:
   - select a suitable strip for an emergency landing
   – extract the engine
   – increase the air speed to 130-140 km/h (70-76 kt)
   – start the engine

WARNING: if the starting is unsuccessful and the ground height has decreased below 150 m (450 ft) AGL, land on the selected emergency strip.

Take into consideration that the extended engine with stopped propeller creates a significant drag and its mass is high over the centerline of the airplane. This decreases the flight characteristics of the airplane, its glide ratio and stall speed, particularly in turn. That is why when flying in this configuration keep higher speed and do not extend 30 degrees in turns.

4.10.3 RETRACTING OF THE ENGINE

1. Bring the airplane in the straight flight, reduce airspeed to 90-100 km/h [49-54 kt]. Drop the engine rpm down to its idle rpm
2. ignition switch off, fuel valve off
3. after the engine has stopped, wait about 30 seconds for cooling of the engine and its exhaust manifold
4. during this cooling put the main switch (key) into the position 1
5. open the engine doors by activating the engine retraction push button
6. wait until the airmill effect has moved the propeller into the vertical position, check in the mirror to ascertain that the propeller is indeed in the vertical position (stopped by the plastic flap)
7. activate for the second time the engine retracting push button. The relevant pilot lamp twinkles. The engine is being retracted
8. the full retracting is signalized by expiring of the pilot lamp
9. main switch (key) back to the position 0.

NOTE: Extracting and retracting can be any time changed into the opposite direction by activating the relevant push button. Switching-off the main switch after any manipulation with the engine (up or down) has been finished, is highly recommended. It brings an aditional protection for the actuator motor. Any appliances like radio, GPS etc. must be connected to the battery directly, by-passing the main switch (key).

WARNING: Switching-off of the engine and its retraction to be always done only in the stabile straight flight. Remember, that the engine with the stopped propeller cause significant enhancement of the drag and deterioration of the flight characteristics

WARNING: Prior to extracting and retracting the engine during the flight, fully familiarize yourself with the procedure while on the ground. Only after all the above mentioned steps are mastered, should one attempt them during flight. Take into account, that the time necessary for the extraction of the engine and its starting takes approximately one minute.

4.10.4 EXTRACTING OF THE ENGINE

If you cannot continue in the motorless flight and you decide to go on in powered flight, keep the following procedure:

- select a suitable area for landing
- extract the engine

- increase the flight speed to 130 – 140 km/h (70 – 76 kt)
- start the engine

Bring the airplane in the straight flight, reduce the flight speed to 90-100 km/h (49-54 kt) and carry out the following steps:

1. insert the key into the switch box, turn right in the position 1. Green pilot lamp must be alight
2. push the engine extracting push button for cca 1 second. The relevant pilot lamp must twinkle. The engine is being extracted
3. full extraction is signalized by expiring of the pilot lamp
4. open the fuel valve
5. ignition switch and fuel valve on. Turn the starter key further right and start the engine. In case the engine has not been run for an extended period of time or is cool, use the fuel primer
6. key back to the position 0

WARNING: Take into account, that the time necessary for the extraction of the engine and its starting takes approximately one minute. Recognize also, that while extending the engine, the sink rate of the aircraft will increase geometrically with the degree of the erection until the engine is running. To fully understand the effect of the engine extention process while in flight, one should practice as follows:

- on the first attempt, one should climb to 4000 ft AGL or above and then shut down the engine. With a watch, measure the time required to descend 500 ft. This will demonstrate the sink rate when a “dead” engine is sitting back there fully erected
- retract the engine so that thermal climbing is possible. Climb back up to over 4000 ft AGL and mark altitude loss while fully erecting the engine (as in paragraph 3.10.3 above) and getting it started.

Only then can one have a relatively reliable understanding of how much altitude will be lost in the erecting process and how much more will be lost if the engine fails to start the first time. That knowledge then will help one determine at what altitude the engine can be safely extracted and started. If an occasion arises later to attempt a restart a restart and the altitude above the ground is below that predetermined figure, one must abandon a restart and complete an emergency landing.

WARNING: Extracting of the engine and its starting to be always done only in the stabile straight flight. Remember, that the engine with the stopped propeller cause significant enhancement of the drag and deterioration of the flight characteristics

WARNING: Remember, that your engine and accessories is only an auxiliary power unit. That is why always fly in such a way to be able to land on a suitable area in the terrain in case when engine extracting or starting should fail.

NOTE: When extracting or retracting the engine, the ignition switches and the fuel valve switch must be in OFF position. The controlling electronics does not allow the extracting or retracting if these switches are ON.

NOTE: The controlling unit does not allow running the starter, if the engine is in any other position than extracted.

4.11 APPROACH AND LANDING

1. Before turning to the base leg check the dive brakes.

2. Set speed to 90-100 km/h [49-54 kt]. In case of turbulence or rain increase it to 100-110 km/h [54-60 kt]. Maintain these speeds during the whole approach.
3. On the final, use the dive brakes to control the descent of the glider (fully extended, the glide ratio drops to less than 1:7). Operate the dive brakes gently to prevent dropping or floating of the airplane.
4. At the height of 5 m (15 ft), smoothly raise the nose to horizontal flight to flare at 0.3-0.5m [1 – 1.5 ft] above the ground. In order to prevent a rough contact with the ground, reduce the dive brakes. Allow the speed to reduce by holding the constant height such that the airplane lands at the speed of 60-65 km/h [32-35 kt] on the wheel. Mantain this "wheel" position until the tail settles to the runway by itself.
5. The landing can be shortened by full extension of the dive brakes and by using the hand landing gear brake immediately after the landing. Interrupt this braking before the glider is stopped in order to avoid tipping the nose into the ground.
6. Also the switching off the engine in the approach final position will help to shorten the landing run if one is landing with the engine extended.

WARNING: you may control the descent of the glider when flying the landing pattern. However, before entering any turn, close the dive brakes. Flying with the dive brakes extended when the glider is in a turn is prohibited.

4.12 INSPECTIONAL REGIME OF THE ENGINE

When manipulating with the engine and the engine doors during refuelling, inspections or repairs the inspectional regime of the engine is used. The procedure is as follows:

1. Activate simultaneously both push buttons for engine retraction and erection.
2. Keep these buttons pushed and turn the main switch into the position 1
3. Release both push buttons. Both pilot lamps twinkle.

In this regime the opening of the engine doors and the movement of the engine can be controlled by activating and keeping the push buttons.

Basic automatic regime is reactivated by turning the main switch into the position 0.

NOTE: manipulation with the engine is possible only when the main switch (key) is in the position 1. Switching-off this main switch (key) immediately after any manipulation with the engine (up or down) has been finished, is also here highly recommended (it brings an aditional protection for the actuator motor).

5 EMERGENCY PROCEDURES

5.1 GENERAL

This section outlines recommended procedures for emergency situations that could occur in flight. Before each flight, be aware of the possibility of an emergency situation, and mentally prepare a plan to resolve the situation. If possible practice the emergency procedures during training.

5.2 STALL CHARACTERISTICS

At low speed, close to stall speed (about 65 km/h – 35 kt) in straight flight, the aircraft will begin to gently shake just prior to the separation of airflow. At this moment, a forward movement of the stick will return the airplane to normal flight. Also all controls are fully in force and effective during the speed reduction. At further speed decrease the airplane comes to a stall – the nose goes down below the horizon and also left or right wingtip drops. The stall recovery to be carried out as follows:

- briskly move the stick forward, maintain the straight direction with rudder pedals
- after higher speed is again achieved, smoothly raise the nose to maintain horizontal flight at the desired airspeed

WARNING: when recovering the stall, never use ailerons. The steep flight must be recovered smoothly only after proper speed is reached. A violent steep flight recovery at insufficient speed can lead to a secondary stall that ends in a spin.
Never fly or try flying the stall speed intentionally.

5.3 SPIN RECOVERY

WARNING: The spin is a dangerous flight regime and therefore it is not allowed in UL airplanes. That is why it is also not flight tested. The response of the airplane due to incorrect piloting cannot be anticipated. Always fly in such a way in order to prevent spins.

Performing spins intentionally is prohibited. However, if it occurs by error or by an extraordinary circumstance, execution of the following steps will lead to its recovery:

1. Apply full opposite rudder and at the same time push the control stick to the front position. Ailerons must be in neutral position.

3. When rotation stops, return the rudder to normal (neutral) position and get out of the dive in shallow climb. Move the controls gently to prevent stress and negative speed increase. Too steep recovery at yet insufficient speed or even at higher speed can lead to stalling and repeated fall into the spin.

5.4 ENGINE FAILURE

WARNING: The engines applied on the UL airplanes are not certificated as aircraft engines

and potential failures can occur more frequently. Take this into account and maintain sufficient height over terrain hostile to a safe landing such that an emergency landing at another location is possible at any time.

5.4.1 Engine failure at acceleration on the runway

1. Rpm to idle run regime, brake in action.
2. Ignition switch OFF, fuel valve OFF.
3. Roll out straight ahead or avoid obstacles, if necessary.

5.4.2 Engine failure after take-off

1. Set the airplane into gliding regime. Push the nose down if in a climb. Switch off the ignition. Switch off the fuel valve.
2. At height under 50 m AGL [160 ft AGL] land straight ahead making shallow turns to avoid obstacles only.
3. At higher elevation, land into the wind or if the elevation is sufficient provide a normal shortened pattern landing. The glide ratio of the airplane enables one to select a suitable area for an emergency landing in most cases.
4. In a normal cruise elevation, on may try to restart the engine. The following procedure is to be followed:
   - find a suitable area for emergency landing
   - Ignition switch ON, fuel valve ON
   - increase the speed to 130-140 km/h (70-76 kt)
   - start the engine

WARNING: complete all attempts to restart at a height above 150 m (450 ft AGL) so that sufficient altitude remains for a landing in a selected area.

5.5 FIRE ON THE ENGINE

If there is a fire during the flight, it is caused by failure either of the engine or of the fuel system. Proceed as follows:

1. Switch off the ignition and fuel valve, set up a normal glide.
2. Increase the speed to 130-140 km/h (70-76 kt), extend the dive brakes and with the rudder set the airplane into slip. Maintain direction with the ailerons.
3. Complete emergency landing immediately on the nearest area that a suitable landing can be made. When on land, release the safety belts and when stopped, immediately leave the airplane.

NOTE: if the pilot is wearing a parachute, the altitude is sufficient, and the fire is weakening the structure or threatening the pilot, a bail out may be preferable to a landing attempt.

5.6 BAILING OUT FROM THE AIRCRAFT

If you must bail out, proceed as follows:

1. Switch the engine off (both ignition and fuel valve)
2. Release the canopy front hinge by energic twitching of the relevant exuviation rod

3. Unlock the canopy side locks using both hands, open it and lift it up. Then, again using both hands, move the canopy up and back and throw it off.
4. Release the lock of the safety belts. Place your legs close to the pilot seat.
5. Bail out of the aircraft over the right or left cockpit side.
6. When enough clear of the airplane, open your personal parachute.

WARNING: Train this procedure before your initial flights.

5.7 USAGE OF A ROCKET RESCUE SYSTEM

In case the airplane is equipped with a rocket rescue system, study and keep the manufacturer's instruction. When it becomes necessary to use the system, do the following steps:

1. Tighten the safety belts
2. Main swith off
3. Engine ignition off
4. Fuel valve off
5. Lower the speed to minimum
6. Pull the rocket handle and launch the parachute.

In case of a sudden failure or collision with an other airplane, if further flight is impossible even while using emergency procedures, shut off the engine (both ignition and fuel valve) and activate the BRS. Provide the other acts, if possible, only during descent. In case of a fire recognise that the fire could catch the BRS as well, especially if it is deployed. Therefore do not activate the BRS early on. Wait till one has descended to the lowest altitude possible that still allows safe deployment of the BRS, than deploy it. Before impacting the ground gather up your legs and protect your face and head.

ATTENTION: Before commencing the first flight practice emergency and rescue procedures. On the first flight that is possible to attain a safe altitude, practice the aircraft as if one or more of the controls were blocked or disabled to get a feel for how the aircraft would react if a control had not been properly connected during rigging. On an early flight, also practice the engine restart procedures as outlined in paragraph 3.10.3 above. On any flight, assume that an emergency could become necessary. That is why one must avoid flying over woods, lakes, cities and mountains at altitudes that would not permit an escape to suitable terrain should an emergency landing become imminent. Look for the weather development and in case of dangerous weather deterioration accomplish an emergency landing on suitable terrain if escape from the weather condition at hands is not possible.

6 INSPECTIONS AND MAINTENANCE

6.1 LIFETIME OF THE AIRFRAME

The lifetime of the airframe is 2000 flight hours or 20 years (what is shorter). Then it can be prolonged by an authorized inspector who will record it into the airworthiness documents.

6.2 REGULAR MAINTENANCE

After each flight day look for ruptures, damages, wear, too great clearances and malfunction. Check the following systems after each flying day:

6.2.1 Ventilation

Check the system of cockpit ventilation and the function of the ventilation flap. If necessary, lubricate the bowden by oil.

6.2.2 Electrical System

Check the charge of the battery. Also, visually check the condition of the battery and it's surrounding area. Check also the cables, their fixing and insulation. If necessary, add destilated water up to the lavel mark.

6.2.3 Internal Equipment and Emergency Devices

Check the fastening of the First Aid kit. Inspect the canopy emergency release. The force necessary for the emergency canopy release is adjusted by a nut under the cover in the cockpit front part. All the release mechanism should be lubricated by oil against corrosion and for its proper function.
Check the attachment of the seat and the safety belts.
Check the function of the tow release handle. Look for wear and tear, deformations and cracks. Lubricate the pins with a suitable oil.
Check the function of the pedals. Lubricate the adjusting screw, nut and stirrup.

6.2.4 Controls

Check the function of the controls and also, inspect the attachment of the rudder and the dive brakes. The prestress of the dive brakes is adjusted by turning of the end of the vertical rods in the fuselage. The dive brakes are locked by shifting the actuating rod forward past the dead point so that they cannot be suctioned open during flight. An additional force is required when the handle reaches its stop to shift the rod past the dead point. Maximal 5 mm opening of the brakes during the flight is acceptable.
Check the function of the trim and the engine controls. The trim spring is accessible below the seat near the stick. The spring to be lubricated by oil.
Check the tension of pedal controls. The cable tighteners are accessible under the floor near the pedals. The cables must be tightened, but just enough to enable free run of the controls with minimal clearances.

6.2.5 Instrument Panel

Check the fittings on the instrument panel and inspect all instruments. Make sure all instruments, marks, symbols and placards are legible and in good condition.

6.2.6 Undercarriage

Inspect the condition of both main and tail wheel and their surrounding area. Check the side clearance (max. 3 mm). When installing the wheel after a previous removal pay attention to the correct application of spacers – the wheel must be freely rotating. The bearings are covered, they have a permanent lubricant inside.
Inspect the function of the wheel brake. The brake must not rub when not activated, but must be sufficiently effective when braking. This to be adjusted by screws on the ends of the Bowden cables below the brake lever, on the undercarriage fork, or on both places.
Check the air pressure in the tire: 0.25 MPa (26 psi). Check, whether the valve is in vertical position and is not deformed by the rim.

6.2.7 Flight Control Instruments

Check the condition and zero values of the instruments. Check the legibility of all values and marks.

6.2.8 Fuselage

Visually inspect the surface of the fuselage. Look for cracks and damaged places. Tiny scratches can be repaired by acrylic dope, colour RAL 9016. Deeper grooves can be filled with a lute (filler).
Check the connecting pins between the fuselage and the wing.
Check the connection of the fuselage – horizontal tail. The brackets must not be damaged. The vertical clearance on the end of the stabilizer must not exceed 10 mm – if greater, the brackets must be replaced.
Check the connection fuselage-rudder.

6.2.9 Tail Section

Visually inspect the surface of the horizontal and vertical tail.
Inspect the rudder and elevator for free movement and check the attachment of the stabilizer.
Check the clearances of the movable parts.

6.2.10 Canopy

Check the canopy and its hinges.

6.2.11 Wing

Visually inspect the surface of the wing. Check the clearances of the controls. In case of a greater clearance exchange the bearing or the pin.
Check the ailerons and dive brakes for free movement, full deflections and clearances.
Check the fixation of the wing tips (or winglets).

6.2.12 Propulsion group

Maintain the engine in accordance with the manufacturer's manual.

Check that the engine is securely mounted and its parts not damaged.
Check the fuel system for leakage.
Check the reducer and its belt for right tension.
Check the springs connecting and fixing the exhaust manifold.
Check the surface of the propeller and check its fixation and securing. If removing the propeller, mark the its mutual position with the hub.
Check the erecting mechanism and engine bed for cracks and clearances.
Check the rubber shock absorbers and securing of all bolts and nuts.
Check all the electric cables and connectors for good condition.
Further, follow all procedures described in the engine Operator's Manual.

6.2.13 Fuel tank

The fuel tank is welded from aluminium alloy sheet and placed in the fuselage behind the main baffle. This area is vented through the undercarriage pit. It is possible to take out the fuel tank for check and cleaning after the controls are demounted and hoses/cables are disconnected.

6.3 PERIODIC INSPECTION

The safe operation and the airworthiness of the airplane are directly dependent on thorough and complete maintenance and repair of all aircraft parts. The aircraft is highly at risk of losing on its airworthiness if it is not maintained and serviced according to this manual and to the Flight Manual. The inspections and maintenance intervals do not depend on the terms stated below, but on the operational conditions and on the overall shape of the airplane. Nevertheless, minimum number of periodic inspections are:

- Before each flight.
- After the first 25 hours of flying.
- After every 100 hours of flying, or once a year (whichever comes first).

6.3.1 Pre-flight Check

Perform pre-flight inspection prior to each flight, or after rigging the aircraft. The recommended procedure for the pre-flight check is described above in the Chapter 4.

6.3.2 Inspection after first 25 hours and 100 hours of flight

Dismount the covers and decking in the cockpit. Clean both the surface and internals of the airplane. Look for ruptures, damages, wear, too great clearances and malfunction. Lubricate the movable parts with a suitable lubricant.

Inspection after 25 h ....100 h

Engine: proceed according to the Operator's Manual delivered with the engine. Make all checks and measures required in this manual and further make the following checks:

Check the erecting mechanism for function, ruptures, deformations and fixation	X	X
Check the propeller vertical stopping mechanism	X	X
Check the engine for leakage		X
Check the exhaust piping for condition and leakage	X	X
Check the engine bed for ruptures and damages, fixation of screws and nuts, condition of rubber mounting pads	X	X
Check of the fuel system, tank and carburetor for condition and leakage, cleaning of the fuel filter, drainage of the tank		X
Check the ignition cables and their connectors		X
Check the engine control elements for condition and function	X	X
Cleaning (washing) of the engine and the engine area		X

Propeller

Check the hub and fixation for ruptures and damage	X	X
Cleanliness of the blades, check for ruptures and damage	X	X
Check blades for true running (max. deviation 10 mm)	X	X
Check tightening and securing of the fixation screws	X	X

Reducer

Proceed according to the manufacturer's manual.

Wing

General check of the wing surface for ruptures	X	X
Check wing joints and pins for corrosion and ruptures	X	X
Check the control elements by looking into check openings. Check the control rods ends, their pins and securing. Lubricate the bearings of the control levers	X	X
Check the clearance and deflections of the ailerons	X	X
Check the clearance and deflections of the dive brakes	X	X

Inspection after	25 h	.....100 h
Fuselage and tail		
General check of the surface for ruptures and damage	X	X
General check of the canopy for ruptures and damage, check of the ventilation and window	X	X
After dismounting the check openings in the cockpit floor, check the function, wear and securing of the control elements. Lubricate the movable parts	X	X
Check the cables of pedals to rudder for strength	X	X
Check the safety belts and their anchoring	X	X
Check the sensors of static and dynamic pressure	X	X
Check fixation of the instruments and the instrument panel. Check the function of the handlers	X	X
Check the horizontal tail fixation, check the elevator for clearance	X	X
Check the vertical tail fixation, check of the rudder for clearance	X	X
Check the elevator and rudder for deflections	X	X
Undercarriage		
1. Clean the main and tail undercarriage	X	X
2. Check the main undercarriage joints for fixation	X	X
3. Check the function and condition of the rear undercarriage	X	X
4. Lubricate the bearings		X
5. Check the tire, its pressure and anti-slippage mark	X	X
6. Check the brake for condition and function	X	X

NOTE: according to the discovered condition, repair and/or replace the damaged parts. Minor damages, that have no influence on the airworthiness, can be rectified by the owner. For relevant instructions see the following chapters. Major damages can be repaired only when agreed by the manufacturer or in his premises.
Keep records about date and range of inspections, note the found-out and repaired failures. Authorized inspector will use these records when prolonging the airworthiness.

6.4 ADJUSTMENTS OF CONTROLS

With firmly blocked ailerons and elevator, the clearance (measured on the top of the control stick) must not exceed the following values:

- +-10 mm for the ailerons
- +-10 mm for the elevator.

If any excessive clearance is found in the controls, the cause has to be identified and the bearings have to be substituted or the problem consulted with the manufacturer. The natural flexibility of the stick cannot be considered as a clearance.
There should not be any clearance of the rudder if the tension in the cables is correct. However, the pedals can have certain side clearance, necessary for their free adjustment.

6.5 FIT OF WING MOUNTING BRACKETS

The increased clearance in the wing fittings is mostly caused due to an excessive wear of the connection pins and of the fittings. If the back and forward movement of the wings exceeds 10 mm (measured at the wing tips), it is necessary to replace the connection pins with bigger ones and their holes reamed out to fit the larger pins. However, the natural flexibility of the wing cannot be considered as a clearance.

6.6 OPERATION AND MAINTENANCE

6.6.1 GENERAL

The operation and the maintenance of the aircraft must be executed in accordance with the following manuals:
A) this Aircraft Manual.
B) Engine Operator's Manual
C) Propeller Manual
D) Instruments Manual (if Bräuniger *Alpha*MFD instrument board is installed)

6.6.2 WEIGHT AND CENTER OF GRAVITY

Center of gravity of the aircraft must be within the limits specified in the above chapter 3.6 under any load conditions. If any modifications of the airplane or its equipment are done, that can change the position of the center of gravity, the manufacturer to be contacted for consultation.

6.6.3 CONTROL ADJUSTMENTS

Deflections of the rudder, the elevator and ailerons must be set within +/- 2^0. Adjust the stops of the controls at the bottom of the control stick and the pedals, accessible after the removal of the cockpit floor.

6.6.4 ASSEMBLY INSTRUCTIONS

The assembly and derigging of the airplane can be done by at least three persons. After finishing the assembly, check all rudders for correct directions and movability in the whole range up to their stops.
For rigging and derigging of the aircraft, see above chapter 4.2.

6.6.5 GENERAL CARE OF THE AIRCRAFT

Store the aircraft in dry and ventilated space. The temperature should not exceed 30 degrees Celsius (86 F) for longer periods. The aircraft must not be mechanically loaded.
Protect metal parts of the aircraft against corrosion.
When the aircraft is transported on a trailer, all parts of the aircraft have to be secured to avoid any transport related damage.
Use water and common liquid detergents to wash the aircraft. Usual car cleaners can be used. To clean the canopy use cleaner designed for plexiglass only. For wiping, use soft cloths or rugs only.
Use vacuum cleaner to clean dirt and trash from the cockpit.
Do not wipe the canopy when it is dry.
Keep clean and lubricate regularly all bearings, pins, eyes, Bowden cables etc.

WARNING: Do not use any organic solvents (gasoline, thinners, etc.) for cleaning of the canopy.

WARNING: The aircraft is painted with two-component acrylic dope, which is water and weather resistant. Internal area is protected by preservative lacquer. The airplane structure cannot prevent rainwater from penetrating into the interiors of wings, fuselage and elevator. In case the airplane has to be outdoors when raining, seal up all the slots with waterproof band or protect all the airplane with waterproof sleeves.

6.6.6 LUBRICATION

Keep all bearings clean. During regular inspections, lubricate the bearings with suitable lubricant, e. g. with high-pressurized cohesive lubricant ARECAL. In the same way lubricate the pins in wings and fuselage. When needed, bowdens of the wheel brake and throttle to be lubricated by a suitable fine oil.

7 DIRECTIONS FOR REPAIRS

7.1 SUBSTITUTE MATERIALS

If substitute materials are used please follow the instructions below:

- all metallic materials, including fasteners must comply with the standards set by the manufacturer. The standards can be found in the documentation supplied by the manufacturer.
- all parts which require welding must be checked for welding capabilities of the substitute material
- all fasteners (bolts, rivets, nuts, and washers) must be checked for the following parameters: strength, heat treating, tolerance, pitch of thread, size of the head, and surface protection. All substitute materials must be equivalent in quality to the original materials.
- check strength and tensile strength of all substitute materials
- if uncertain of the quality of the substitute material perform a technological test.

7.2 GENERAL REPAIRS

7.2.1 Recommended Procedures for Repairs

Evaluate the damage and then follow these recommended instructions:

A) **Small damages** which do not need to be repaired are: scratches no deeper than the layer of the paint, paint defects, upholstery etc.

B) **Damages which can be repaired by the operator of the aircraft** are:

- substitution of broken or worn down parts
- all minor repairs which do not interfere with the structural integrity of the aircraft, for example cracks in the canopy, repairs of the frame of the cockpit, hinges and fibreglass parts.
- paint repairs

C) **Structural damage** must be repaired by certified authorized repair shop only, except for aircraft built by amateurs, in which case the builder has the authority to make the necessary repairs himself/herself. After completion the repairs made have to be inspected by an authorized inspector.

D) If the **repair is impossible or too expensive**, the damaged part has to be replaced by a new one.

7.2.2 Control Adjustments

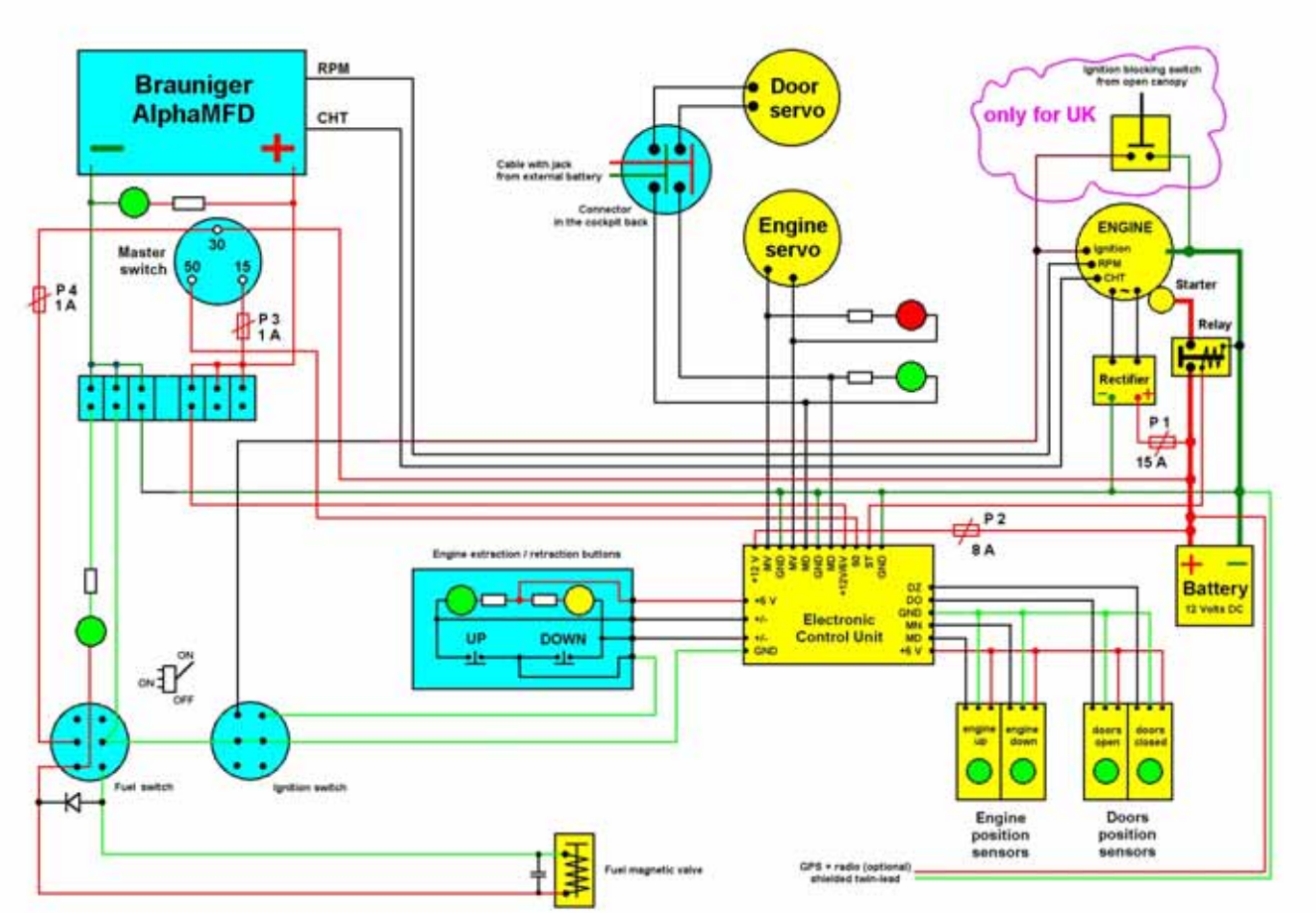
Anytime an unusual resistance or clearance in the control system is noticed, check the control system for any structural deformation. If the cable tension is lacking adjust the tension with the turnbuckles. After the adjustment secure the turnbuckles again. Damaged or worn out pins, bearings and clevises must be replaced. Check that the clevis is screwed in sufficiently so that the fork is visible in the control opening in the rod nut.

8 TRANSPORT IN THE TRAILER

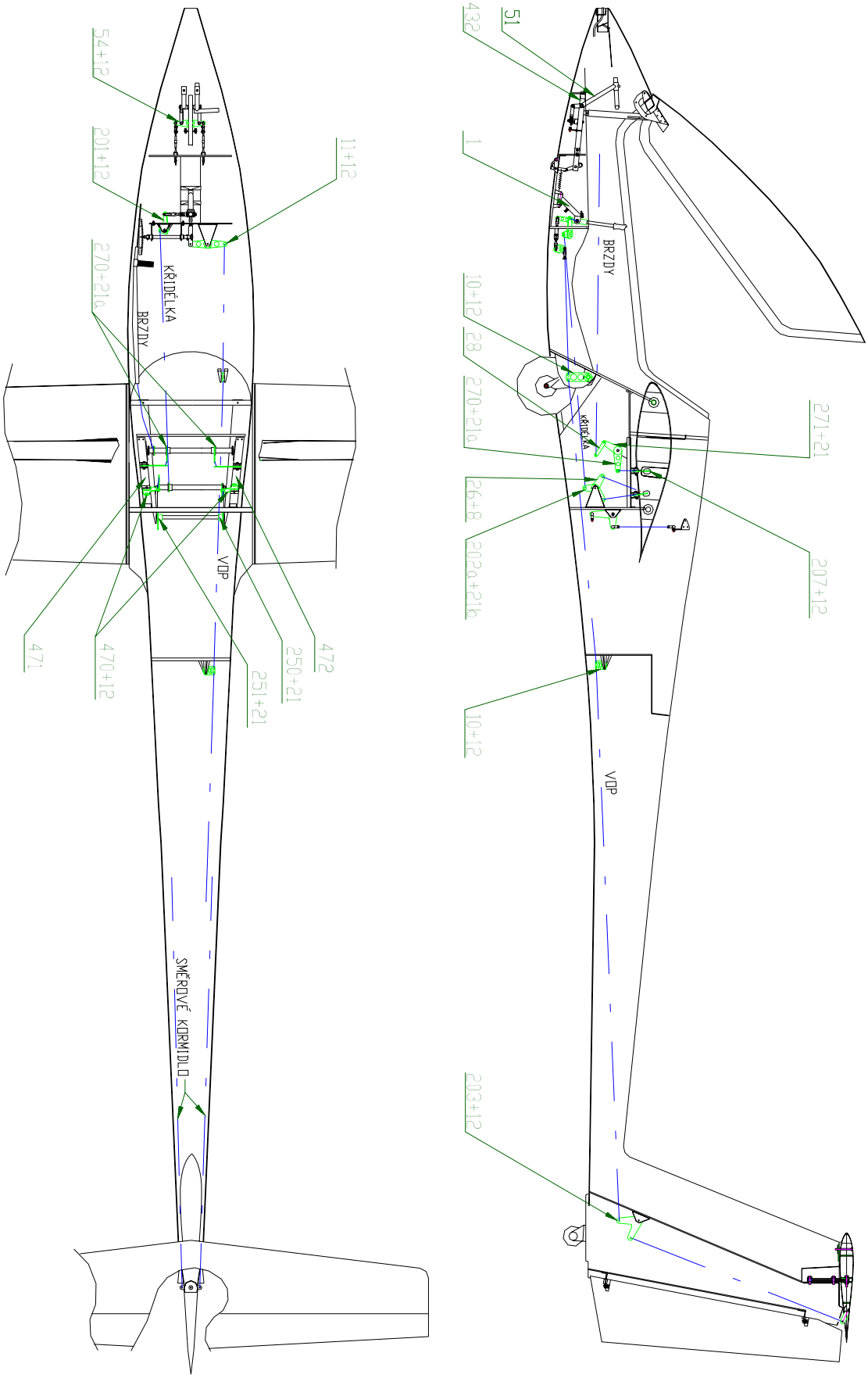
When loading the airplane into the trailer, make the following steps:

1. Put the left wing brackets on the right buggy and insert it into the trailer. Secure the buggy with a cotter pin.
2. The wing tip is hung on the auxiliary suspension inside the trailer.
3. In the same way insert the right wing into the left side of the trailer. The winglets are directed to the center. The wing tips are thus elevated and so create area for insertion of the fuselage.
4. The fuselage, fixed to the undercarriage in its buggy to be inserted into the trailer such that the nose matches the front bushing and the tail wheel into the slit in the trailer floor.
5. Insert the wing supports into the floor openings. Unhang the wing tips from the auxiliary suspensions, bed them into the supports and secure them by holders to the trailer sides.
6. Bed the elevator into its cradle and fix it to the trailer floor by insertion into the bushing and tightening the nut.

WARNING: The trailer tongue must always press down onto the towing car ball. With the airplane loaded in the trailer, this condition is fulfilled. However, when towing the empty trailer, a weight (ballast) must be fixed in the forward part of the trailer to accomplish this condition.



obrázek 1


54+12
201+12
11+12
270+21a
KŘIDÉLKA
BRZDY
VOP
471
470+12
472
250+21
251+21
SMĚROVÉ KORMIDLO
432
51
1
BRZDY
10+12
28
270+21a
271+21
KŘIDÉLKA
26+8
202a+21k
207+12
10+12
VOP
203+12