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FLIGHT MANUAL

FOR THE ULTRA LIGHT AEROPLANE

DYNAMIC WT 9

Model: WT 9 Dynamic
Serial No: DY –
Registration:
Date of Issue: 01.01.2005

Pages identified by „Appr“ are approved by the [Civil Aviation Authority of the Slovak Republic](#).

Signature:
Authority:
Stamp:
Original date of approval:

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

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1.1 Introduction

The aeroplane Flight Manual has been prepared to provide pilots and instructors with information for the safe and efficient operation of this ultra light aeroplane.

This manual contains supplementary data supplied by the aeroplane manufacturer.

1.2 Certification basis

This type of aircraft has been approved in Germany by the Deutscher Aero Club e.V. (DaeC) in accordance with the German Certification Regulations and Airworthiness Requirements for ultra light aircraft of the DaeC (BFU des DaeC, Ausgabe 10/95) and the Type Certificate No. 61179 has been issued on 23.10.2001.

The Civil Aviation Authorities of Slovak Republic following an application by AEROSPOOL, spol. s r. o. Prievidza and after studying the documentation has issued the Type Acceptance Certificate No. 34/2002 dated December 4th 2002 for Type WT 9 Dynamic with limitation stated in Type Certificate LBA Germany No. 61179, regulation BfU and Directive 3/69.

Category of Airworthiness : **Normal – Ultralight Aircraft.**

1.3 Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes used 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 to any special item, not directly related to safety but which is important or unusual.

1.4 Descriptive data

1.4.1 Airplane description

DYNAMIC WT9 is low-wing monoplane with fixed or retractable tricycle landing gear. An airframe consists of a sandwich shells from advanced composite material. There are two places in the cockpit, side by side type. This ultralight aircraft is intended for sporting, recreation and tourist flying in accordance with VFR. DYNAMIC WT9 has been approved by the DaeC in the Category of Airworthiness : Normal – Ultralight Aircraft.

As the power plant this ultralight aircraft uses the 4 cylimder, 4 stroke ROTAX engines, 912 UL or 912 ULS. Propelers: These engines can be fitted with 3 bladed in-flight electricaly adjustable propellers and the following types and models are approved: Woodcomp SR 2000 or Rospeller 3 bladed.

1.4.2 Technical data

Wing span.....	9,00 m
Wing area.....	10,3 m ²
Wing aspect ratio.....	7,82
Length.....	6,4 m
Height.....	2,0 m
Aerodynamic mean chord (MAC).....	1,185 m

Control surfaces

Aileron span.....	1,25 m
Aileron area.....	0,273 m ²
Flap span.....	2,28 m
Flap area.....	0,75 m ²
Horizontal tail span.....	2,40 m
Horizontal tail area.....	1,68 m ²
Vertical tail span.....	1,022 m
Vertical tail area.....	1,02 m ²

Landing gear

Wheel spacing.....	1,49 m
Wheel base.....	2,27 m
Main wheel diameter.....	0,35 m
Nose wheel diameter.....	0,32 m

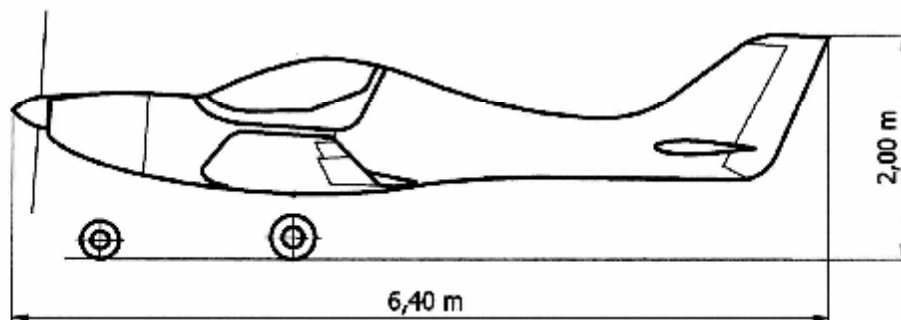
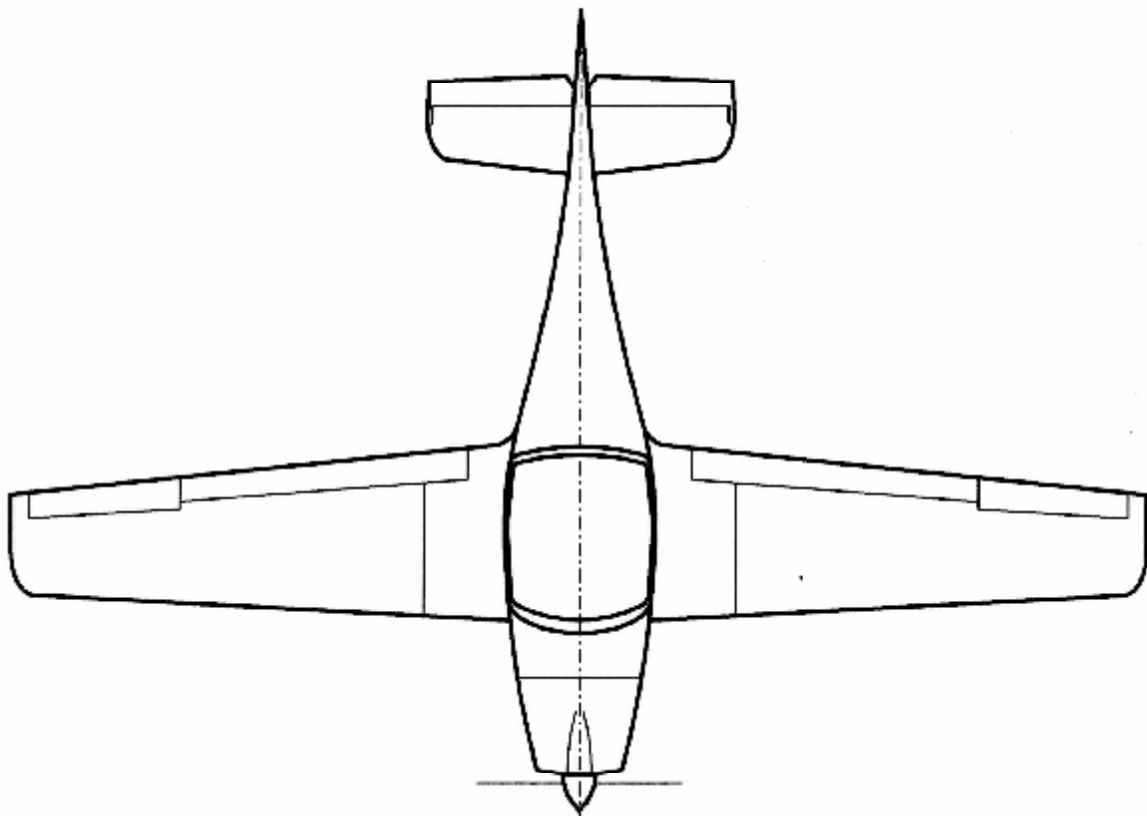
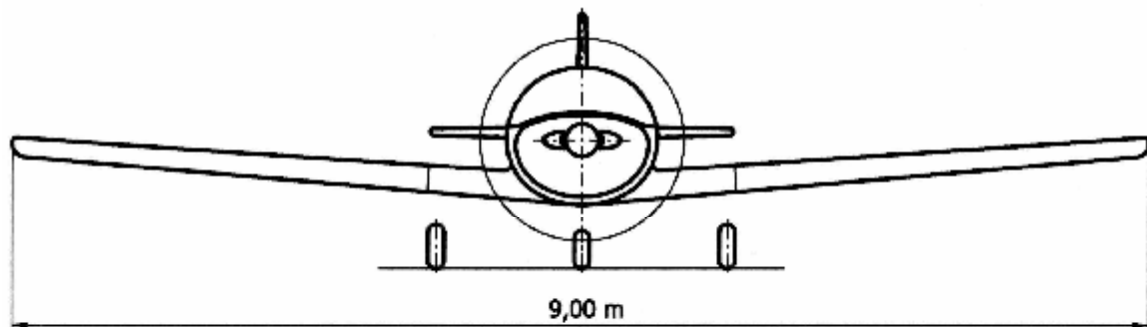
Weights

Empty weight with fixed undercarriage.....	259 kg
Empty weight with retractable undercarriage.....	270 kg
Maximum take-off weight.....	450 kg
Useful load.....	190 kg
Fuel tanks capacity.....	75 litres

The ROTAX 912 UL (59,6 kW) or ROTAX 912 ULS(73 kW) has a maximum rpm limitation on take off of 5800 1/min 912 UL, 5/min 912 ULS. The Woodcomp SR 2000 or Rospeller are 3 bladed in-flight electricaly adjustable propellers. Propeller diameter is 1,7 m.

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1.5 Three – view drawing



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2.1 Introduction

Section 2 includes operating limitations, instrument markings, and basic placards necessary for safe operation of the aeroplane, its engine, standard systems and standard equipment. The limitations included in this section and in Section 9 have been approved by [the Civil Aviation Authority of the Slovak Republic](#).

2.2 Airspeed

Airspeed limitations and their operational significance are shown below:

	Speed	IAS			Remarks
		km/h	MPH	knots	
V_{NE}	Never Exceed speed	280	174	150	Do not exceed this speed in any operation
V_{NO}	Normal Operating Limit speed	250	156	135	Do not exceed this speed except in smooth air, and then only with caution
V_{RA}	Rough Air speed	230	143	124	Do not exceed this speed except in smooth air. Air movements in lee-wave rotors, thunderclouds, visible whirlwind, or over mountain crests are to be understood as rough air

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	Speed	IAS			Remarks
		km/h	MPH	knots	
V _A	Manoeuvring speed	165	103	88	Do not make full or abrupt control movement above this speed, because under certain conditions the aircraft may be overstressed by full control movement
V _{FE}	Maximum Flap Extended speed	140	88	75	Do not exceed these speeds with the given flap setting.
V _{LO}	Maximum Landing Gear Operating Speed	140	88	75	Do not extend the landing gear above this speed.
V _{LE}	Maximum Landing Gear Extended Speed	250	156	135	Do not exceed this speed with the landing gear extended.

2.3 Airspeed indicator markings

Airspeed indicator markings and their colour-code significance are shown below:

Marking	IAS value or range			Significance
	km/h	MPH	knots	
White arc	65 – 140	40 - 88	35 - 75	Positive Flap Operating Range. (Lower limit is maximum weight 1.1 V _{SO} in landing configuration. Upper limit is maximum speed permissible with flaps extended positive.)
Green arc	70 – 230	43 - 143	37 - 124	Normal Operating Range. (Lower limit is maximum weight 1.1 V _{S1} at most forward c.g. with flaps and landing gear retracted (if retractable). Upper limit is V _{RA} .
Yellow arc	230 – 280	143 - 174	124 - 150	Manoeuvres must be conducted with caution and only in smooth air.
Yellow triangle	100	62	53	Minimum Approach speed
Yellow line	165	103	88	V _A Manoevring speed
Red line	280	174	150	Maximum speed for all operations.

2.4 Powerplant

Engine Manufacturer: ROTAX-Bombardier, Gunskirchen

Engine Models: ROTAX 912 UL , (ROTAX 912 ULS)

Maximum Power - Take-off: 59,6 kW / 80 HP (73,5 kW / 100 HP)

Continuous: 58 kW / 77,8 HP (69 kW / 93,8 HP)

Maximum Engine Speed – Take-off: 5800 1/min (5 min)

Continuous: 5500 1/min

Maximum Cylinder Head Temperature: 150 ° C (135 ° C) (reading FLYdat CHT)

Maximum Oil Temperature: 140 ° C (130 ° C) (reading FLYdat OIL TEMP)

Oil Pressure: Minimum: 0,8 bar (12 psi)

Maximum: 7 bar (102 psi)

Fuel Pressure: Minimum: 0,15 bar (2.2 psi)

Maximum: 0,4 bar (5.8 psi)

Fuel Grade: the following fuels can be used:
min. RON 95

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- EN 228 Premium
- EN 228 Premium plus
- Unleaded Automobile Gasoline

AVGAS 100

Due to the higher lead content in AVGAS, the wear of the valve seats, the deposits in combustion chamber and lead sediments in the lubrication system will increase. Therefore, use AVGAS only if you encounter problems with vapour lock or if the other fuel types are not available.

Oil Grade: motorcycle oil of a registered brand with gear additives. Use only oil with API classification „SF“ or „SG“! If using aircraft engine oil, then only blended one. Due to the high stresses in the reduction gears, oils with gear additives such as high performance motor cycle oils are required. Heavy duty 4-stroke motor cycle oils meet all the requirements. These oils are normally not mineral oils but semi- or full synthetic oils. ,

Oil capacity: 3,0 litre
Minimum: 2,0 litre
Oil consumption: max. 0,1 l/h

WARNING

Never use AVGAS, LB 95 with fully synthetic engine oils.

Propeller Manufacturer: WOODCOMP
Propeller Model: SR 2000, 3 blade, in flight electrically adjustable aircraft propeller
Propeller Diameter: 1,7 m
Propeller Blade Angle (at 75 % station): 10 ° from minimum angle
- for engine ROTAX 912 UL: 15° / 25°
- for engine ROTAX 912 ULS: 19,5° / 29,5°
Time Between Overhaul (TBO) : 1200 hrs or 15 years (whichever comes first)

Additional data can be found in Section 7, Subpart 7.9, in the Operator's Manual for engine ROTAX 912 UL / 912 ULS and in the User's Guide for electric variable pitch propeller SR 2000 or Rospeller propeller.

WARNING

Never run the engine without propeller, this inevitably causes engine damage and is an explosion hazard.

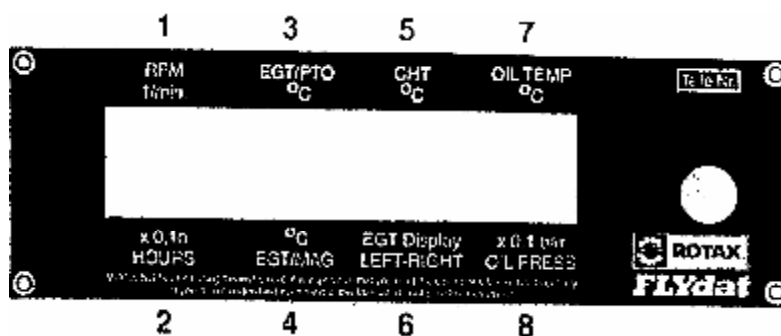
2.5 Powerplant instrument markings

According to customer requirement, either round one-purpose needle instruments or multiple instrument FLYdat are fitted in the instrument panel. The FLYdat represents an instrument especially developed for ROTAX aircraft engines for indication and acquisition of engine operating data readily accessible for the pilot. The operating data is permanently compared with the engine specific operating limit. If the signalled

operating data exceeds the stored operating limit, the FLYdat will warn the pilot by the warning light (annunciator).

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FLYdat indications and their significance are shown below:



Display field Resolution	Designation	Unit	
1	Engine speed	rpm	1
2	Hours of operation	h	0,1
3	Exhaust gas temperature cylinder PTO*	°C or °F	1
4	Exhaust gas temperature cylinder MS**	°C or °F	1
5	Cylinder head temperature	°C or °F	1
6	x)		
7	Oil temperature	°C or °F	1
8	Oil pressure	bar	0,1

- x) Arrow indicating the line of cylinders from which the exhaust gas temperature is picked up. Arrow ← denotes left line of cylinders
Arrow → denotes right line of cylinders

* Cylinder PTO is at power take off side

** Cylinder MS is at the magneto side

The FLYdat has been configured for ROTAX 912 UL engine by the manufacturer. The following warn- and alarm limits are stored:

Display	Unit	Warn limit	Alarm limit
Engine speed	rpm	5 800	6 000
Exhaust gas temperature EGT	°C	880	900
Cylinder head temperature CHT	°C	150	160
Oil temperature	°C	140	150
Oil pressure maximum	bar	6,0	8,0
Oil pressure minimum	bar	2,0	1,0

The FLYdat has been configured for ROTAX 912 ULS engine by the manufacturer. The following warn- and alarm limits are stored:

Display	Unit	Warn limit	Alarm limit
Engine speed	rpm	5 800	6 000
Exhaust gas temperature EGT	°C	880	900
Cylinder head temperature CHT	°C	135	150
Oil temperature	°C	130	145
Oil pressure maximum	bar	6,0	8,0
Oil pressure minimum	bar	2,0	1,0

Distinguish between three ranges of readings control:

Colour range	Significance
Green (standard operation)	All readings are below or above (min. oil pressure) the warn limits programmed.
Yellow (exceeding of warn limits)	If one or more readings exceed the programmed warn limit, then the readings appears flashing on the display , and simultaneously the alarm output is periodically (0,25 sec.) switched on and off, until no readings exceed warn limit.
Red (exceeding of alarm limits)	If one or more readings exceed the programmed alarm limit, then the readings appear flashing on the display and simultaneously the alarm output is permanently activated until no reading exceeds the warn limit.

If one or more alarm limits have been exceeded, or the reading on the meter of the operating hours has surpassed the programmed TBO, the maintenance message reads as follows: „**Service !**“ .

CAUTION

Disregard of the warn- and alarm signals might result in injuries or endanger the life of operator or third party.

BOMBARDIER-ROTAX as manufacturer, warrants every FLYdat for a period of not more than 9 consecutive months for private use owners or 12 consecutive months from date of shipment of the manufacturer or the first 150 operation hours.

Powerplant instrument markings and their colour code significance are shown below:

Instrument	Unit	Red Line Minimum Limit	Green Arc Normal Operating	Yellow Arc Caution Range	Red Line Maximum Limit
Tachometer	rpm	1 400	1 800 – 5 500	5500–5800	5 800
Oil temperature indicator	°C	50	90 – 110	50 – 90 110 – 140 ¹⁾ 110 – 130 ²⁾	140 ¹⁾ 130 ²⁾
Cylinder-head temperature indicator	°C				150 ¹⁾ 135 ²⁾
Fuel-pressure indicator	bar	0,15			0,5
Oil-pressure indicator	bar	1,5	1,5 – 5	5 – 7	7
Fuel indicator	l	Red light annunciator above the fuel indicator will be illuminated with the remaining fuel of 7 litre in each fuel tank.			

1) Indication is valid for ROTAX 912 UL engine

2) Indication is valid for ROTAX 912 ULS engine

2.6 Miscellaneous instrument markings

According to option of the customer miscellaneous instrument can be mounted. The following miscellaneous instrument markings and their colour code significance are shown below:

Instrument	Unit	Red Line Minimum Limit	Green Arc Normal Operating	Yellow Arc Caution Range	Red Line Maximum Limit
Boost-pressure gauge	kPa x 100		0,58 – 1,16	1,16 – 1,2	1,2

Acceleration indicator	G	- 2			+ 4
Fuel reserve indicator		Red light annunciator above the fuel indicator will be illuminated with the remaining fuel of 7 litre in each fuel tank.			

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2.7 Weight

Empty weight - with fixed undercarriage269 kg
 - with tow system.....272 kg
 - with retractable undercarriage285 kg

Note: 30 kg is rescue and towsystem weight

NOTE

Due to different equipment in each aircraft, the actual empty weight is included in the Section 6.

Maximum take-off weight.....450 kg
 Maximum landing weight450 kg
 Maximum zero fuel weight.....400 kg
 Useful load200 kg
 Maximum fuel weight50 kg
 Maximum crew weight.....190 kg
 Minimum crew weight.....77 kg
 Maximum weight in Baggage Compartment..... 10 kg

WARNING

Maintain maximum take off weight 450 kg

Depending on different countries rules

2.8 Centre of gravity

Position of C.G.:

Empty airplane.....12 ± 2% MAC
 Position of C.G. in flight.....20 ÷ 30% MAC

Aft centre of gravity limit is valid for en-route weight at maximum crew weight. Forward centre of gravity limit is valid for minimum pilot weight 77 kg and minimum capacity of the fuel tanks. Example to check the centre of gravity position is in Section 6.

2.9 Approved manoeuvres

DYNAMIC WT9 is certified in the Normal Category – Ultralight aircraft. The following manoeuvres are permitted:

- **Steep turns with the angle of bank up to 60°** - appropriate entry speed is **140 km/h**.
- **Lazy eighths** - appropriate entry speed is **140 km/h**.
- **Combat turns** - appropriate entry speed is **200 km/h**.

WARNING
Aerobatic manoeuvres and intentional spins are prohibited!

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2.10 Manoeuvring load factors

Manoeuvre speed	Speed			Load factors
	km/h	MPH	knots	
V _A - Manoeuvring speed	165	103	88	+ 4
V _{NE} - Never exceed speed	280	174	150	+ 4
V _A – Manoeuvring speed	165	103	88	-2
V _{NE} - Never exceed speed	280	174	150	-2
V _{FE} – Maximum Flap Extended speed	140	88	75	+ 2

2.11 Flight crew

The minimum flight crew with which the airplane is allowed to fly is one pilot sitting in the left pilot seat. The passenger or another pilot may occupy the right seat in the cockpit.

2.12 Kinds of operation

The ultralight aircraft DYNAMIC WT9 is approved to perform flights in accordance with VFR only. Aerobatic manoeuvres and intentional spins are prohibited!

WARNING
IFR flights and flights in icing conditions are prohibited.

For flight operations the following minimum equipment must be installed:

- Magnetic compass
- Sensitive barometric altimeter
- Airspeed indicator
- Pilot's Safety belts

2.13 Fuel

The following fuels can be used for the ultralight aircraft DYNAMIC WT9:

- EUROSUPER ROZ 95 unleaded accordance DIN 516 07 and O NORM 1100, Unleaded Automobile Gasoline Super 95
- Leaded Automobile Gasoline Super 95 accordance DIN 516 00 O NORM 1100,
- AVGAS 100 LL. Due to the higher lead content in AVGAS, the wear of the valve seats, the deposits in combustion chamber and lead sediments in the lubrication system will increase. Therefore, use AVGAS only if you encounter problems with vapour lock or if the other fuel types are not available.

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	Left tank (1)	Right tank (1)
The total quantity of fuel in the tank	35	35
Unusable fuel in the tank	0,5	0,5
Unusable fuel during approach	1,9	1,9
The total usable quantity of fuel in the tank	34,5	34,5

2.14 Maximum passenger seating

The maximum number of passenger aboard is one passenger sitting in the right seat in the cockpit.

2.15 Other limitations

The maximum crosswind component limit according to the airworthiness requirements for take off and landing is **6 m/s, 12 knots**.

NO SMOKING on board the ultralight aircraft.

Maximum towing cable load is 3.000 N. If the strength of tow cable is more than 3000 N a weak link must be used.

Maximum weight of towed glider is 525 kg.

Maximum weight of towing aircraft by 1 pilot occupation is 440 kg.

2.16 Limitations placards

Airspeed IAS				
		km/h	MPH	knots
Never Exceed speed	V_{NE}	280	174	150
Normal Operating Limit speed	V_{NO}	250	156	135
Rough Air speed	V_{RA}	230	143	124
Manoeuvring speed	V_A	165	103	88
Maximum Flap Extended speed	V_{FE}	140	88	75

Maximum Landing Gear
Operating speed

V_{LO} 140 88 75

Aerobatics, intentional spins and stalls are prohibited!

IFR flights and flights in icing conditions are prohibited !

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Fixed undercarriage

Maximum allowed filling of the fuel tanks in litres									
Baggage weight (kg)	Crew weight (kg)								
	70	80	130	140	150	160	170	180	190
0	Full tanks			62	48	34	20	7	
5	Full tanks			69	55	41	27	13	0
10	Full tanks			62	48	34	20	7	0

With tow system

Maximum allowed filling of the fuel tanks in litres									
Baggage weight (kg)	Crew weight (kg)								
	70	80	130	140	150	160	170	180	190
0	Full tanks			70	57	43	31	17	3
5	Full tanks			64	50	38	24	10	0
10	Full tanks			57	43	31	17	3	0

Retractable undercarriage

Maximum allowed filling of the fuel tanks in litres									
Baggage weight (kg)	Crew weight (kg)								
	70	110	120	130	140	150	160	170	179
0	Full tanks			69	56	42	28	14	1
5	Full tanks			63	49	35	21	7	0
10	Full tanks		69	56	42	28	14	0	0

Retractable undercarriage with tow system

Maximum allowed filling of the fuel tanks in litres									
Baggage weight (kg)	Crew weight (kg)								
	70	110	120	130	140	150	160	170	180
0	Full tanks			65	52	38	24	10	0
5	Full tanks			58	45	31	17	3	0
10	Full tanks		65	52	38	24	10	0	0

**Maximum Baggage
weight 10 kg**

NOTE

Due to different equipment in each aircraft, the actual empty weight is included in the Section 6.

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SECTION 3

EMERGENCY PROCEDURES

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3.1 Introduction

Section 3 provides checklist and amplified procedures for coping with emergencies that may occur. Emergencies caused by aeroplane or engine malfunction are extremely rare if proper preflight inspections and maintenance are practised.

However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

3.2 Engine failure**3.2.1 Engine failure at take-off run**

1. Throttle lever - set to idle position
2. Ignition - both circuits switched off
3. Brakes - apply till stop

3.2.2 Engine failure at take-off up to height 50 m

1. Airspeed - modify to 120 km/h
2. Field selection - land straight ahead no more than 15° left or right into wind if possible. Ground loop if required.
3. Ignition - both circuits switched off
4. Main fuel cock - close

3.2.3 Engine failure at take-off above height 50 m

1. Airspeed - modify to 120 km/h
2. Field selection - select in the direction of the free area without obstacles, if possible into wind
3. Ignition - both circuits switched off
4. Main fuel cock - close
5. Flaps - extend as required

3.2.4 Engine failure in flight

1. Airspeed - modify to 120 km/h
2. Field selection - according to height available
3. Air start - in accordance with item 3.3
4. In case of an unsuccessful air start, perform emergency landing in accordance with item 3.6.1.

3.2.5 Performance loss and irregular running of the engine during flight

This situation may occur with carburettor icing.

Apply carburettor pre-heating as required to restore normal power, smooth running. Or it can happen because of empty fuel tank, the indicator is the fuel pressure loss – close the empty tank fuel cock.

If everything fails perform an emergency landing.

3.3 Air start

1. Airspeed - modify to 120 km/h
2. Altitude flight - check
3. Field selection - select according to height available
4. Main fuel cock - open
5. Choke - if the engine is already in operating temperature, start the engine without choke
6. Throttle lever - at cold engine set to idle position
- at warm engine slightly open
7. Ignition - both circuits switched on
8. Starter button - actuate

As soon as engine runs, adjust throttle to achieve smooth running at 2500 r.p.m for approximately half a minute before increasing power as required.

WARNING

The rate of descent approx. 2.3 m/s causes measurable loss of altitude during the air start. If the air start is unsuccessful up to height 150 m above ground level, perform emergency landing according to item 3.6.1.

3.4 Smoke and fire

3.4.1 Engine fire on the ground

1. Fuel cocks - close
2. Throttle lever - full open
3. Ignition - both circuits switched off after consumption of the fuel
4. Crew - leave the cockpit immediately
5. Extinguish fire - with best available means

3.4.2 Engine fire in flight

1. Fuel cocks - close
2. Throttle lever - full open
3. Ignition - both circuits switched off after consumption of the fuel

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Change: 22.09. 2004

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4. Try to extinguish the fire with side slip
5. Perform emergency landing in accordance with item 3.6.1.

CAUTION

After extinguishing the fire do not start engine again!

3.4.3 Fire in cockpit

1. Fire source - locate
2. Ignition - both circuits switched off
3. Master switch - off
4. Crew - leave the cockpit on the ground ,
- perform emergency landing accordance with item 3.6.1.
5. Try to extinguish - with best available means

3.5 Glide

Glide path will determine the field selection for emergency landing. The optimum gliding performance is with retracted wing flaps (retracted undercarriage) and with stopped propeller.

In case of engine failure it is necessary to maintain the following optimum speeds for given configuration.

Landing gear position	Retracted			Extended		
	km/h	MPH	knots	km/h	MPH	knots
Optimum descent airspeed IAS	120	75	65	120	75	65
Maximum gliding range	14			10		
Rate of descent	2,4 m/s 500 ft/min			3,0 m/s 600 ft/min		

3.6 Landing emergency

3.6.1 Emergency landing

1. Airspeed - modify to 110 km/h
2. Field selection - select in the direction of the free area without obstacles, if possible into wind
3. Seat belts and harness - fasten
4. Flaps - extend as required
5. Main fuel cock - close
6. Ignition - both circuits switched off
7. Master switch - off

CAUTION

The loss of height for 360 ° turn is approx.. 120 m.

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3.6.2. Precautionary landing

In the event of the aeroplane failure, disorientation, shortage of fuel, dangerous deterioration of the meteorological conditions (visibility, thunderstorm) and approaching sunset, a precautionary landing should be conducted.

1. Select a suitable landing field, if possible into the wind.
2. Fly over selected field with wing flaps 15° and 110 km/h airspeed at a height 50 m AGL, noting the preferred area for touchdown for the next landing approach to inspect the terrain for obstructions and surface conditions.
3. Make landing circuit at a height 150 m AGL or at a safe altitude in accordance with the ceiling with flaps 15° and 110 km/h airspeed. Extend “down wind” position and make approach with sufficient power.
4. Don't lose sight of the selected field in low visibility.
5. Landing approach with flaps for landing and sufficient power.
6. Arrange approach so that the desired touch down spot will be immediately after passing the edge of the selected landing field.
7. After touch down apply heavy breaking till stopped. ground loop if necessary.
8. When the aeroplane comes to a stop, shut down the engine, master switch off, Main fuel cocks close, secure the aeroplane and seek assistance.

3.6.3 Landing with a flat tyre

1. Landing approach - with flaps 38 ° and 110 km/h airspeed
2. Touch down - with the bank angle on the unflat tyre at minimum touch down speed,
3. Direction after landing - maintain ground roll direction.

3.7 Recovery from unintentional spin

For recovery from an unintentional spin the following procedure should be used:

1. Throttle lever - set to idle position
2. Control stick - set neutral position, without deflection of the ailerons
3. Rudder control - apply full rudder opposite to the direction of rotation
4. Control stick - move forward of neutral in a brisk motion until rotation stops.
5. Rudder control - immediately as rotation stops, neutralize rudder position
6. Control stick - make a smooth recovery from the resulting dive.

WARNING

Intentional spins are prohibited !

3.8 Other emergencies

3.8.1 Control failures

Aileron control fault

- the aeroplane is possible to control laterally by the secondary effect of the rudder. Start and termination of the yawing up to bank angle 15° is possible using the rudder only.

Rudder control fault

- the yawing and the termination is conducted with help of the lateral control of the ailerons.

3.8.2 Vibrations

The power plant can be the source of the vibrations.

1. Reduce engine speed to minimize the vibrations.
2. Proceed to the nearest airport for landing or select a suitable precautionary landing field in accordance with item 3.6.2.

3.8.3 Emergency extension of the undercarriage

An overswitch on the instrument panel labelled “Hydraulic On” is in the up position at normal operation. In case of the electrical driven hydraulic pump malfunction, the overswitch is set in the down position labelled “Emergency extension of L/G”. The emergency extension of the undercarriage is carried out by its own mass with the help of a three-way valve. The drag stay is arrested with the help of the springs. The undercarriage is extended even in an electrical power loss. The emergency extension of the undercarriage is terminated, when three green lights are illuminated on the instrument panel.

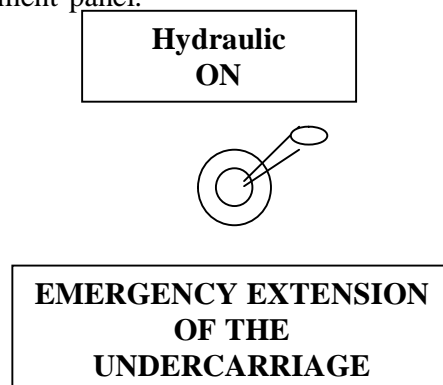


Fig. 2 Emergency extension of L/G overswitch

3.8.4 * Rescue system

1. Remove the safety pin of rescue system control
2. Pull out the rescue system control

* Optional

SEKCTION 4

NORMAL PROCEDURES

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4.2 Rigging and derigging	4-1
4.3 Daily inspection	4-4
4.4 Preflight inspection	4-4
4.5 Normal procedures and check list	4-7

4.1 Introduction

Section 4 provides checklist and amplified procedures for the conduct of normal operation. Normal procedures associated with optional systems can be found in Section 9.

4.2 Rigging and derigging

4.2.1 Rigging of the wings

The aeroplane has the wings disassembled for transportation purposes or to save space in the hangar. There is a description for the rigging procedure of the right wing. The procedure for the left wing is analogous. Thoroughly clean and lubricate all the wing fittings and pins so pins locate easily.

Rigging:

1. Fit the spar end of the right wing into the spar end (fork) of the wing central section and push the wing along its longitudinal axis so that a connection slot between the wing central section and the wing root is approx. 100 mm (Fig. 3).
2. Connect the hoses from the Pitot-static tube (connect the wiring for position lights, strobe lights, if lights installed).
3. Fully push the wing into the wing central panel. Insert the pin of the extended wing flap hinge into the fitting of the wing central panel. Take care of the hoses from the Pitot-static tube. They must not be twisted.
4. Insert wing pins to connect wing spar end with the wing central panel. The outer pin is inserted through the undercarriage box of the retractable version (for model SPEED) or through the access hole on the lower wing surface (for model CLUB and TOW). The inner pin is inserted through the hole in the cockpit below pilot seat (slightly lift and lower the wing tip to ease the pin insertion).
5. Insert rear spar into the fitting to locate the rear spar to the centre section. Secure all 6 pins with safety pins (Fig.4).
6. Insert connecting pin of the flap rod. During this procedure the flap control lever in the cockpit shall be set to the rearmost position and the flap shall be deflected to maximum down position.

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7. Connect the aileron control rod with the rod in the wing centre section and secure the nut (Fig.4) with the safety pin.
8. Repeat the procedure with the second wing. After checking the security of the connection, the connection slot between wing and the wing centre section should be sealed with sticky tape.

WARNING

After rigging of the wings check for correct operation and security of the aileron control pins and the flap control pins as well as the connection of the hoses from the Pitot-static tube.

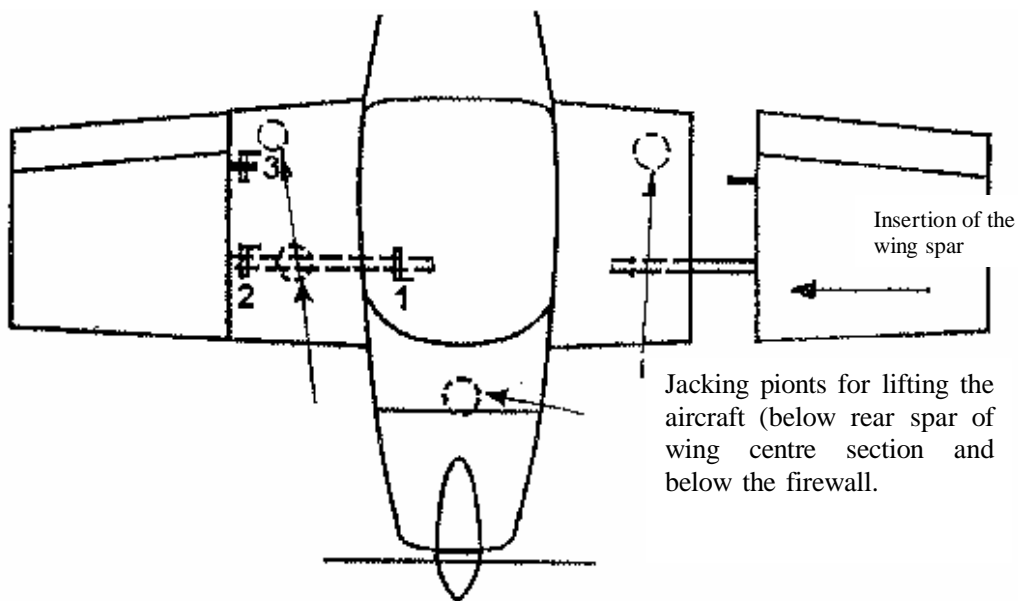


Fig. 3 Insertion of the wing spar into the wing centre section, position of the wing pins and the support points.

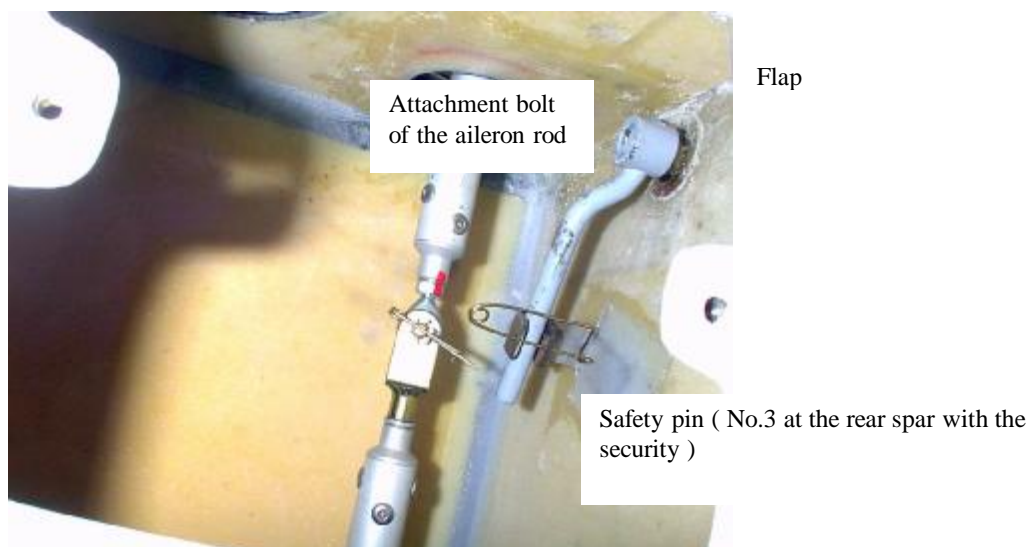


Fig. 4. Connecting bolt + safety pin of aileron connection.

4.2.2 Derigging of the wings

Use the opposite sequence for derigging:

1. Disconnect aileron rod from the rod in the wing centre section.
2. Remove the sticky tapes from the connection slot between wing and the wing centre section. Unlock the joints of the fla shaft.
3. Pull out all wing pins. (Pull out the fixation pins for connection of the wing spar end with the wing central panel and the auxiliary rear pin.)
4. Pull out the wing along its longitudinal axis so that there is a distance between the wing and the wing root of approx. 100 mm (Fig. 3). Disconnect the hoses from the Pitot-static tube (disconnect the position lights wires etc, if lights installed).
5. Carefully pull the wing away from the wing centre section and put on soft mats.

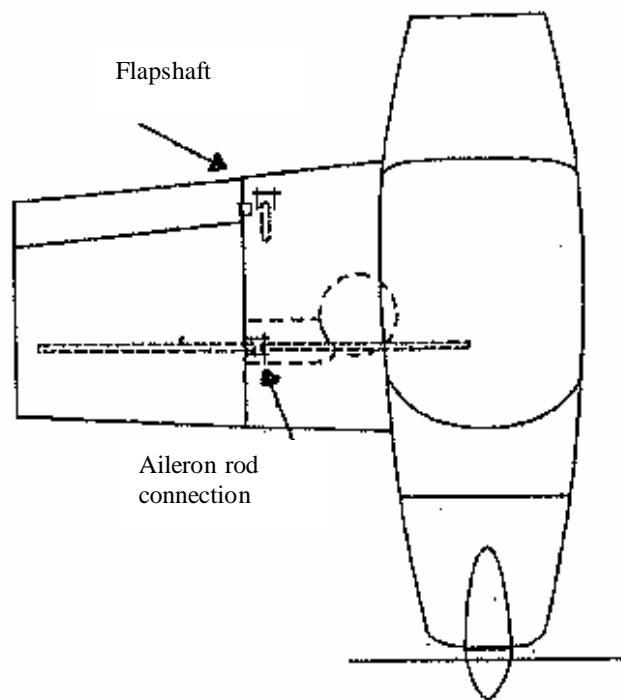


Fig. 5 Connecting position for the flap and the aileron.

4.3 Daily inspection

The daily inspection must be performed every day before flight of the ultralight aeroplane. The scope of this inspection is to check the following:

1. Aeroplane log-book and airworthiness certificate
2. Aeroplane technical log-book
3. Cockpit
4. Landing gear
5. All control surfaces for full and free movement
6. All surfaces of the ultralight aeroplane for cracks, nicks or any visible damage.
7. Power plant and propeller
8. Check fuel, oil, coolant liquid.

WARNING

If any problems are found they must be corrected before flying.

4.4 Preflight inspection

It is most important to perform a preflight inspection carefully to prevent possible trouble. The preflight inspection is essential for flight safety.

CAUTION

Special attention must be devoted to the parts, which are affected by high vibrations and high temperatures.

Preflight inspection procedure:

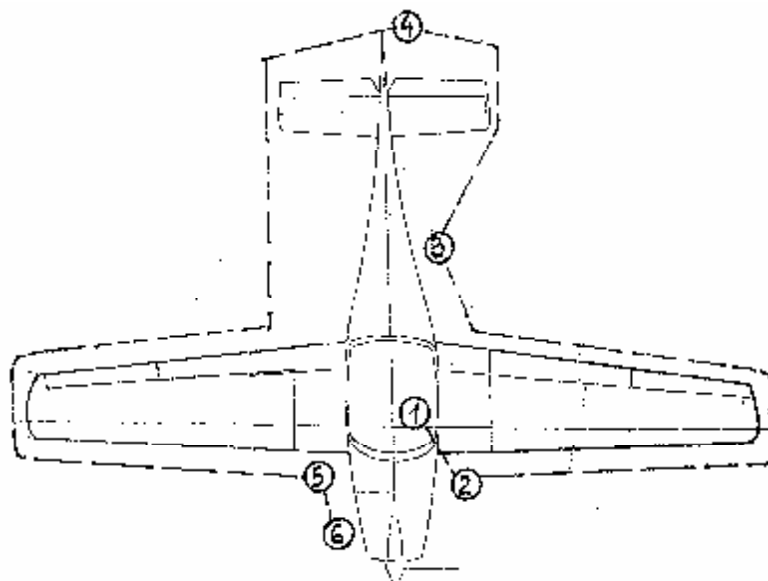


Fig. 6 Walkaround inspection

1. Cockpit:

Flight controls	- check for freedom of movement
Master switch	- switched off
Ignition switch	- both circuits switched off
Loose items	- secure or remove
Check instruments	- set "O"
Cockpit canopy glass	- clean, check cockpit canopy lock
Safety harness	- inspect
Fuel	- check fuel quantity, check fuel cock
Propeller	- main stop system check. With the engine not

running, adjust the propeller pitch from one end position to the other. If the system is functioning normally, the propeller reaches its end pitch position and the appropriate lamp (green or red) shines continuously, the servomotor stops. If the main stop system is faulty the servomotor continues to operate after it has reached its final normal position and there is also a specific clicking noise produced by the clutch slipping. If this occurs the propeller should not be used until repaired by the producer or service center. Do not fly.

2. Wing

Surface	- state of wing surface
Connection	- wing pins fully inserted and secured
Pitot static head	- pitot tube cover removed, check opening for blockage.
Leading edges	- without damage, clean
Ailerons	- check for freedom of movement and security
Flaps	- without play, check hinges for security

3. Fuselage

Surface	- without damage
Static pressure receivers	- check opening for blockage
Antennas	- fixed, without damage
Cockpit wing walks	- without damage

4. Tail units

Surface	- without damage
Control surfaces	- check for freedom of movement , without excess play
Auxiliary tail skid	- check for secure attachment

5. Landing gear**Fixed undercarriage:**

Main wheel tyres	- state, inflation (250 kPa)
Brakes	- visually check condition of pads, brake system for leaks
Laminated legs	- state without damage, attachment
Spats	- attachment, state without damage,
Nose wheel leg	- nose wheel tyre state, inflation (200 kPa) attachment, springed rubber components state spat attachment, wheel free rotation

6. Powerplant

Propeller - attachment, leading edge blade state, check for nicks and security, check spinner for cracks and attachment.

Engine

- check for any operating fluids leaks below engine cowlings
- state of the cowlings
- state of the exhaust system attachment
- state of the engine attachment into the rubber engine mants.
- check coolant level and oil level
- check attachment of carburettors
- check electric system state
- state of the holder hoses
- check condition and integrity of wires, plug
- check fuel filter
- turn the propeller by hand several times for odd noises or excessive resistance and normal compression.

WARNING

Before cranking the propeller switch off both ignition circuits. The propeller must be caught at the blade surface every time. Do not catch at the edge.

4.5 Normal procedures and check list

The standard cockpit control arrangement is shown in fig.7 and the instrument panel is shown in fig.9.

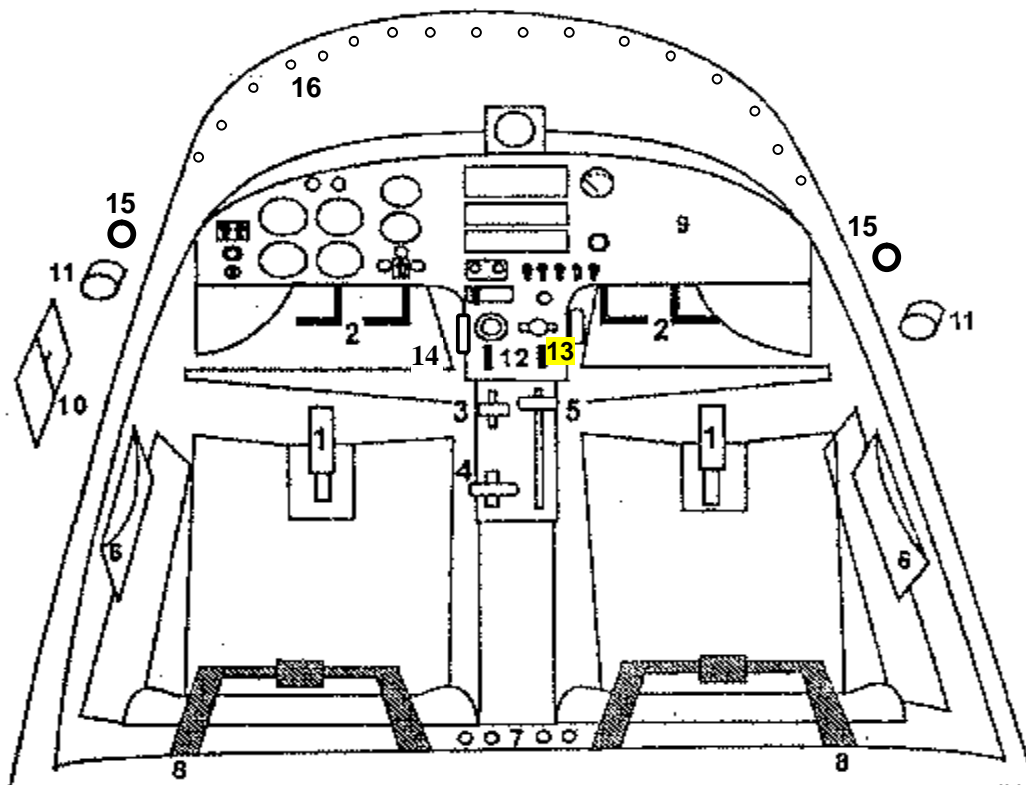


Fig. 7. The cockpit controls, see also fig.9 on page 7 – 3

- | | |
|-------------------------------------|--------------------------------|
| 1. Control stick/ propeller control | 9. Instrument panel |
| 2. Rudder pedals | 10. Ventilation sliding window |
| 3. Elevator trim control lever | 11. Ventilation |
| 4. Brake control lever | 12. Fuel cock |
| 5. Wing flaps control lever | 13. Chock |
| 6. Pocket | *14. Tow cable release |
| 7. Headset socket / jack | 15. Ventilation flow baffle |
| 8. Seat and safety harness | 16. Canopy ventilation |
- * Optional

4.5.1 Before starting engine

- | | |
|----------------------------|---|
| 1. Ignition | - both circuits switched off |
| 2. Rudder pedals | - freedom of movement |
| 3. Control stick | - freedom of movement |
| 4. Throttle lever | - freedom of movement, set to idle position |
| 5. Elevator trim control | - set neutral position |
| 6. Fuel quantity | - check |
| 7. Instruments | - setting and check up of the value |
| 8. Radio | - function check |
| 9. Seat and safety harness | - adjust and lock |
| 10. Break | - function check |
| 11. Canopy of cockpit | - shut and latched |

4.5.2 Engine starting**Cold engine:****WARNING**

Before starting engine check position of the landing gear overswitch .
Overswitch position – **EXTENSION** (L/G extended).

- | | |
|---------------------------|---|
| 1. Main fuel cocks | - open |
| 2. Fuel pump | - switch on and establish fuel pressure then switch off |
| 3. Choke | - open |
| 4. Throttle lever | - set to idle position |
| 5. Brakes | - set on parking position, control lever secured |
| 6. Master switch | - switched on |
| 7. Ignition | - both circuits switched on |
| 8. Starter button | - actuate, activate starter for max. 10 sec only without interruption |
| 9. As soon as engine runs | - adjust throttle lever to achieve smooth running at approximately 2000 r.p.m, check if oil pressure has risen within 10 sec to 2 bar and monitor oil pressure, choke off |
| 9. Warming up | - start warming up period at 2000 r.p.m for approx. 2 minutes, continue at 2500 r.p.m, duration depending on ambient temperature, until oil temperature reaches 50 °C |

Warm engine: if the engine is already at operating temperature**WARNING**

Before starting engine check position of landing gear overswitch.
Overswitch position – **EXTENSION** (L/G extended).

- | | |
|--------------------|--|
| 1. Main fuel cocks | - open |
| 2. Throttle lever | - set to slight open position |
| 3. Brakes | - set on parking position, control lever secured |

- | | |
|---------------------------|---|
| 4. Master switch | - switched on |
| 5. Ignition | - both circuits switched on |
| 6. Starter button | - actuate, activate starter for max. 10 sec only without interruption |
| 7. As soon as engine runs | - adjust throttle lever to achieve smooth running at approximately 2000 r.p.m, check if oil pressure has risen within 10 sec to 2 bar and monitor oil pressure, |

4.5.3 Engine warming up

In accordance with the Operator's Manual for all versions of ROTAX 912 as follow: Start warming up period at 2000 r.p.m for approx. 2 minutes, continue at 2500 r.p.m, duration depending on ambient temperature, until oil temperature reaches 50 °C.

Engine ground test:

1. Ignition check – check the two ignition circuits at 4000 r.p.m (approx. 1650 r.p.m propeller). Speed drop with only one ignition circuit must not exceed 300 r.p.m (approx. 125 r.p.m propeller). 120 r.p.m (approx. 50 r.p.m propeller) max. difference of speed by use of either circuit A or B. (Note: the propeller speed depends on the actual reduction ratio).
2. Throttle response – short full throttle ground test, speed must not exceed 5800 r.p.m.
3. The minimum speed on the ground must be 5000 r.p.m depending on ambient temperature and pressure. (approx. 2060 r.p.m propeller)
4. Check idle speed 2000 r.p.m (approx. 820 r.p.m propeller)

4.5.4 Taxying

Use of the Vernier throttle (screw in, screw out) will help with smooth adjustments of power during taxying. Taxying of the aeroplane is controled by he rudder pedals which are connected to the nose wheel steering. The wheel brakes are actuated by sliding the brake lever rearwards in the centre console.

4.5.5. Before take-off

- | | |
|-----------------------------|--|
| 1. Rudder pedals | - freedom of movement |
| 2. Control stick | - freedom of movement |
| 3. Elevator trim control | - set neutral position |
| 4. Wing flaps | - set take off position |
| 5. Main fuel cocks | - open, check fuel quantity |
| 6. Fuel pump | - switched on |
| 7. Power plant instrument | - check for correct readings |
| 8. Flight instrument | - check altimeter setting |
| 9. Propeller | - set minimum fine angle (take off position) |
| 10. Seat and safety harness | - adjust and lock |
| 11. Canopy of cockpit | - latched |

4.5.6. Normal Take-off

Throttle lever – full open,

- control stick set into neutral position
- direction on the ground run controlled by rudder pedals
- unstick at speed at 80-85 km/h (according to take off weight)
- accelerating at speed 110-120 km/h (acceleration after unstick)
- reduce engine rpm to 5500 – 5700 by using the electronic propeller control (this increases the angle of blades)
- at height 50m AGL wing flaps up
- adjust cruising power (engine speed 5500 r.p.m)

4.5.7. Climbing

Normal climbs are conducted at climb speeds 110 - 120 km/h in accordance with the take off weight of the aeroplane. Monitor cylinder head temperature and oil pressure during climb. Oil temperature limits must not be exceeded. In case of high readings, increase airspeed and reduce engine power setting.

4.5.8. Cruise

The range of cruising speeds is from 140 to 250 km/h in accordance with the engine speed setting from 4000 to 5200 r.p.m. The economy airspeed for best fuel economy is at 140 km/h, the optimum operation is between 180 km/h to 200 km/h. In case of turbulence reduce cruising speed below 160 km/h. Under certain conditions the aeroplane may be overstressed. The aeroplane is able to be trimmed through the range of the cruising speeds. Due to economy reasons is recommended to maintain the following data:

Engine ROTAX 912 UL Engine power setting	Engine Speed (r.p.m)	Performance (kW)	Torque (Nm)	Manifold pressure (in Hg)
Take-off performance	5 800	59,6	98,1	Full throttle
Cruising power	5 500	58	100,7	Full throttle
75 %	5 000	43,5	83	27,2
65 %	4 800	37,7	75	26,5
55 %	4 300	31,9	70,8	26,3

Engine ROTAX 912 ULS Engine power setting	Engine Speed (r.p.m)	Performance (kW)	Torque (Nm)	Manifold pressure (in Hg)
Take-off performance	5 800	73,5	119,0	27,5
Cruising power	5 500	69,0	121,8	27
75 %	5 000	51,0	97,4	26
65 %	4 800	44,6	88,7	26
55 %	4 300	38,0	84,3	24

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4.5.9. Descending

Descending is conducted at airspeeds 110 – 120 km/h with the throttle lever set to idle position. For increasing the rate of descent it is recommended wing flaps set to landing position (38° flaps deflection) and proceed at airspeed 120 km/h. In this configuration the gliding range is 1:8.

Side slipping is conducted with airspeed 120 km/h, and bank angle 30° with help of the full rudder deflection. The side slip direction is controlled by the bank.

4.5.10 Landing

Check systems (fuel) before approach for landing. Landing approach conduct at small glide slope angle due to long distance of the float before aeroplane touch-down

1. Propeller - set minimum fine angle (take off position)
2. Fuel pump - switched on
3. Approach speed 110-120 km/h according to the weight.
4. Wing flaps - as required flaps down at speed below 135 km/h
5. Elevator trim – adjust as required
6. Begin levelling out at height circa 2-3 m.
7. Actual touchdown should be made with power-off and on the main wheelsfirst. The nose wheel should be lowered smoothly to the runway as speed is diminished.
8. During landing run control the aeroplane with help of the rudder pedals.
9. Apply braking as required. The main wheel brakes are actuated via the handle on the pedestal between the pilot seats.

WARNING

The light and audible warning signal for retracted landing gear will not operate, if the landing is made without the wing flaps set down in landing position.

4.5.11 Balked landing

1. Smoothly adjust the throttle lever – full open (a thrust yawing moment is manifested in case of the steep setting of the throttle lever)
2. Airspeed modify to 120 km/h
3. The wing flaps setting reduced to take-off position
4. Elevator trim – adjust as required and proceed in the climb out

4.5.12 After landing

1. Engine speed - adjust for taxiing

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2. Wing flaps - retract
3. Elevator trim - set to rearmost position of neutral
4. Fuel pump - switched off
5. Taxiing - into the parking position

4.5.13. Securing aeroplane

1. All electronic instruments (avionics) - switched off
2. Ignition - switched off
3. Master switch - switched off
4. Main fuel cocks - closed in case of lengthy duration on the ground
5. Brakes - set on parking position, control lever secured
6. After leaving the cockpit, the canopy should be covered with the cloth dust-cover, to avoid the effects of the sun.

4.5.14 Aerotowing

Aircraft WT 9 DYNAMIC is approved for aerotowing of sailplanes in MTOM 525 kg. (see 2.15 "Other limitations")

Take off and climbing do with wing flaps position 15° (max. TOW of towed sailplane up to 410 kg) at safe height (min 50 m) wing flaps up

Take off and climbing do with wing flaps position 0° (towed sailplane with water ballast or TOW more than 410 kg to 525 kg)

Note: Take care for max. towing speed of towed sailplane.

SECTION 5
PERFORMANCE

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5.1 Introduction

Section 5 provides approved data for airspeed calibration, stall speed and take-off performance and non-approved additional information. The data in the charts has been computed for condition of the standard atmosphere from actual flight tests with the aeroplane at maximum take-off weight and engine in good condition and using average piloting techniques.

5.2 Approved data

5.2.1 Airspeed indicator system calibration

IAS (km/h)	50	65	70	80	90	100	110	120	130	140	160
CAS (km/h)	65	76	80	87	92	100	110	118	127	136	156

IAS (km/h)	180	200	220	240	260	280
CAS (km/h)	175	195	215	233	252	272

IAS = indicated airspeed

CAS = calibrated airspeed

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5.2.2 Stall speed

Maximum weight 450 kg, C.G. in 25% MAC, idle engine speed

Position wing flaps	0°	15°	38°
Stall speed IAS in km/h	60	55	50
Stall speed CAS in km/h	72	70	65

5.2.3 Take-off performance

The data is valid for following conditions: H = 0 m MSL, Temperature t = 15 ° C
Wing flaps position 15° and engine ROTAX 912 ULS

Surface of the runway	Take-off run distance (m)	Take-off distance up to 15m (m)
Paved runway	75	252
Non paved – grass	86	264

5.2.4 Landing distance

The data is valid for following conditions: H = 0 m MSL, Temperature t = 15 ° C
Wing flaps position 38° , landing run is braked.

Surface of the runway	Landing distance (m) from height 15 m	Landing run distance (m)
Paved runway	267	152
Non paved - grass	258	144

5.2.5 Climb performance

The data is valid for max.weight 450 kg , without flaps.

Engine ROTAX 912 ULS, speed 5500 r.p.m

Propeller SR 2000

Altitude (m)	Speed IAS km/h	Rate of climb m/s
0	120	6,2
1000	120	5,9
2000	120	5,2

The service ceiling is 5000 m for models equipped by engine ROTAX 912 UL. The service ceiling is 5500 m for models equipped by engine ROTAX 912 ULS at the cruising power.

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5.3 Additional information

5.3.1 Cruise

The following graph shows the reached speeds depending on the engine speed and the fuel consumption.

Fuel consumption of the aeroplane DYNAMIC with engine ROTAX 912 ULS, propeller SR 2000

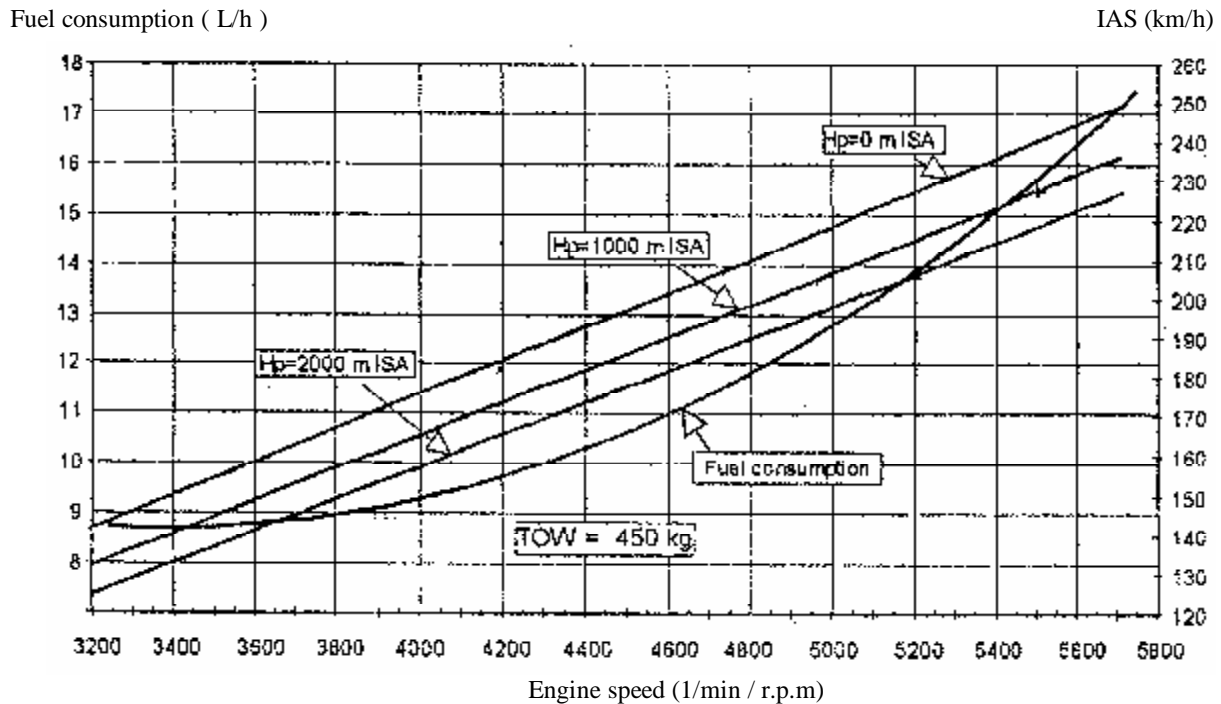


Fig. 8 Fuel consumption graph

5.3.2 Endurance

The power requirement of propeller in the dependence of the airspeed has the quadrate running. The power consumption and also the fuel consumption increases with square of the airspeed. The flight altitude is another factor, which effects the fuel consumption, because the performance drop with increasing flight altitude. The minimum fuel consumption is at lift-over-drag maximum speed, which is 115 km/h. The minimum fuel consumption is at lift-over-drag maximum speed, which is 115 km/h. The good compromise for effective cruising performance is the airspeed range from 180 to 220 km/h.

The following table shows the fuel consumption for engine ROTAX 912 ULS with take-off performance 73,5 kW at different engine speeds. The fuel consumption for engine ROTAX 912 UL with take-off performance 59,6 kW is about 10 % less. The propeller setting is not determined, due to flat running of the propeller curve optimum. The engine speed has greater effect in its upper section.

Engine speed	1/min	4900	4800	4700	4600	4500	4500	4500	4500	4500	4500	4500
Propeller blade angle	°	25°	24°	23°	22,5°	21,9°	21,5°	21°	20,5°	20°	19,5°	19°
Fuel consumption	l/h	18	17	16	15	13,5	12,5	11,2	10,7	9,9	9,5	8,6
Airspeed IAS	km/h	250	240	230	220	210	200	190	180	170	160	150
Endurance	h:min	3:50	4:04	4:19	4:36	5:07	5:31	6:16	6:27	6:58	7:16	8:00
Max. range	km	958	975	990	1010	1070	1100	1170	1160	1185	1160	1200

The table is valid for:

Flight altitude 1000 m MSA, take-off performance 73,5 kW, the total usable quantity of fuel in the tanks is 69 litres.

5.3.3 Balked landing climb

The data is valid for maximum landing weight 450 kg, wing flaps position 38°. Engine ROTAX 912 ULS, engine speed 5500 r.p.m, Propeller SR 2000

Flight altitude (m)	Airspeed IAS km/h	Rate of climb m/s
0	115	4,7
1000	115	4,2
2000	115	3,6

5.3.4 Take-off measurements

The data is valid for following conditions: H = 0 m MSL, Temperature t = 15 ° C
Wing flaps position 15° and engine ROTAX 912 ULS

Surface of the runway	Take-off run distance (m)	Take-off distance up to 15m (m)
Non paved - grass	86	264

5.3.5 Effect on flight performance and characteristics

No disturbing effects on flight performance and characteristic of the ultralight aeroplane DYNAMIC WT9 were recorded during the flight tests.

Date: 1.12.2001

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5.3.6 Demonstrated crosswind performance

The maximum demonstrated crosswind speed for take-off and landing is 6 m/s according to the airworthiness requirements.

5.3.7 Noise data

The maximum noise data 56,7 dB (A) was measured during the flight tests according to the German noise requirement LS – UL 96.

5.3.8 Aerotowing performance

5.3.8.1 Take off and climbing

The following table shows the take-off and climbing performance

Glider Type	MTOM (kg)	Distance (m)		Time of climb up to		Airspeed IAS (km/h)	Rate of climb (m/s)
		take off run	take of up to 15m	400 m	600 m		
Luňák LF107	315	140	449,26	2:38,1	3:54,6	110	2,65
Blaník L13	501	201	523,5	3:03,5	5:09,2	110	2,0
VTC CIRUS	405	170	533,8	2:45,1	4:10,6	120	2,46
VTC CIRUS	405	170	521,7	2:43,3	4:13,0	110	2,55
LS 8b	525,7	240	597,8	3:07,1	4:47,9	130	2,11
LS 8b	525,7	240	563,9	2:53,7	4:08,9	120	2,45
VENTUS C	525	205	526,3	2:56,2	4:08,0	130	2,45

SECTION 6

WEIGHT AND BALANCE / EQUIPMENT LIST

	Page
6.1 Introduction	6-1
6.2 Weighing procedure	6-1
6.3 Weight and balance record and permitted payload range	6-2
6.4 Master minimum equipment list	6-4

6.1 Introduction

This section contains the payload range with which the ultralight aircraft may be safely operated. C.G. position is very important parameter which effects the safety of flight.

6.2 Weighing procedure

To define the aeroplane C.G. it is necessary to weigh the empty aeroplane with standard and optional equipment, with operating fluids of the engine but without the fuel in the tanks.

The aeroplane is weighed with the help of three weighing-machines located below the left and right main wheels and below the nose wheel. The aeroplane position for weighing has to be parallel with the horizontal plane which passes through the side edge of the cockpit. The reference point (datum point = DP) is leading edge of wing root section. To measure the distance from centre of main landing wheel axle and of nose wheel axle to reference point DP. C.G. position is calculated from the reference point DP (leading edge) and C.G. position is calculated in % aerodynamic mean chord (MAC) too. The leading edge of the MAC is located in distance 77 mm rear from DP.

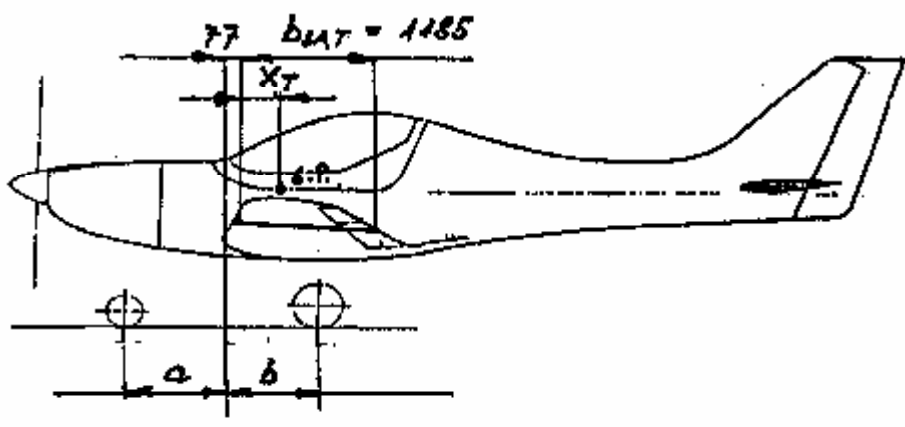
Centre of gravity position after loading aeroplane (crew, fuel, baggage or additional equipment) is calculated as following: The sum moments of aeroplane all components mass is added to the total moment of the empty aeroplane and divided by total weight.

Date: 1.12.2001	
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WEIGHT AND BALANCE RECORD

Model: DYNAMIC WT9	Registration:	S/N :
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Configuration : (Empty weight including the operating fluids of the engine and standard equipment).
Datum point (DP): leading edge of wing root section



Weighing weights (kg):

Weighing-machines place	Weight (kg)	Distant from DP (mm)	Moment M= G * Distant
Empty aeroplane			
Right wheel	Gr	b =	
Left wheel	Gl	b =	
Nose wheel	Gn	a =	
Total Empty Weight	G=		Total Moment M =
Crew	Gcrew	720	
Fuel	Gfuel	240	
Baggage	Gbag	1100	
Total weight	G =		Total Moment M =

C.G. position from DP.

$$X_T = M/G = \text{-----} =$$

C.G. v % MAC (MAC= 1185 mm)

$$X_{CT} = (X_T - 77) / SAT \times 100 = \frac{X_T - 77}{1185} \times 100 =$$

Permitted C.G. range of empty aeroplane X_{CT} is $12\% \pm 2\%$ MAC

Permitted position of C.G. in flight is $20 \div 30\%$ MAC

Calculated position of C.G. is within an permitted range at :

Empty aeroplane: yes..... no.....

Flight configuration: yes..... no.....

Place of weighing:

Date:

Signature

Date: 1.12.2001	
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6.4 Master minimum equipment list

In accordance with the German Certification Regulations and Airworthiness Requirements for ultra light aircraft of the DaeC (BFU des DaeC, Ausgabe 10/95) the following minimum instrument equipment is requested :

Flight and navigation instruments:

- Airspeed indicator – with the Airspeed indicator markings in accordance with item 2.3, Section 2 of this Manual
- Sensitive Barometric Altimeter
- Magnetic compass

Powerplant instruments :

- Ignition Switch
- Fuel indicator
- Tachometer
- Oil temperature indicator and Oil pressure indicator
- Coolant temperature indicator

Additional equipment :

- Master Switch of the electrical system with fuses
- Battery – located in front of the firewall .
- Safety harness – 4 point static harness restrain system is attached to the fuselage structure
- Limitation placards - in accordance with item 2.16, Section 2 of this Manual

CAUTION

If additional equipment is mounted within the magnetic field of the compass, it may affect the readings of the compass.

SECTION 7

AEROPLANE AND SYSTEM DESCRIPTION

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7.1 Introduction	7-1
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7.5 Landing gear system	7-4
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7.12 Pitot and static pressure system	7-11
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7.1 Introduction

This section provides a description of the operation of the aeroplane and its systems. Refer to Section 9, Supplements, for details of optional systems and equipment.

7.2 Airframe

DYNAMIC WT 9 is a single engine ultralight aircraft, controlled aerodynamically, made from advanced composite material, low-wing monoplane with two side-by side seats. The aeroplane is equipped with a fixed or a retractable tricycle undercarriage.

Fuselage

The fuselage sandwich shell is divided in the symmetry plane. The shell is of three layer construction. The external and internal shell layers are made of glass and carbon fibre fabrics, which are saturated with a resin. Between them there is a filling of hard foam panels. The fin is made together with the fuselage. The wing central panel is fixed at the fuselage.

There are two places in the cockpit, side by side type. The interior width is 1.15 m. A lifting cockpit canopy hinges forward. The canopy opening system is assisted by an air strut. The wing central panel with span 2.45 m is fixed at the fuselage. There is an integral tank in the forward box of the wing central panel. The back box of the wing central panel is used as room for main legs of the retractable undercarriage.

Wing

The tapered wing is a monospar construction with a rear auxiliary spar for the aileron and flap attachments. The main spar caps are made from carbon rovings. The slotted flaps are rectangular sandwich construction. The flap is attached to the wing with four hinges. The aileron is attached to the upper surface of the wing with three hinges. The spars of right and left wings are joined to the wing central panel spar with the help of two pins. The third connecting point is the pin in the rear auxiliary spar. An aileron control system consists of duraluminium rods. The control handle of flaps is attached to the pedestal in the cockpit. The movement by help of the rods and the bellcranks is transmitted to the flap shaft in the wing, next the movement from the shaft is transmitted to the flaps.

Horizontal tail unit

The horizontal tail unit consists of a stabilizer and elevator. The stabilizer consists of sandwich shells from advanced composite material. The stabilizer is fixed at the fin. The width of the horizontal tail unit is 2.4 m, (the same width as the wing central panel) and allows the transport of the fuselage with regular truck. The elevator consists of two parts, which are joined together by help of the elevator control.

Vertical tail unit

The vertical tail unit consists of the fin and rudder and has trapezoidal shape. The rudder consists of a sandwich shell from advanced composite material with the control-surface weight balance. The rudder is attached by three hinges at the fin.

7.3 Flight controls

The aircraft has dual controls with two control sticks. The ailerons are controlled by control sticks, connecting rods and arms.

The elevator is controlled by control sticks, connecting rods. The rudder is controlled by cables attached at the rudder pedals and guided alongside the fuselage sides to the rudder. The rudder pedals are adjustable on the ground.

The wing flaps are controlled by a flap control lever located on the pedestal between the seats. The lever has four positions: retracted, take-off with flap deflection 15°, landing position with flap deflection 24 ° and landing position with flap deflection 38°. The flap position is locked by a plate at the flap control lever in the appropriate position. Movement with help of rods and bellcranks is transmitted onto the coaxial shaft and from the shaft is transmitted onto the flaps with help of the rod.

7.4 Instrument panel

The standard instrument panel arrangement is shown in the following figure (fig.9). A different instrument panel arrangement may be used, if optional flight and navigation instruments are mounted in the airplane.



Fig. 9 Instrument panel

- | | | |
|---|------------------------------|---|
| 1. Landing Gear Check Light | 16. Tow Release | 31. Cylinder-Head Temperature Indicator |
| 2. Charge | 17. Throttle Lever | 32. Oil Temperature Indicator |
| 3. Net Light | 18. Choke Lever | 33. Oil Pressure Indicator |
| 4. Bank Indicator | 19. Oil Cooler Flap Lever | 34. Hydraulic Pump |
| 5. Airbox Temperature | 20. Carburettor Heat Control | 35. Auxiliary Electrical Fuel Pump |
| 6. Airspeed Indicator | 21. Heating | 36. Landing Lights Switch |
| 7. Tachometer | 22. Main Fuel Cokes | 37. Navigation Lights Switch |
| 8. Variometer | 23. Trim Control Lever | 38. Wing Tip Strobe Lights Switch |
| 9. Altimeter | 24. Flap Control Lever | 39. 12 V Stage Pocket |
| 10. Landing Gear Control | 25. Brake Lever | 40. Fuses |
| 11. Propeller Control
Constant Speed Indicator | 26. Control Column | 41. Magnetic Compass |
| 12. Master Switch | 27. VHF button | 42. Rescue System Handle |
| 13. Ignition | 28. Fuel Quantity Indicator | |
| 14. Starter | 29. Fuel Pressure | |
| 15. Intercom Control | 30. Manifold Pressure | |

7.5 Landing gear system

The main wheels of the model CLUB and TOW are mounted on spring legs, which are attached to the left and to the right outside of the wing central panel. The nose wheel leg is attached at the fire wall. The nose wheel is sprung by help of rubber components and is controlled with the rudder pedals. The main wheels on both legs are equipped with hydraulic disc brakes and spats.

The model SPEED is equipped with a retractable undercarriage, which is actuated by a hydraulic system with the help of the electrical driven hydraulic pump. The emergency extension of the undercarriage is carried out by its own mass with help of a three-way valve. The drag stay is arrested with help of the springs. The main undercarriage legs are attached to the left and to the right outside of the wing central panel and they are retracted inside. The nose undercarriage leg is retracted backwards. The main wheels on both legs are equipped with hydraulic disc brakes. The main wheel are braked by hydraulic brakes with main hydraulic face ram, which is located beyond the seats. The main wheel brakes are actuated via the handle on the pedestal between the pilot seats. This handle actuates the parking brake too.

The tires of the main landing gear have dimension 350 x 140 mm , the tire of the nose wheel has dimension 320 x 120 mm.

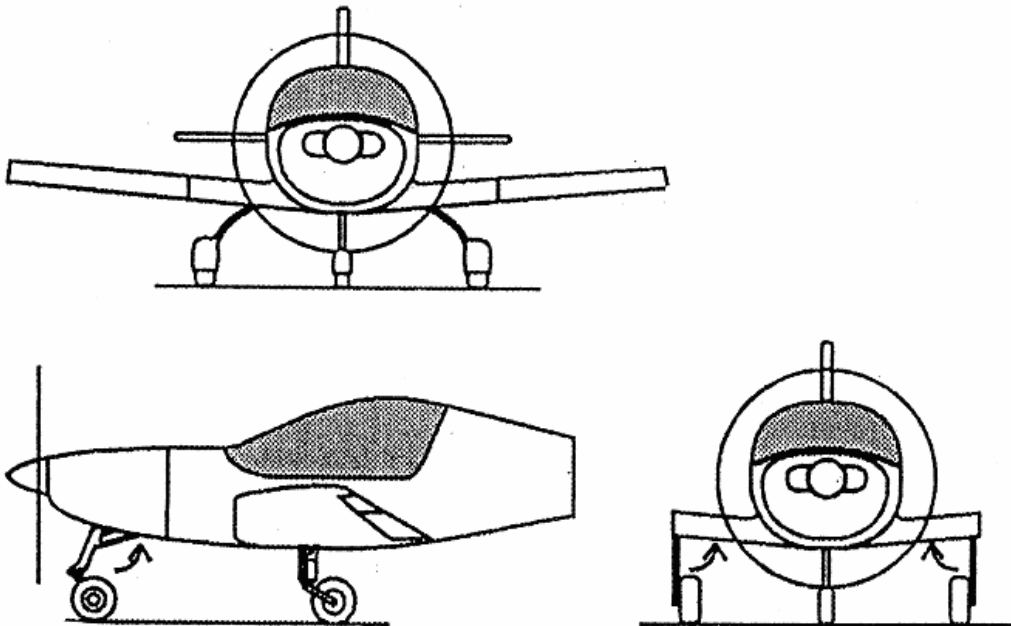


Fig. 10 Fixed undercarriage and hydraulic retractable undercarriage

The hydraulic system schematic of the retractable undercarriage is shown in the following figure (fig.11). The power is supplied from the battery to the switch S1 in the up position on the instrument panel labelled “Hydraulic On”, which switch on the hydraulic pump by help of the pressure switch and the relay. The pressure switch switches off the power after reaching the desired pressure. The switch S1 in the down position labelled “Emergency extension of L/G” switches on the emergency extension of the undercarriage. The emergency extension of the undercarriage is carried out by own mass with the help of a three-way valve. The drag stay is arrested with help of the springs. The other switch S2 controls the direction of the pressure fluid movement for extension or retraction of the undercarriage. The pressure fluid proceeds via the three-way valve to the one or another side of the hydraulic face ram. Both sides of the hydraulic face ram are without pressure during the emergency extension of the undercarriage.

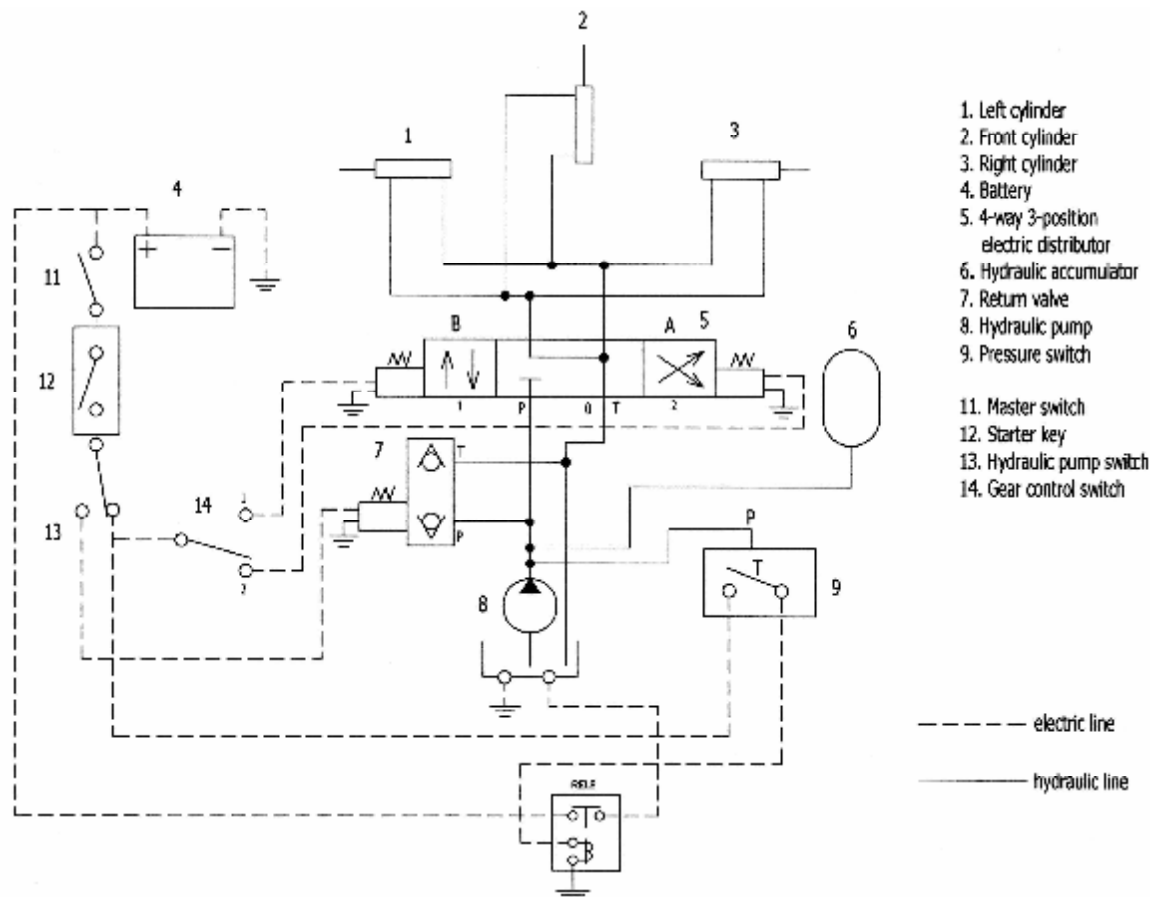


Fig. 11 The hydraulic system schematic of the retractable undercarriage

Date: 20.11.2004

Change No. 1

7.6 Seats and safety harness

The plane has two side-by-side seats which are fixed, unadjustable. The back support of the seats is glued into the fuselage construction as the frame. The safety belts – 4 point static harness restraint system is attached to the left and right seat side panel and to the strut behind the back support of the seats.

7.7 Baggage compartment

The baggage compartment is situated behind the seats. Maximum baggage weight is stated on a placard near the compartment. Hard objects may not be carried in the baggage compartment without a suitably designed lashing or anchorage.

7.8 Doors, windows and exits

The cockpit canopy consists of one part. The Perspex canopy is glued on the composite frame. The canopy is attached to the nose section of the fuselage by pins which make it possible for the canopy to be tilted forward. For easier manipulation, the weight of the canopy is counterbalanced by two gas struts which allow it to open effortlessly. On the lower frame there are handles outside the canopy. The canopy is equipped with a lock on the upper rear section of the frame (see Fig.12).

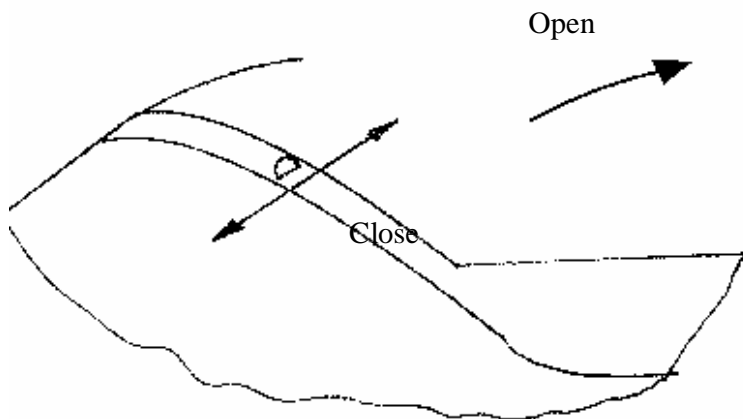


Fig.12. Cockpit canopy lock

7.9 Powerplant

Standard powerplant consists of 4 cylinder horizontally opposed, 4-stroke engine ROTAX 912 UL with power 59,6 kW or engine ROTAX 912 ULS with power 73 kW and a three blade wooden fixed pitch or in flight electrically adjustable aircraft propeller. These engines are suitable for ultralight aircraft, but they must never fly at locations, airspeeds, altitudes, or in any other circumstances from which a successful no-power landing cannot be made, after sudden engine stoppage.

Description

ROTAX 912 UL / 912 ULS is 4-stroke, 4 cylinder horizontally opposed, spark ignition engine, one central camshaft-push-rods-OHV. Liquid cooled cylinder heads, ram air cooled cylinders. Dry sump forced lubrication. The engine is fitted with electric starter, AC generator, mechanical fuel pump and the reduction gear with integrated shock absorber. Refer to the Operator's Manual for all versions of ROTAX 912 for more details about versions difference.

WARNING

Due to carburetors, flights in icing conditions are prohibited.

The cooling system of the engine is designed for liquid cooling of the cylinder heads and ram-air cooling of the cylinders. As coolant for the cooling system 50 % antifreeze concentrate with additives against corrosion and 50 % pure water is used. Satisfactory results were achieved with "BASF Glysantin Anticorrosion". Use this or equivalent coolant. The coolant must be renewed every two years. Refer to the Operator's Manual for all versions of ROTAX 912 for renewal of the coolant.

The periodic inspections are structured on 25, 100 and 200 hours check which must be performed according to the maintenance schedule. The 50 hour check is recommended by the manufacturer but not mandatory, with the exception of oil change. Additionally, a check after the first 25 hours of operation must be performed.

There are two laminated cowlings (upper and lower) which cover the engine suspended at the engine bed. The disassembly and assembly of the upper cowling is easy – just release the quick-closing locks. The upper cowling is usually removed during engine pre-flight inspection to check the engine compartment, operating fluids quantity (oil, coolant) and to check engine installation.

After removing the upper cowling of the engine, check the following:

1. Oil quantity check: Remove the cover of the oil tank (3). The oil level in the oil tank should be between two marks (max./min.) on the dipstick, but must never fall below the min. mark.
2. Coolant quantity check: Remove the cover of the expansion tank (7). The coolant level in the overflow bottle should be between min. and max. mark.

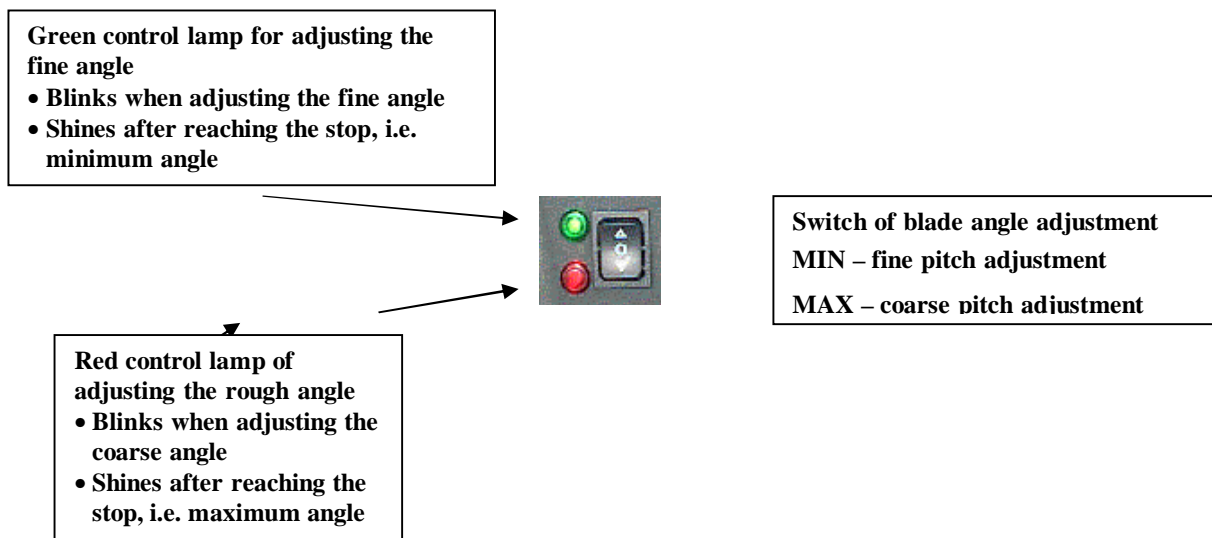
The lower cowling is removed after unscrewing the attachment screws connecting the cooler to the cowling face side, then unscrew the attachment screws connecting the cowling to the firewall border.

Propeller

SR 2000 is the three blade, in flight electrically adjustable aircraft propeller with diameter 1.7 m of mixed structure.

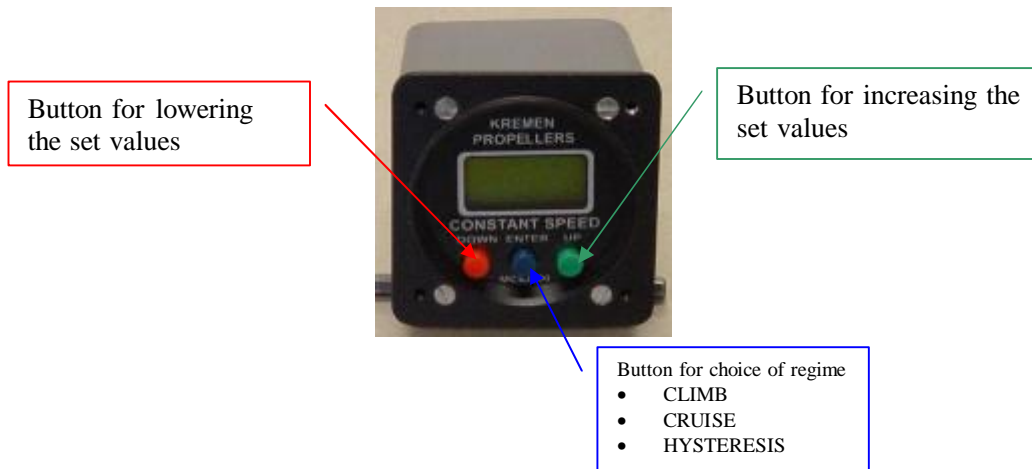
The angle of the blades setting is adjusted by servomotor controlled from the cockpit and it can be adjusted smoothly in range from the minimum angle intended for take-off up to maximum angle.

The propeller can be operated either manually or automatically regime as a propeller of constant speed. The installation of manual control can be with the propeller control on the control stick or on the instrument panel. Propeller control on the instrument panel consists of a panel, in which there is placed the signalisation of the direction of propeller blades adjusting, together with control diodes of small and large angle and also the switch of control. The details of this arrangement and their significance are shown below:



CAUTION

With maximum engine power at full-fine pitch, engine over speed may occur. Attention must be paid to the engine tachometer. When ground running the engine make sure propeller pitch is fine. Coarse pitch angles at full throttle can overload the propeller and cause damage.



Automatic mode – Constant speed propeller the propeller is equipped with an electronic regulator MCS 2000 (see picture), which is installed in the instrument panel of the aircraft. The regulator is intended for automatic regulation of the propeller RPM, which are set by the pilot, regard less of the regime of mode selected.

The illuminated display of the regulator displays the mode selected, propeller RPM and activity of servomotor, readjusting the propeller blades. Further, it signals reaching the maximum RPM set and issues an acoustic warning if RPM is exceeded.



Switch to control choice of mode

On the instrument panel, there is also placed the switch for choosing the mode of control, i.e. AUTOMAT (Constant speed) or MANUAL (manual).

Regulator works in three regimes: CLIMB, CRUISE, and HYSTERESIS.

CLIMB regime – regulator controls the set maximum take-off (climbing) rpm in such a manner, that regardless of the aeroplane speed during take-off, maximum engine power output is maintained whilst avoiding overspeeding of engine. The pilot does not need, if there is the change of aircraft speed, to be engaged with modification of the propeller adjustment and can pay attention to other tasks.

The regulator screen displays the real value of propeller RPM together with the symbol CLIMB. It is not possible to enter in to the CLIMB regime during take-off and to alter the set RPM value.

CRUISE regime – regulator controls the RPM of flight. Pilot is allowed according to the character of the flight to enter in to the set RPM and smoothly increase or reduce them.

The regulator screen displays the real value of propeller RPM. The magnitude of the RPM is shown on display by capital digits.

HYSTERESIS regime – this regime makes it possible to alter the size of deviation in RPM which triggers the regulator to start the readjustment.

For the CRUISE regime the set value may go both to plus and to minus.

For the CLIMB regime the set value goes to minus only.

In turbulent conditions, it is advantageous to set a higher magnitude of hysteresis – the hardware is responding at higher change of the RPM. In still air, it is advantageous to set the lower magnitude of hysteresis – the hardware responds at lower RPM variation.

The regulator screen displays the symbol HYSTERESIS and the set value.

It is possible to enter the HYSTERESIS regime in flight and smoothly to increase or decrease its value.

Instructions for using the regulator MCS 2000

1. Switch on the power supply on the control panel. The inscription KREMEN PROP appears on the display.
2. Operate the switch to choose the desired regime AUTOMAT – constant speed. The inscription KREMEN PROP appears on the display.
3. For the flight it is possible to use the program from the previous flight, which the regulator remembers automatically or the regulator can be newly programmed, see the further steps.
4. Push on the middle button for a period of 3 seconds. The regulator will be switched over to program of the regime E – CLIMB, on the display there appears E – CLIMB.
5. By means of two outside buttons adjust the value of max. RPM for take-off. This completes the adjustment of the CLIMB program.
6. Briefly push the middle button. The regulator switches over into the program of the CRUISE regime and the inscription E – CRUISE appears on the display. By means of the outside buttons adjust the value of cruising RPM for flight. This completes the adjustment of the CRUISE regime.
7. Briefly push the middle button. The regulator switches over into program hysteresis RPM. On display there will appear the inscription HYSTERESIS. By means of the outside buttons adjust the desired value of hysteresis RPM. This completes the adjustment of the HYSTERESIS program.
8. By repeatedly pushing the middle button, recheck the adjusted values.
9. After starting and warming up the engine, press the middle button to switch the regulator in to E – CLIMB regime. The instrument displays briefly the programmed value and after the delay of 3 secs automatically switches into the working of actual RPM scanning. On the display there appears CLIMB and value of the scanned RPM of the propeller together with a small arrow in the upper or bottom corner, which indicates the direction of adjustment of propeller pitch. In the steady state, i.e. when programmed RPM equals scanned RPM and the servomotor is not active, the arrow disappears.
10. Smoothly increase the throttle setting to full, and check that the engine reaches the set maximum RPM value.

11. After take-off and transition into horizontal flight, reduce throttle to lower engine RPM and switch the regulator to CRUISE regime by pressing the middle button. The display shows the numerical value of scanned propeller RPM and a small arrow in the top or bottom corner indicating activity of the pitch adjusting servomotor. In the steady state when programmed RPM equals scanned RPM and the servomotor is not active the arrow disappears. It is possible to enter the CRUISE regime during flight to check the set RPM value and to adjust it. Program is entered by briefly pressing the middle button and the word CRUISE appears on the display together with the set RPM value. This value may then be adjusted with the outer red or green buttons. After the change is completed the regulator automatically switches back to working mode within 3 secs. It is also possible in flight to adjust the set hysteresis values in a similar way.

WARNING

Before landing it is always necessary to switch over the regulator **into the regime CLIMB**.

In the case of an aborted landing when it is necessary to secure sufficient power output, **switch over from CRUISE to CLIMB regime by means of two pushes of the middle button**.

Example: the aircraft is descending for landing on long finals in AUTOMAT mode with regulator set in regime CRUISE and with low adjusted engine RPM and large angle of incidence of the propeller blades. If the pilot decides to go around and sharply opens throttle, engine thrust may be insufficient for satisfactory climb performance.

In case of failure in regime AUTOMAT switch over the switch **into the MANUAL** position for manual control.

CAUTION

Due to delay of the regulation system, it is necessary to increase the RPM smoothly by means of throttle lever.

NOTE

The color of the middle button can be various, in accordance with the current Constant Speed instrument (blue, yellow, or black).



Fig. 13 Powerplant ROTAX 912 ULS

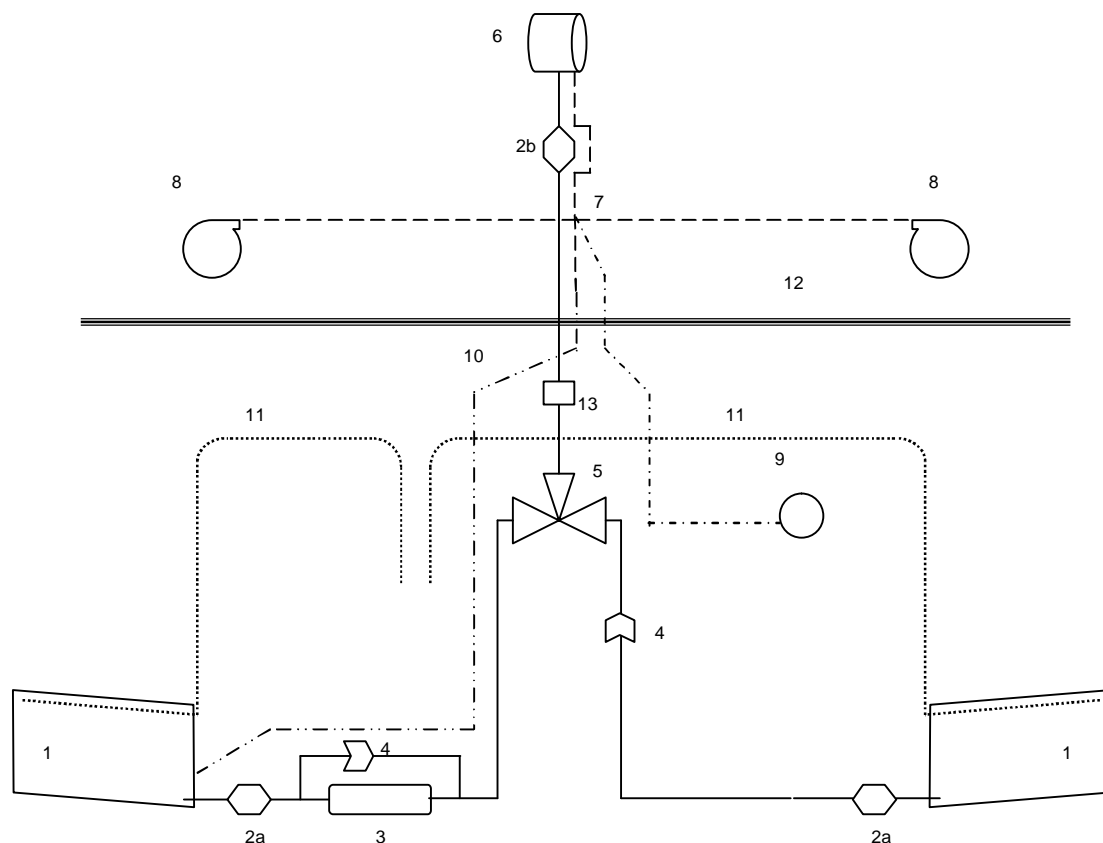
- | | | |
|-----------------|-----------------------------|---------------------------------------|
| 1 – Fuel filter | 5 – Carburettor | 9 – Fuel pump |
| 2 – Regulator | 6 – Ignition | 10 – Ram air (optional) |
| 3 – Oil tank | 7 – Coolant overflow bottle | 11 – Carburator preheating (optional) |
| 4 – Air filter | 8 – Oil cooler | 12 – Oil cooler flap (optional) |

On the drawing is not fuel filter (1) shown because there is the fuel filter with draincock installed instead. (see fuel system scheme fig. 14. page 7-13)

7.10 Fuel system

The integral fuel tanks are located in the forward box of the wing central panel. The fuel system scheme is shown at fig.14.

The fuel is fed from the fuel tank into the fuel cock located inside the cockpit below the instrument panel, then through the fuel filter into the engine fuel pump into the carburettor. The unconsumed fuel is supplied back through return piping into the left tank. The vent pipe is outgoing from the upper part of the fuel tank, proceeds along the fire wall and the vent opening is located at a lower surface of the fuselage behind the fire wall. The electrical fuel indicator switch allows the indication of the fuel quantity in the left or the right fuel tank. Red light annunciator above the fuel indicator will be illuminated when 7 litres of fuel remain in each fuel tank.



- | | | |
|-----------------------------------|----------------------------|---|
| 1. fuel tank | 5. fuel cock | 10. return piping |
| 2a, 2b. filter | 6. engine fuel pump | 11. vent pipe |
| 3. auxiliary electrical fuel pump | 7. fuel governor | 12. fire wall |
| 4. non-return valve | 8. carburettor | 13. fuel filter with draincock (optional) |
| | 9. fuel pressure indicator | |

If there is fuel filter with drain cock (13), no filter (2b) installed.

Fig. 14 The fuel system scheme

On the WT 9 Dynamic aircraft the left tank is considered the main tank as the electric fuel pump operates on this tank and the excess fuel is also returned there.

The left tank must be used for all take offs and landings. When You are flying with full tanks, use the left tank for 30 – 40 minutes before changing to the right tank. This allows space for the return of excess fuel without venting it overboard.

Monitor the fuel quantity when you are doing long flights or flights with low fuel quantity. To maximize range/endurance when the red annunciator lights flash (7 liters each tank), the following procedure is recommended. Select the right tank and close the left tank fuel cock. Use this tank until all the fuel is exhausted. Change back to the left tank being careful to close the right fuel cock to prevent the fuel pump from sucking air. The left tank should now have slightly more than 7 litres (around 20 minutes flying depending on power settings) because of the return fuel. Continue flight and landing procedure with the electric fuel pump on, as is written in this manual.

7.11 Electrical system

There are electrical system diagrams in the Maintenance Manual for the ultralight aircraft DYNAMIC WT9. The wiring system depends on instrumentation and other electric equipment of an individual aeroplane according to a customer's desire. The dual engine ignition is a separate part of the electric system. Each of two ignition circuits has its own break switch. The detailed description of the ignition and the AC generator is listed at the Operator's Manual for ROTAX 912 UL / 912 ULS engine. Refer to the FLYdat Operator's Manual for more details.

7.12 Pitot and static pressure system

The Pitot tube for the airspeed indicator is located on the right wing leading edge. Pressure distribution to individual instruments in the cockpit is done through flexible plastic hoses. The static pressure receivers are located on the both sides of the fuselage behind the cockpit. Keep the system clear to assure its right function.

7.13 * Miscellaneous equipment

The rescue system USH 520 Speed Softpack from the company USH – záchranné systémy s.r.o Praha can be mounted as miscellaneous equipment of the aeroplane DYNAMIC WT 9. This rescue system is designed for ultralight aircraft with maximum weight up to 520 kg and with maximum speed of 300 km/hour. The triconical type of parachute with 30 parachute gores and square area 105 m² with slider is used for the rescue system. The descent rate of the opened parachute is 6,5 m/sec. The container dimension is 260 x 150 x 500 mm and the total weight is 12,5 kg. The solid fuel rocket engine UPI – PFE – 400 with total impulse of 400 N sec and time of burning 0.85 sec . The life time of the rescue system is 10 years with the repacking interval being 5 years.

7.14 Avionics

The following avionics are mounted in the airplane: radios and intercom. This equipment must be connected with the headphones and with the antenna. The airplane might be equipped with other instruments (GPS, transponder, or board computer). The flight and navigation instruments are mounted as an option of the customer (but with respect to the weight limitation of the ultra light aircraft). Refer to the Manuals supplied with above mentioned instruments for right operation of the instruments and for more details.

* Optional

Date: 1.12.2001

SECTION 8

AEROPLANE HANDLING, SERVICING AND MAINTENANCE

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8.1 Introduction

This section contains factory recommended procedures for proper ground handling and servicing of the aeroplane. It also identifies certain inspection and maintenance requirements which must be followed if the aeroplane is to retain that new-plane performance and dependability. It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered.

The airframe surfaces should be protected with light plastic foil or cloth cover against dust. All engine intakes, vents, the fuel vents and pitot static system should be covered before long term aeroplane parking or storing, due to contamination by foreign objects (insects, birds).

The external surfaces of the aeroplane should be washed with a sufficient quantity of the water and an adequate quantity of detergent. Do not apply petrol or chemical solvents for cleaning the external surfaces of the aeroplane.

It is advisable to park the aeroplane inside a hangar or eventually inside other weather-proof space with stable temperature, good ventilation, low humidity and dust-free environment. The parking place should be protected against possible damage caused by sun radiation, humidity and wind. Sunbeams reflected through the canopy can magnified and may cause spot heating, which can create damage to the cockpit area and the upholstery.

8.2 Aeroplane inspection periods

8.2.1 Powerplant

The engine periodic inspections and maintenance are conducted according to the procedures contained in the Maintenance Manual for ROTAX Engine Type 912 Series.

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Daily inspection – is carried out in accordance with the instruction for execution of the preflight inspection, which are contained in Section 4, item 4.4.

Check after 25 hr. of operation – must be carried out according to the Maintenance Manual for ROTAX Engine Type 912 Series.

100 hr. check – must be performed according to the Maintenance Manual for ROTAX Engine Type 912 Serie every 100 hr. of operation or 1 year, whichever comes first. The renewal of the spark plugs, the fuel filter and the coolant are carried out after 200 hr. of operation.

TBO (Time Between Overhaul) – 1500 hr or 15 years, whichever comes first

Oil change

must be performed according to the Maintenance Manual for ROTAX Engine Type 912 Series. There is an oil drain screw on the bottom of the oil tank. There is an oil filter at the left side beside the propeller gearbox. At every oil change, replace the oil filter and open the old one with special tool, to ensure the engine is not producing chips. Remove filter insert, cut top and bottom cover off the mat. remove filter mat, unroll and check it for metal chips, foreign matter, contamination and abrasion. This check is important as it allows conclusions regarding the condition of the engine and gives information about a possible cause of any failure.

8.2.2. Propeller

The propeller in operation does not require any special maintenance. In case of propeller contamination wash its surface with a piece of cloth dipped in warm water with addition of the usual detergent. The operator is allowed carry out repairs to common little nicks on the leading edges, up to a maximum size of 4 mm. This repair can be done by using Epoxy resin with filler. The damaged place is to be degreased and fill with resin. After hardening the resin the repaired area is to be sanded and protected with enamel or varnish of the epoxy or polyurethane type. Replace the parts supplied by producer and remove the cone from the propeller. Any other dismantling is forbidden. The repair of large damage must be carried out by the manufacturer or by an authorised service centre. Operator's Manual of the electrical adjustable aircraft propeller SR 2000 includes additional information about maintenance.

Period to overhaul (TBO) is – 1000 hours of operation

8.2.3 Airframe

Daily inspection - is carried out in accordance with the instructions for the execution of the preflight inspection, which are contained in Section 4, item 4.4.

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Check after 25 hr. of operation – must be performed according to the Maintenance Manual for the DYNAMIC after the first 25 ± 2 hr. operation together with the engine check. The scope of this check is same as the check after 50 hr. of operation.

Check after the 50 hr. of operation – must be performed according to the Maintenance Manual for the DYNAMIC every 50 ± 3 hr. operation together with the engine check. The scope of this check is same as the check after 25 hr. of operation. The following work should be carried out:

1. **Fixed and retractable undercarriage:** Check the leg attachment into the wing central panel and into the fuselage. Check the control of the nose wheel, the brakes, the tyres.
2. **Outside surface check,** check all control surface shafts, the rods, the articulated joints, the hinges, the control cables, the auxiliary tail skid. Sparingly lubricate the control service hinges. Thoroughly clean and lubricate the piston rod of the canopy gas struts.
3. **Check the control cable guides,** lubricate the roller-bearings of the elevator control rod.
4. **Check charging** – charge battery if need be, cleaning.
5. **Power plant** – visually check the hoses for condition, damage, leaks, attachment and security, the rubber flange of the air filter for cracks. Visually check exhaust system for condition, cracks, deformation or damage. Lubricate the bowden cable for throttle and starting carburettor (choke) (see the Maintenance Manual for ROTAX Engine Type 912 Serie).
6. **Check the brake fluid level** in the main hydraulic face ram, which is located beyond the seats. Check the brakes for operation.
7. **Control surfaces deflections** – to check the control surfaces deflections see Control Surfaces Deflections Record, which is contained in the Maintenance Manual for ultralight aeroplane DYNAMIC WT9.

100 hr. check - must be performed every 100 hr. of operation or 1 year, whichever comes first. This inspection must be performed by qualified staff. The scope of this inspection is the same as the check after 50 hr. of operation covering the following work:

1. Full cleaning of the aeroplane
2. Check aeroplane surfaces for mechanical damage and cracks
3. Pay special attention to:
 - Undercarriage and its attachment into the wing central panel
 - Wing-fuselage connection reliability, clearances, spar ends state
 - Engine bed, welded areas, rubber engine mounts, security of attachment bolts: engine-engine bed, engine bed-firewall

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4. Visually check condition and integrity of wires, check charging – charge battery, function of the signal bulbs, function of the fuel quantity indicator, fuel drains and fuel vents for blockages, fuel filters.
5. Visually check condition of the instruments and the avionics (connector, a plug) and for correct operation
6. Lubricate according to the Lubrication Chart
7. Check tyres for condition, cuts, uneven or excessive wear and slippage – replace if need be.

Lubrication Chart

The manufacturer recommends using grease and oil without acid for lubrication only. Apply the lubricants sparingly without contaminating of the airframe.

- Check condition of the bearings of the main wheels – clean and lubricate if need be, at least every 2 years.
- Check condition of the bearings of the nose wheel – clean and lubricate if need be, at least twice per year.

Lubricate: Main and rear spar pins
 The axle of the nose wheel leg
 Guid tube of the flap control lever
 The pins of the nose undercarriage leg , the leg support struts

Sparingly lubricate: The hinges of the control surfaces, movable parts of the control surfaces, bearings of the ailerons, the pedals and the brake control lever, all control cables at inlet into the terminations (in engine compartment).

Battery

The powerplant is equipped with an AC generator, which recharges the battery in the flight. The maintenance-free battery is dry and hermetized, it doesn't release any toxic or explosive gas (Dryfit / Gel – Electrolyte). The battery needs a visual check of the attachment and security, and inspection for leakage of the electrolyte. The electrolyte contains mordant vitriol acid, which may cause damage to the airframe and equipment.

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8.3 **Aeroplane alterations or repairs**

It is essential that the responsible airworthiness authority be contacted prior to any alterations on the aeroplane to ensure that the airworthiness of the aeroplane is not violated. For repairs refer to the applicable Maintenance Manual. The operator is allowed replace parts supplied by the producer only. The repairs to damaged skin must be carried out by qualified staff in accordance with approved procedures.

WARNING

After aeroplane repairs, repainting or mounting of additional instruments or equipment it is necessary to check weights and positions of C.G.

8.4 **Ground handling / Road transport**

The aeroplanes can suffer higher stress loads on the ground than in the air. In this case can result a potential menace of the safety, as the aeroplane construction is designed for the manoeuvring load. It is valid for ultralight aeroplane especially. The high aircraft normal accelerations are occurred at the hard landing, during the taxiing at the rough surface and during the driving at the hole road. Don't use unnecessary transportation in the road.

CAUTION

The aeroplane is equipped with mooring eyes which are screwed into the threaded hubs on the wing lower surface located approx. half way along the wing. It is also necessary to moor the nose wheel landing gear.

CAUTION

Push or pull the aeroplane from the propeller root only, never at the wing tips or the control surfaces.

8.5 **Cleaning and care**

Regular cleaning and care of the powerplant, propeller, wings and the airframe is the first consideration for safe and efficient operation. Cleaning and care should be based on climatic and flying conditions.

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The exterior painted surfaces should be cleaned with clear water using a sponge or soft cotton towel and chamois. These surfaces should also be protected with a silicone free hard wax reapplied at least once a year by hand or with a rotating cloth disc.

Clean the Plexiglas canopy only as necessary using a soft cotton towel and clear water mixed with a small amount of mild detergent. Protect the canopy with anti-static cleaning agents which are made specifically for Plexiglas.

CAUTION

Do not clean the canopy with alcohol, acetone or lacquer thinner, because the canopy is made from acrylic. Acrylic becomes fragile after contact with these liquids.

8.6 Winter operation

The cooling system of the cylinder heads is filled with a mixture of anti-freeze and water, which protects the cooling system against freezing up to -18°C . Check coolant with densimeter or glycol tester before winter operation and to prevent the failure of the radiator or cooling system due ice.

If the temperature is below this value, the coolant must be drained or renewed with pure anti-freeze liquid. The coolant must be renewed every two years. Use only coolant according to the current Operator's Manual for engine ROTAX 912 UL / 912 ULS.

If low cylinder head or oil temperatures occur during operation under low outside temperature, then the following is recommended:

Cover a part of radiator face by a duralumin sheet or drawing paper of appropriate dimensions, insert it between the radiator and the bottom engine cowling.

Cover the oil cooler face or a part of the face only, by a duralumin sheet or drawing paper attached with a suitable adhesive tape (or bend the oil cooler with that tape) and lag the oil tank.

CAUTION

The temperature limits of the coolant, cylinder heads and oil must be checked after these arrangements.

If the aeroplane has a fixed undercarriage with wheel spats fitted it is recommended that these should be removed during winter operations on frozen or rough ground to minimize damage to the spats.

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SUPPLEMENTS

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9.1 Introduction

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

NOTE

Additional individual equipment in accordance with a customer's request will increase the aeroplane empty weight and reduce the allowed useful load.

9.2 List of inserted supplements

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9.3 Supplements inserted

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