AEROSPOOL SPOL. S R.O.

PILOT'S OPERATING HANDBOOK

Type: **WT9 Dynamic**

Model: **Speed iS Sport**

Aircraft Serial Number: **DY-XYZ/201X**

Aircraft Registration Number: **__-___**

Issue No.: **Initial**

Date of Issue: **20.01.2015**

Signature:

Authority:

Stamp:

Original date of approval:

This aircraft has to be operated in compliance with information and limitations contained herein.

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0.1 RECORD OF MANUAL REVISION

Any revision of the present manual, except actual weight data, must be recorded in the following table and in case of approved chapters endorsed by the responsible airworthiness authority.

The new or amended text in the revised pages will be indicated by a black vertical line in the right hand margin, and the Revision No. and the date will be shown on the bottom left side of the page.

Rev. No.	Affected pages	Revision description	Date	Approval
00	All	Initial	20.01.2015	

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0.2 LIST OF EFFECTIVE PAGES

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0.3 TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. Introduction

The Pilot's Operating Handbook has been prepared to provide pilots and instructors with information for the safe and efficient operation of this aircraft. This handbook contains supplementary data supplied by the aircraft manufacturer.

WARNING

Airplane operator is also obligated to read carefully the Operators Manual for Rotax Engine Type 912 i Series, Ref. No.: OM-912 Series; the Operator's Manual for – Electrical Adjustable Aircraft Propeller SR2000/DN, actual valid revision and all avionic manuals.

1.2. Certification basis

The 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 after studying the documentation Predpis MDPT SR L 8/A and LU č. P- ULL-1 SR has issued the Type Certificate of Airworthiness No. V-80/2004 dated April 25th 2005 for Type WT-9 Dynamic

Category of Airworthiness : **Normal**

1.3. Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes used in the Pilot's Operating Handbook

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. Aircraft description

WT9 Dynamic Speed is low-wing monoplane with retractable landing gear. The airframe consists of a sandwich shells from advanced composite material. There are two places in the cockpit, side by side type. This aircraft is intended for sporting, recreation and tourist flying in accordance with VFR day.

Models of WT9 Dynamic (MTOW 472,5 kg) Club are equipped with wide range of combinations of instruments, engines and propellers. This POH describes one of many combinations.

Powerplant of the aircraft is the 4 cylinder, 4-stroke engine Rotax 912 iS Sport with a maximum take-off RPM limitation 5800 min^{-1}.

The aircraft is fitted with a 3-bladed in-flight electrically adjustable propeller WOODCOMP SR2000/DN with diameter 1700 mm.

1.4.2. Technical data

Aircraft	
Wing area	10,31 m^2
Wing span	8,93 m
Length	6,47 m
Height	1,85 m
Wing aspect ratio	8,12
Aerodynamic mean chord (MAC)	1,185 m

Control surfaces	
Aileron area	0,27 m^2
Aileron span	1,13 m
Flap area	0,75 m^2
Flap span	2,27 m
Horizontal tail area	1,68 m^2
Horizontal tail span	2,40 m
Vertical tail area	0,89 m^2
Vertical tail span	1,18 m

Landing gear	
Wheel base	1,42 m
Wheel track	2,24 m
Nose wheel size	13x5,00-6
Main wheel size	15x6,00-6

Weights	
Empty weight	325,0 kg
Maximum take-off weight	472,5 kg
Max. useful load	147,5 kg
Fuel tanks capacity	126 l

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1.5. Three view drawing

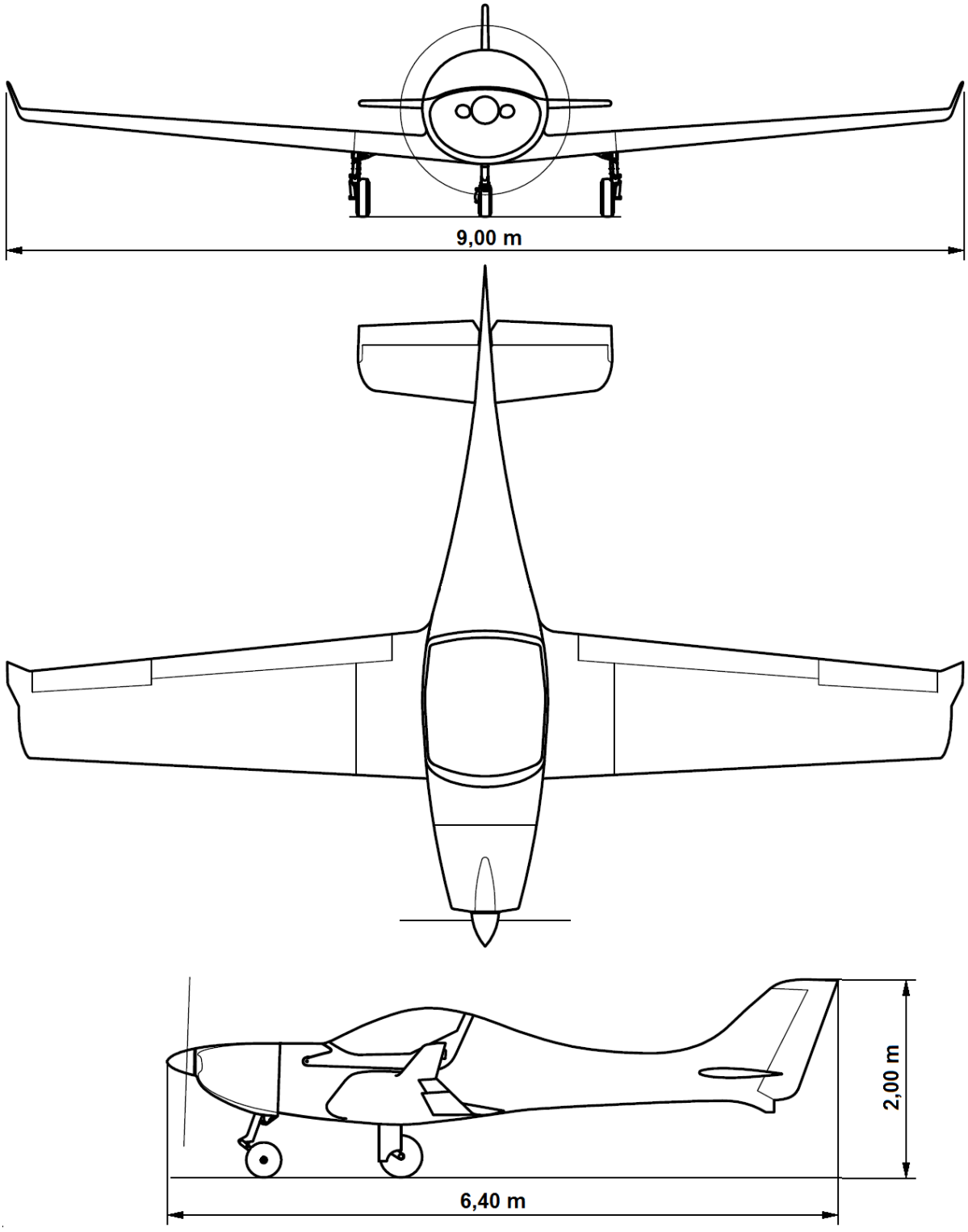


Fig. 1.5-1 Three view drawing

2. LIMITATIONS

2.1. Introduction

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

2.2. Airspeeds

Airspeed limitations and their operational significance are shown below:

Airspeed description		Airspeed		Remarks
		KIAS	IAS	
V_{NE}	Never Exceed speed	**151**	**280**	Do not exceed this speed in any operation.
V_{NO}	Normal Operating speed	**135**	**250**	Do not exceed this speed except in smooth air, and then only with caution
V_{RA}	Rough Air speed	**124**	**230**	Do not exceed this speed in rough air. Air movements in lee-wave rotors, thunderclouds, visible whirlwind, or over mountain crests are to be understood as rough air
V_A	Manoeuvring speed	**89**	**165**	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	**76**	**140**	Do not exceed these speeds with the given flap setting.
V_{LO}	Maximum Landing Gear Operating speed	**76**	**140**	Do not extend the landing gear above this speed.
V_{SO}	Stall speed	**35**	**65**	Stall speed with flaps fully extended.
V_T	Towing speed	**-**	**-**	Limited by a glider to be towed.

2.3. Airspeed indicator markings

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

Colour code significance	Airspeed		Significance
	KIAS	IAS	
White arc	35 - 76	65 - 140	Operating range with extended flaps. (Lower limit is v_{S0}. Upper limit is v_{FE}.)
Green arc	39 - 124	72 - 230	Normal operating range. (Lower limit is v_S. Upper limit is v_C.)
Yellow arc	124 - 151	230 - 280	Manoeuvres must be conducted with caution. (Lower limit is v_C. Upper limit is v_{NE}.)
Red line	151	280	Never exceeded speed v_{NE}

2.4. Powerplant

Engine		
Engine manufacturer	-	BRP-Powertrain GmbH, Austria
Engine model	-	Rotax 912 iS Sport
Maximum power	Take-off *(max. 5 min.)*	73,5 kW / 100 hp
	Continuous	72,0 kW / 97 hp
Maximum RPM	Take-off *(max. 5 min.)*	5800 min^{-1}
	Continuous	5500 min^{-1}
Coolant temperature	Maximum	120 °C
Oil temperature	Minimum	50 °C
	Normal	90 - 110 °C
	Maximum	130 °C
Oil pressure	Minimum	0,8 bar / 12 psi
	Normal	2,0 - 5,0 bar / 29 - 73 psi
	Maximum	7 bar / 102 psi
Fuel pressure	Minimum	2,8 bar / 40,5 psi
	Normal	2,8 – 3,2 bar / 40,5 – 46,5 psi
	Maximum	3,2 bar / 46,5 psi
Oil consumption	Maximum	0,06 l/h

Propeller	
Propeller manufacturer	WOODCOMP spol. s r. o., Odolená Voda, Czech republic
Propeller model	SR2000DN, 3-bladed in flight electrically adjustable
Propeller diameter	1700 mm

WARNING

Additional data can be found in Chapter 7.9 and in the Operators Manual for Rotax Engine Type 912 Series, Ref. No.: OM-912 i Series and in the Operator's Manual for – Electrical Adjustable Aircraft Propeller SR2000DN, actual valid revision.

WARNING

Never run the engine without propeller! This inevitably causes engine damage and is an explosion hazard!

2.5. Powerplant instrument markings

Digital powerplant instrument Dynon SkyView SV-D1000 for monitoring of engine parameters complements an analogue manifold pressure indicator and a fuel pressure indicator. Ranges are marked with following colour code significance:

Digital instrument (Dynon SV-D1000)	Unit	Red Line Minimum Limit	Green Arc Normal Operating	Yellow Arc Caution Range	Red Line Maximum Limit
Tachometer	**min^{-1}**	-	1400 - 5500	0 - 1400 5500 - 5800	5800
Manifold pressure	**inHg**	-	0,0 - 28,0	28,0 - 29,5	29,5
Coolant temperature	**°C**	50	90 – 110	50 – 90 110 – 120	120
Oil temperature	**°C**	50	90 - 110	50 - 90 110 - 130	130
Oil pressure	**bar**	0,8	2,0 - 5,0	0,8 - 2,0 5,0 - 7,0	7,0
Exhaust gas temperature	**°C**	250	300-800	250-300 800-950	950
Fuel pressure	**bar**	0 – 2,8	2,8 - 3,2	-	3,2 – 3,4
Fuel flow meter	**l/h**	-	0,0 - 25,0	-	over 25,0
Fuel level	**l**	Red light annunciator will be illuminated with the remaining 7 litres of fuel in the fuel tank.			

2.6. Miscellaneous instrument markings

No additional miscellaneous instruments.

2.7. Weights

Weights	
Maximum take-off weight	472,5 kg
Maximum landing weight	472,5 kg
Maximum fuel weight	90,7 kg
Maximum occupant weight per seat	120,0 kg
Minimum weight solo pilot	65,0 kg
Maximum weight in baggage compartment	10,0 kg
Maximum weight of glider to be towed	750,0 kg

WARNING

Maximum take-off weight is 472,5 kg!

2.8. Centre of gravity

CG positions	
Empty aircraft CG position	12 ± 2% MAC
Position of CG in flight	20 ÷ 30% MAC

Rear centre of gravity limit is valid for en-route weight at maximum crew weight and minimum fuel amount. Forward centre of gravity limit is valid for minimum pilot weight and maximum capacity of the fuel tanks. Example of the centre of gravity position check is in the Chapter 6.

WARNING

A flight shall not be commenced until the pilot-in-command is satisfied that the mass of the aircraft and centre of gravity location are such that the flight can be conducted safely!

2.9. Approved manoeuvres

Manoeuvre	Appropriate entry airspeed	
	KIAS	IAS
Steep turns with the angle of bank up to 40°	97	180
Lazy eights	89	165

WARNING

Aerobatic manoeuvres and intentional spins are prohibited!

2.10. Manoeuvring load factors

Airspeed description		Airspeed		Load factor
		KIAS	IAS	
V_{FE}	Maximum Flap Extended speed	76	140	0 / +2
V_A	Manoeuvring speed	89	165	-2 / +4
V_{NE}	Never exceed speed	151	280	-2 / +4

2.11. Flight crew

The minimum flight crew with which the aircraft 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.

During towing is allowed only pilot sitting in the left pilot seat.

2.12. Kind of operation

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

WARNING

IFR flights and flights in icing conditions are prohibited!

2.13. Fuel

The fuels that can be used for the operation of aircraft are listed in the Chapter 2.4 Powerplant and in the Operator's Manual for Rotax Engine Type 912 i Series, Ref. No.: OM-912 i Series. Fuel tank's capacities are in table below:

Fuel tanks	Left		Right	
	l	US gal	l	US gal
Total quantity of fuel in the tank	63,0	16,6	63,0	16,6
Unusable fuel quantity in the tank	2,9	0,8	2,9	0,8
Total usable quantity of fuel in the tank	60,1	15,8	60,1	15,8

Maximum allowed filling of the fuel tanks in litres to not get over the MTOW												
Baggage weight (kg)	Crew weight (kg)											
	70	80	90	100	110	120	130	140	150	160	170	180
0	107,6	93,8	79,9	66,0	52,1	38,2	24,3	10,4	0	0	0	0
5	100,7	86,8	72,9	59,0	45,1	31,3	17,4	3,5	0	0	0	0
10	93,8	79,9	66,0	52,1	38,2	24,3	10,4	0	0	0	0	0

WARNING

Fuelling has to respect allowed CG range, see Chapter 6.3!

2.14. Maximum passenger seating

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

2.15. Other limitations

(a) Wind speed

The maximum demonstrated crosswind velocity for take-off and landing is 24 kts (12,4 m/s).

(b) Smoking

No smoking on board the aircraft.

(c) Minimum equipment for flight operation:

1 Airspeed indicator.
2 Sensitive barometric altimeter.
3 Magnetic compass.
4 SkyView SV D1000 with following indications:
   a. Fuel quantity indication
   b. Engine RPM indication
   c. Oil temperature indication
   d. Oil pressure indication
   e. Cylinder head temperature indication
   f. Manifold pressure
   g. Fuel pressure
5 Safety harness for each occupied seat.

2.16. Limitations placards

AIRSPEEDS:	
V_{NE}	280 km/h
V_{NO}	250 km/h
V_{RA}	230 km/h
V_A	165 km/h
V_{FE}	140 km/h

WARNING
IFR flights and flights in icing conditions are prohibited!

WARNING
Aerobatic manoeuvres and intentional spins are prohibited!

APPROVED FOR: DAY - VFR

NO SMOKING

Maximum Baggage weight 10 kg

3. EMERGENCY PROCEDURES

3.1. Introduction

Chapter 3 provides checklist and amplified procedures for coping with emergencies that may occur. Emergencies caused by aircraft or engine malfunction are extremely rare if proper pre-flight inspections and maintenance are practised.

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

If any operations difficulties were observed, use a form in Annex 1 for notification to the manufacturer about this issue.

3.2. Engine failure

3.2.1. Engine failure at take-off roll

1. Throttle lever:	Set to idle position.
2. Lane A/Lane B:	Both circuits switch OFF.
3. Main and auxiliary fuel pumps:	Both switched OFF.
4. Brakes:	Apply until stop.

3.2.2. Engine failure at take-off up to height 200 ft (60 m) AGL

1. Sufficient runway:	Complete a normal landing without engine power.
2. Insufficient runway:	Perform emergency landing according to procedure 3.6.1.

3.2.3. Engine failure at take-off above height 200 ft (60 m) AGL

A. Insufficient altitude - below 500 ft (150 m) AGL

1. Insufficient altitude:	Perform emergency landing according to procedure 3.6.1.

B. Sufficient altitude - above 500 ft (150 m) AGL

1. Airspeed:	Modify to 65 kts (120 km/h).
2. Field selection:	Select in the direction the free area without obstacles, if possible against the wind.
3. Air start:	Start the engine according to procedure 3.3.
4. Unsuccessful start:	Perform emergency landing according to procedure 3.6.1.

3.2.4. Engine failure in flight

1. Air start:	Start the engine according to procedure 3.3.
2. Unsuccessful start:	Perform emergency landing according to procedure 3.6.1.

3.2.5. Performance loss due to irregular running of the engine during flight

This situation may occur due to emptying of fuel tank (indication is loss of fuel pressure): Select the non-empty fuel tank.

If everything fails, perform an emergency landing according to procedure 3.6.1.

3.3. Air start

1.	Airspeed:	Modify to 65 kts (120 km/h).
2.	Altitude:	Check.
3.	Field selection:	Select according to height available.
4.	Fuel selector:	Select non-empty tank.
5.	Main and auxiliary fuel pumps:	Both switched ON.
6.	Throttle lever:	Put between 1 to 2 cm of throttle opening.
7.	Lane A/Lane B:	Both circuits switched ON.
1.	Starter key:	Press until engine runs, then release to ACC position.
8.	Successful start:	Adjust throttle to achieve smooth running at 2500 min^{-1} for approximately half a minute before reaching required power.
9.	Unsuccessful start:	Perform emergency landing according to procedure 3.6.1.

WARNING

The rate of descent approximately 600 ft/min (3,0 m/s) causes measurable loss of altitude during the air start. If the air start is unsuccessful up to height 500 ft (150 m) above ground level, perform the emergency landing according to procedure 3.6.1!

3.4. Smoke and fire

3.4.1. Engine fire on the ground

1.	Fuel selector:	Set OFF.
2.	Throttle lever:	Set full throttle.
3.	Lane A/Lane B:	Both circuits switched OFF after the fuel has been consumed.
4.	Main and auxiliary fuel pumps:	Both switched OFF.
5.	Crew:	Leave the cockpit immediately.
6.	Extinguish fire:	With best available means.

3.4.2. Engine fire in flight

1.	Fuel selector:	Set OFF.
2.	Throttle lever:	Set full throttle.
3.	Lane A/Lane B:	Both circuits switched OFF after the fuel has been consumed.
4.	Main and auxiliary fuel pumps:	Both switched OFF.
5.	Extinguish fire:	Try to extinguish the fire with side slip.
6.	Emergency landing:	Perform emergency landing according to procedure 3.6.1.

CAUTION

After the fire has been extinguished, do not start the engine again!

3.4.3. Fire in cockpit

1. Fire source: Localize.
2. Lane A/Lane B: Both circuits switched OFF.
3. Main and auxiliary fuel pumps: Both switched OFF.
4. Master switch: Set OFF.
5. Crew: On the ground: Leave the cockpit.
   During flight: Perform an emergency landing according to procedure 3.6.1.
6. Extinguish fire: 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 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**	
Optimum descent airspeed (IAS)	**KIAS**	**IAS**	**KIAS**	**IAS**
	70	130	70	130
Maximum gliding range	14		10	
Rate of descent	**ft/min**	**m/s**	**ft/min**	**m/s**
	492	2,5	590	3,0

3.6. Emergency landing

3.6.1. Emergency landing

1. Airspeed: Modify to 65 kts (120 km/h).
2. Field selection: Select in the direction of the free area without obstacles, if possible against the wind.
3. Landing gear: Airfield or similar surface: Set DOWN.
   Other surfaces: Use one's discretion.
4. Flaps: As required.
5. Fuel selector: Set OFF.
6. Lane A/Lane B: Both circuits switched OFF.
7. Main and auxiliary fuel pumps: Both switched OFF.
8. Master switch: Set OFF.

CAUTION

The loss of height for 360° turn is approx. 500 ft (150 m)!

3.6.2. Precautionary landing

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

1. Select a suitable landing field, if possible against the wind.
2. Fly over selected field with wing flaps 15° and 65 kts (120 km/h) airspeed at a height 200 ft (60 m) AGL, check properly the preferred area for landing to inspect the terrain properties (obstructions, surface conditions).
3. Make landing circuit at a height 500 ft (150 m) AGL or at a safe altitude as allowed by cloud base with flaps 15° and 65 kts (120 km/h) airspeed. Extend "down wind" position and make approach with sufficient power.
4. Don't lose sight on the selected field in the case of low visibility.
5. Landing approach with flaps for landing and sufficient power.
   Landing gear: airfield or similar surface – set DOWN, other surfaces – use one's discretion.
6. Arrange approach so that the desired touchdown spot will be immediately after passing the edge of the selected landing field. In the case of object collision, perform obstacle avoidance manoeuvre to the side.
7. After touchdown apply heavy breaking till stopped.
8. When the aircraft comes to a stop, shut down the engine, master switch off, close the main fuel selector, secure the aircraft and seek assistance.

3.6.3. Landing with a flat tyre

1.	Landing approach:	Flaps take-off position (35°), airspeed 65 kts (120 km/h).
2.	Touchdown:	With the bank angle on the inflated tyre at minimum touchdown 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 aircraft 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 are conducted with the help of the lateral control of the ailerons.

3.8.2. Vibrations

The powerplant 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 procedure 3.6.2.

3.8.3. Emergency extension of the landing gear

In the case of hydraulic pump malfunction switch OFF the switch labelled as "HYDRAULICS" (fig. 3.8.3-1) and the emergency extension of the landing gear is carried out by its own mass with the help of gas struts. The landing gear is extended even in the electric power loss. The emergency extension of the landing gear is terminated, when three green lights are illuminated on the instrument panel.

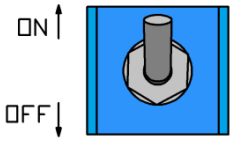


Fig. 3.8.3-1 Emergency extension of landing gear

3.8.4. Rescue system

Activation of rescue system:

1. Switch of the Fuel Pumps, Lane B and Lane A to stop the engine.
2. Lift off the emergency system actuator protector (1) (fig. 3.8.4-1).
3. Strongly pull the handle of rescue system.
4. Protect your head by hands.

Fig. 3.8.4-1 Emergency system actuator protector

For other information regarding operation and handling with the rescue system Magnum 501 refer to the Manual for Mounting and Use - Rescue Ballistic Parachute Systems Series Magnum.

3.8.5. Unsecured cockpit canopy

If the „Before take-off" checklist is performed insufficiently (Chapter 4.5.5., Canopy), there is a danger of partial cockpit canopy latching and insufficient locking. The canopy is equipped with a lock on the upper rear section of the canopy frame and it is secured by shot of the lock lever backwards. The lock pin is projected as latch with compression spring. The gap approx. 8-12 mm will be rise between fuselage and cockpit canopy, which is constant during straight-line flight without side slipping due to the airflow and the function of the gas struts. Partial cockpit canopy latching and non-locking will stack up by the noise increase due to the agitated air through the gap between fuselage and cockpit canopy. Partial cockpit canopy latching is possible to close safely during straight-line flight without side slipping by the following way according to appropriate stage of flight.

3.8.5.1. During take-off roll

1. Abort the take-off, if the cockpit canopy unlatching, unlocking is detected during take-off roll.
2. Latch and lock the cockpit canopy by normal procedure after stopping. (The cockpit canopy handle pull down and check the cockpit canopy latching and locking by canopy frame and the red ring position) (see Chapter 7.8).

3.8.5.2. After unstuck or during climbing

1. Climb to safety altitude.
2. Fly straight-line flight without side-slipping and carry out procedure 3.8.5.3 During level flight.

3.8.5.3. During level flight

1. Open both ventilation windows on cockpit canopy.
2. Reduce speed to 65 kts (120 km/h).
3. Hold control stick by one hand.
4. The cockpit canopy handle pull down for cockpit canopy latching and locking.
5. Check the cockpit canopy latching and locking by canopy frame and red ring position.
6. Close both ventilation windows on cockpit canopy.
7. Adjust flight airspeed to cruising speed.

WARNING

During side-slipping flights (incorrect turn –slipping turn, skidding turn, and side slipping for landing) with partial cockpit canopy latching or non locking due to asymmetrical flow over fuselage by the air flow, the cockpit canopy will be carved through the gap and subsequently will be full open by help of the gas struts. The cockpit canopy will become the braking shield, what will cause abnormal aircraft descent due to increased total drag!

3.8.6. Hot engine

1. Increase the airspeed and reduce the engine power.
2. Wait until the temperature will drop down and continue with the flying.
3. If temperature keeps increasing, land immediately.

3.8.7. Towing emergency procedure

During glider towing this must be done before performing of any emergency procedure.

1. Transmit "RELEASE, RELEASE, RELEASE".
2. If the glider pilot does not act, release the towing rope by pulling of tow release lever.
3. Follow the emergency procedure.

3.8.8. Fault indicated by the EMS lamps

NOTE

Reduce engine power setting to the minimum necessary and curry out precautionary landing!

EMS lamps operating states

Lane A	Lane B	Action
OFF	Flashing	Limited flight operation*
Flashing	OFF	Limited flight operation*
OFF	ON	Land the aircraft
Flashing	Flashing	Land the aircraft
Flashing	ON	Land the aircraft
ON	OFF	Land the aircraft
ON	Flashing	Land the aircraft
ON	ON	Land the aircraft

*If one of the lamps is flashing while the other is off then limited flight operation are permitted up to a maximum of 10 hours.

3.8.9. Failure of the EMS power supply

1. If the EMS power supplies (alternator A) fails then the ECU automatically switches one time over to the second EMS power supply (alternator B).

NOTE

No charging of battery!

2. While alternator B runs, no power drop is recognizable.
3. Failure of both EMS power supplies (alternator A/B) result in engine stoppage. Remedy: Switch "ON" the **Emergency switch**. In this case the power supply is provided by the aircraft battery.
4. Land the aircraft at the next available opportunity.
5. A maintenance inspection should be carried out.

4. NORMAL PROCEDURES

4.1. Introduction

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

4.2. Wing derigging and rigging

Procedure for right wing derigging (from fig. 4.2-1 up to fig. 4.2-5):

1. Drain the fuel tanks.
2. Remove the adhesive tape covering the gap between wing and the wing central section.
3. Remove the Fokker needle (4) and disconnect the aileron pull-push rod 2 (13) from the aileron pull-push rod 1 (12). Release the fuel hoses clamps (15).
4. Put the flap control handle to the flaps fully extended position (35°) and disconnect the flap control rod (9) from wing flap lever (5). Disconnect the wing flap lever (5) from the wing flap hinge (6).
5. Remove the Fokker needles (4) auxiliary pin (3), inner pin (2) and outer pin (1).
6. Pull out the wing so that there is an approx. 100 mm distance between the wing central section and the wing root. Disconnect the pitot-static hoses (only right wing), the wing fuel tank hoses, conductive connection wiring and position lights connector.
7. Carefully remove the wing.

Procedure for right wing rigging (from fig. 4.2-1 up to fig. 4.2-5):

1. Thoroughly clean and lubricate all the wing suspensions before wing assembly.
2. All pins easily lubricate (1, 2, 3).
3. Fit the wing spar of the central section spar and push the wing so that there will be a distance approx. 100 mm between wing and wing central section.
4. Connect the Pitot probe hoses (only right wing), conductive connection wiring and connect the position lights connectors. Avoid of pitot-static hoses twisting. Put on the hose clamps on the fuel hoses.
5. Push the wing closer, pull on the wing fuel tank hoses on the central section tanks sockets and pull the wing flap lever (5) on the central section flap hinge (6).
6. Fully push the wing into the wing central section. Insert the outer pin (1), inner pin (2) (slightly lift and lower the wing tip to make easy the pin insertion). Secure both pins with the Fokker needles (4). Insert the auxiliary pin (3) and secure it with the Fokker needle (4).
7. Tighten the fuel hoses clamps.
8. Lock the central section flap hinge using washer Ø6 (7) and self-locking nut M6 LN (8).
9. Connect the flap rod (9) to the wing flap lever bearing using a pin (10) and lock with the split pin (11). During this procedure, put the flap control lever to the flaps fully extended position.
10. Connect the aileron pull-push rods (12, 13) and secure the connection with a split pin (14).
11. Check the securing of all the connections.
12. Cover the gap between wing and wing central section using an adhesive tape.

NOTE

Take care of Pitot probe when handling with the right wing!

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 probe and fuel hoses!

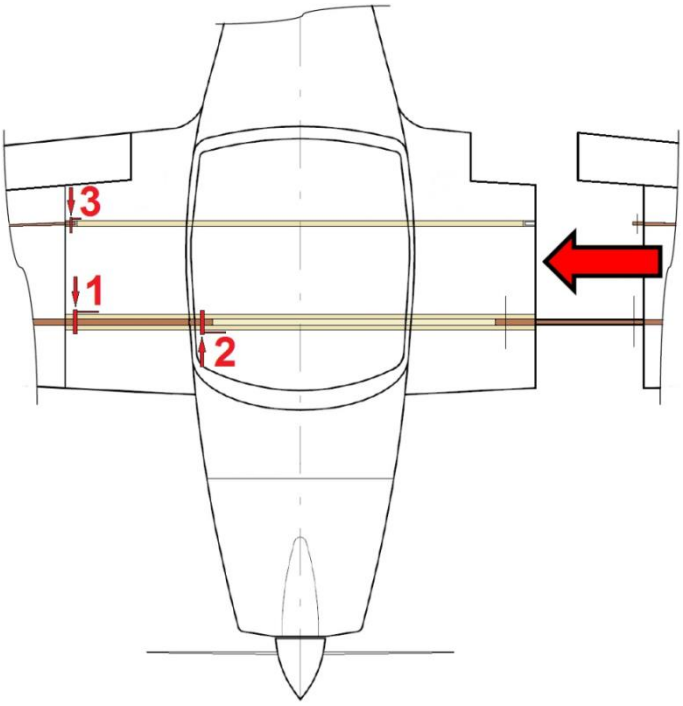


Fig. 4.2-1 Wing rigging

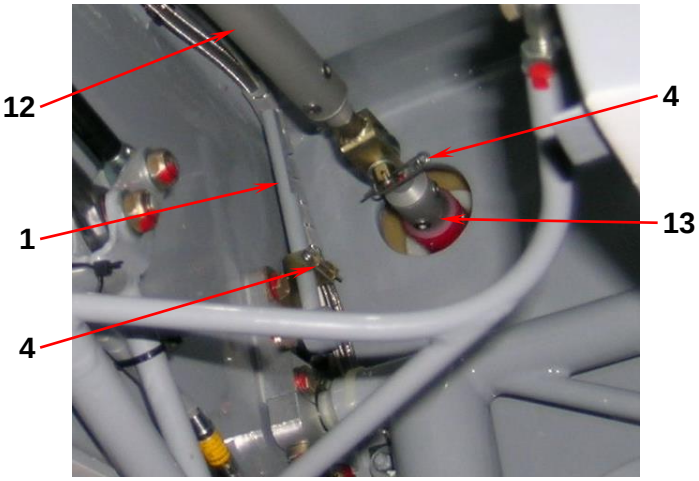


Fig. 4.2-2 Outer pin (1)

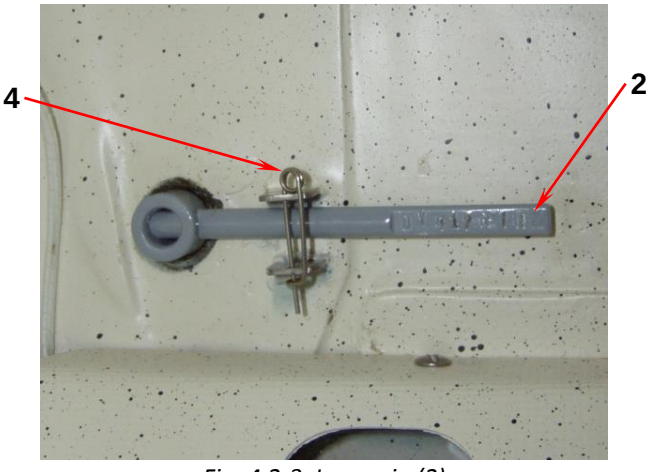


Fig. 4.2-3 Inner pin (2)

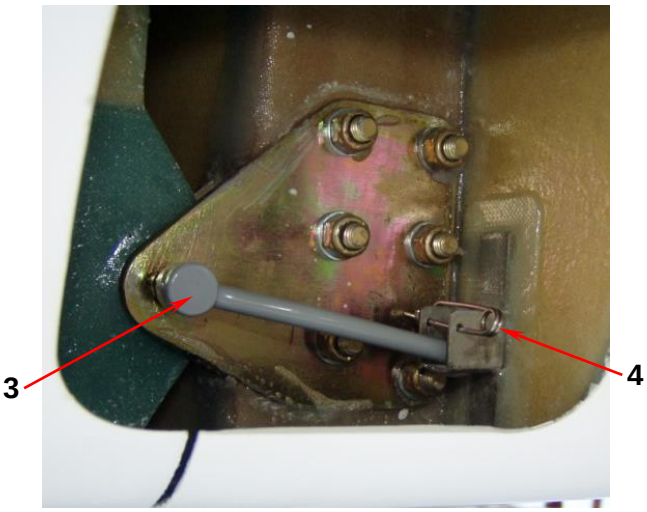


Fig. 4.2-4 Auxiliary pin (3)

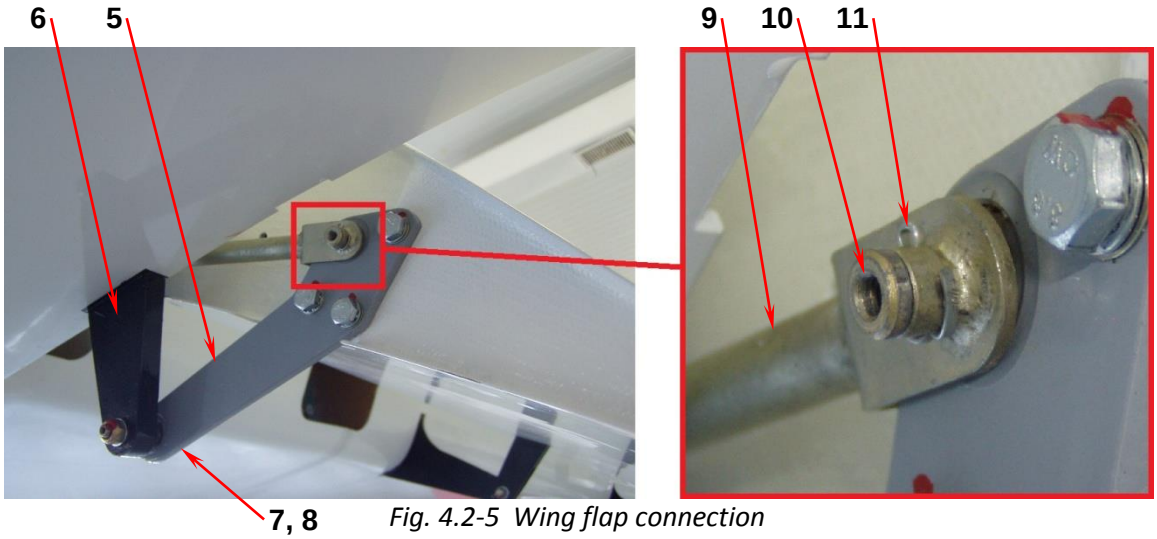


Fig. 4.2-5 Wing flap connection

4.3. Daily inspection

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

1. Aircraft log-book and airworthiness certificate.
2. Aircraft technical log-book.
3. Cockpit.
4. Landing gear.
5. All control surfaces for full and free movement.
6. All surfaces of the aircraft for cracks, nicks or any visible damage.
7. Powerplant and propeller.
8. Service fluids.

WARNING

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

4.4. Pre-flight inspection

It is most important to perform a pre-flight inspection carefully to prevent possible trouble. The pre-flight inspection is essential for flight safety. Pre-flight inspection proceeding is on fig. 4.4-1.

CAUTION

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

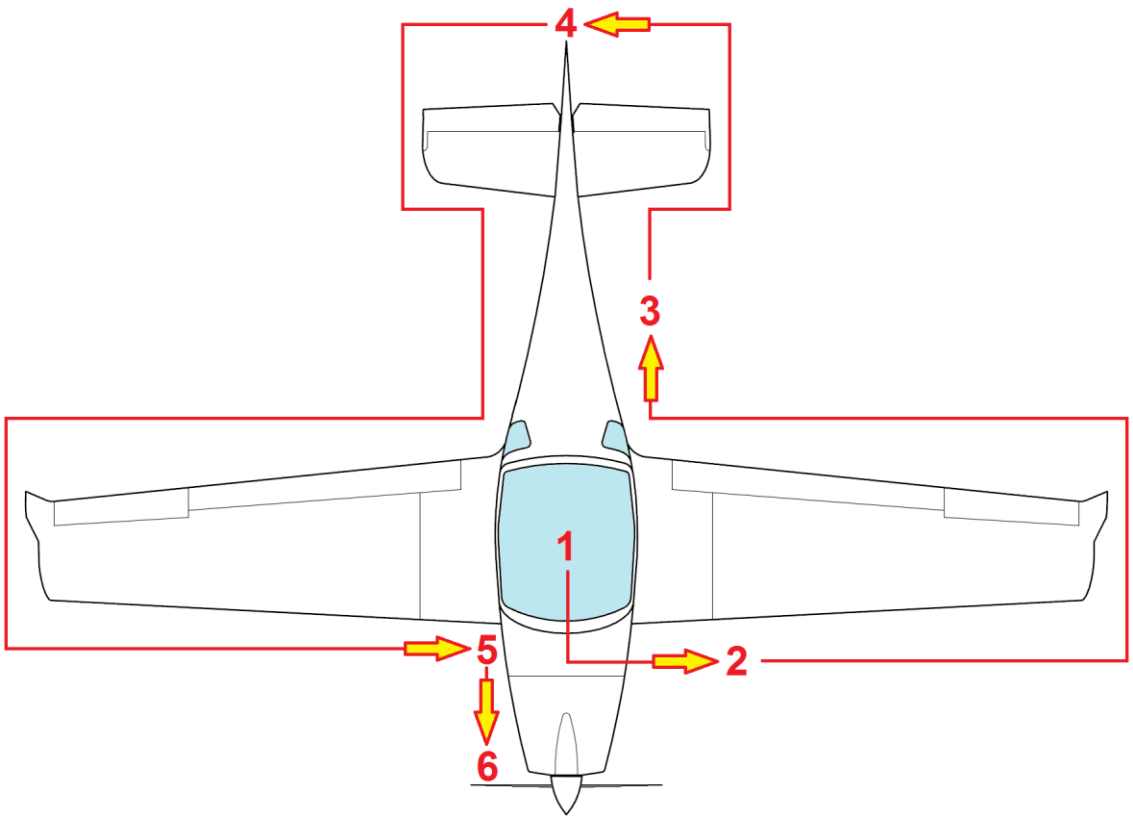


Fig. 4.4-1 Pre-flight inspection proceeding

A. Cockpit:

Flight controls:	Check for freedom of movement.
Master switch:	Switched OFF.
Lane A/Lane B:	Both circuits switched OFF.
Emergency (backup battery) switch:	Switched OFF.
Hydraulic pump:	Switched OFF.
Landing gear:	Set DOWN.
Loose items:	Secure or remove.
Check instruments:	Set "0" (zero).
Cockpit canopy glass:	Clean, check cockpit canopy lock.
Safety harness:	Inspect.
Fuel:	Check fuel quantity, check fuel selector.

B. Wing:

Surface:	State of wing surface.
Connection:	Wing pins fully inserted and secured.
Fuel tank caps:	State of fuel tank caps.
Pitot probe:	Pitot probe cover removed, check opening for blockage.
Leading edges:	Without damage, clean.
Ailerons:	Check for freedom of movement and security.
Wing flaps:	Without play, check hinges for security.

C. Fuselage:

Surface:	Without damage.
Static pressure receivers:	Check opening for blockage.
Antennas:	Fixed, without damage.
Cockpit wing walks:	Without damage.

D. Tail units:

Surface:	Without damage.
Control surfaces:	Check for freedom of movement, without excess play
Tail skid:	Check for secure attachment.

E. Landing gear:

Main gear legs:	Main wheel tyres state and inflation (250 kPa), attachment, suspension check.
Brakes:	Visually check condition of brake pads, brake system for leaks.
Legs:	State without damage, attachment.
Nose gear leg:	Nose wheel tyre state and inflation (200 kPa) attachment, suspension check, wheel free of rotation.

F. 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.
State of the engine cowlings.
State of the exhaust system attachment.
Check coolant level and oil level.
Engine attachment in rubber silentblocks.
Carburettors attachment.
State of hoses holders.
Condition and integrity of wires, plugs
Fuel filters.
Turn the propeller by hand several times for odd noises or excessive resistance and normal compression.

Fuel system: Drain the fuel tanks:
1. Place a suitable bottle below the drain valve.
2. Open the fuel tank filling cap.
3. Drain a small quantity of fuel by pushing of drain valve (fig. 4.4-2) to remove accumulated water if any.
4. Close and check the drain valve.

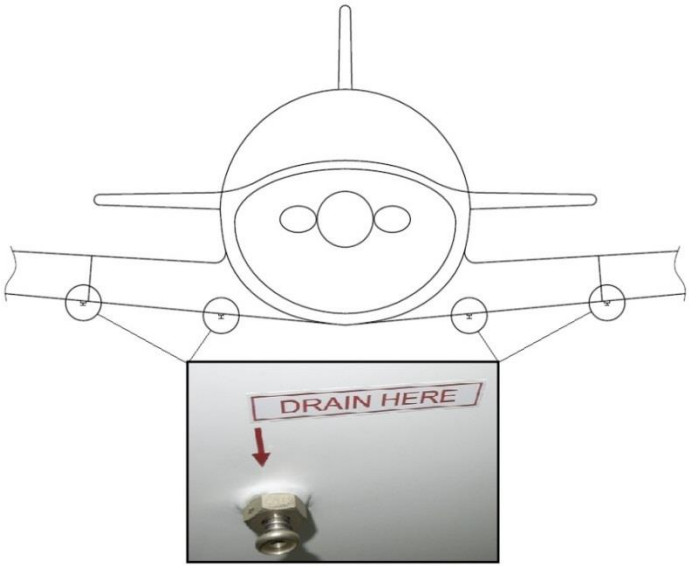


Fig. 4.4-2 Drain valves

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 cockpit controls arrangement is shown in fig. 4.5-1 and the instrument panel is shown in detail in the Chapter 7.4.

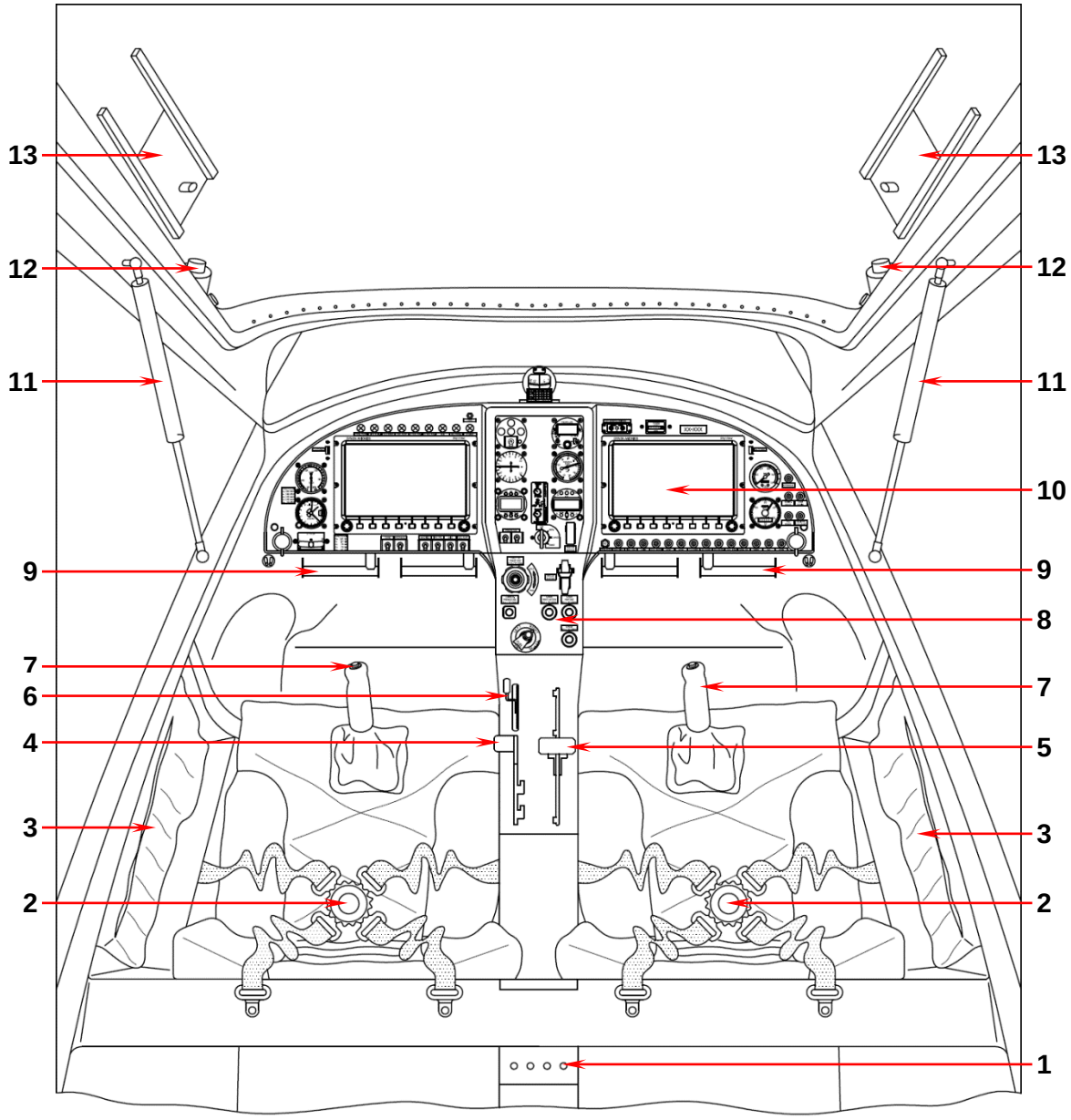


Fig. 4.5-1 Cockpit controls arrangement

1. Headset socket/jack	8. Central console (see Chapter 7.4)
2. Seat and safety belt	9. Rudder pedals
3. Pocket	10. Instrument panel (see Chapter 7.4)
4. Brake lever	11. Gas strut
5. Wing flap lever	12. Ball vents
6. Trim lever	13. Ventilation sliding window
7. Control stick	-

4.5.1. Before starting engine

1.	Master switch:	Switched OFF.
2.	Lane A/Lane B:	Both circuits switched OFF.
3.	Emergency switch:	Switched OFF.
4.	Control stick:	Freedom of movement.
5.	Throttle lever:	Freedom of movement, set to idle position.
6.	Elevator trim control:	Set to neutral position.
7.	Fuel quantity:	Check.
8.	Instruments:	Setting and check up of the value.
9.	Circuit breakers:	Check.
10.	Radio:	Function check.
11.	Seat and safety harness:	Adjust and lock.
12.	Brake:	Function check.
13.	Landing gear:	Set DOWN.
14.	Propeller pitch range:	Check the min. and max. propeller pitch and adjust minimum pitch.
15.	Canopy:	Latched and locked.
16.	Rescue system actuator:	Remove the lock (1) (fig. 4.5.1-1).

Fig. 4.5.1-1 Emergency system actuator lock

4.5.2. Engine starting

WARNING

Before starting the engine, check the position of landing gear switch to be set "DOWN" (landing gear extended)!

1.	Brakes:	Set on parking position.
2.	Fuel selector:	Select non-empty tank.
3.	Master switch:	Switch ON.
4.	Flight Display:	Activate.
5.	ACL lights:	Switch ON.
6.	Main fuel pump:	Switch ON.

WARNING

Switch only one fuel pump when starting the engine! Switching on both fuel pumps – Main and Auxiliary, can lead to a bad starting behavior!

7. Fuel pressure: Check if it has reached 3 bars.
8. Lane A/Lane B: Both circuits switch ON and check if Lane A and Lane B Warning Lamps extinguish within 6 seconds.
9. Starter key: Switch to Start Power position.
10. Warning lamps: Check if illuminate and extinguish within 3 seconds.
11. Throttle lever: Put between 1 to 2 cm of throttle opening.
12. Starter key: Press until the engine runs and release to ACC position after engine has reached 1500 min^{-1} or more (stable engine run).

CAUTION

Activate starter for maximum of 10 seconds only (without interruption), followed by a cooling period of 2 minutes!

13. As soon as engine runs: Adjust throttle lever to achieve smooth running at approx. 2500 min^{-1} and hold speed at least 5 seconds (await generator shift from Gen B to Gen A).

CAUTION

Increasing engine speed is only permitted at steady oil pressure readings above 3 bar!

WARNING

If after the engine start a warning lamp flashes or lights up, perfrom a LANE and IGNITION check. After the check both warning lamps must be deactivated. Otherwise the error must be located and repaired before the flight!

CAUTION

Cooling of the engine is insufficient when idling on the ground. If idling is needed never do that for a longer time, monitor temperatures and preferably relocate the plane into upwind position!

14. Warming up: Start warming up procedure according to the procedure in 4.5.3.
15. Fuel quantity: Check.
16. Avionics: Switch ON and Set. Function check.

4.5.3. Engine warming up

In accordance with the Operator's Manual for Rotax Engine Type 912 i Series, Ref. No.: OM-912 i, start the warming up period at 2000 min^{-1} for approx. 2 minutes, continue at 2500 min^{-1}, duration depending on ambient temperature, until oil temperature reaches 50 °C. Check temperatures and pressures.

Engine ground test:

1. Brakes:	Brakes set on full.
2. LANE and ignition check:	Check the two ignition circuits (LANE A/B) at 4000 min^{-1}. Speed drop with only one ignition circuit must not exceed 180 min^{-1}. Max. difference 75 min^{-1} of speed by use of either circuit A or B. Check power supply and minimum voltage of 12V at each LANE.
3. Throttle response:	Short (maximum of 10 seconds) full throttle ground test, speed must not exceed 5800 min^{-1} (at min. propeller pitch).
4. Minimum speed:	Minimum speed on the ground at full throttle (100%) must be 5500 ±200 min^{-1} depending on ambient temperature and pressure (at min. propeller pitch).
5. Idle speed:	Check the idle speed 1600 ±100 min^{-1}.
6. Fuel pumps check:	Set both fuel pumps ON and engine speed to 2000 min^{-1}. Turn auxiliary fuel pump OFF for 5 seconds, check fuel pressure, then turn auxiliary fuel pump ON. Turn main fuel pump OFF for 5 seconds, check fuel pressure, then turn main fuel pump ON.

WARNING

If fuel pressure is not within the limits, the cause must be determinated and repaired before the flight!

4.5.4. Taxiing

Use of the throttle control (screw in, screw out) what will help with smooth adjustments of power during taxiing. Taxiing of the aircraft is controlled by the 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. During taxiing check the rudder pedals freedom of movement.

In addition before glider towing:

1. Taxi to the front of a glider to can attach the towing rope.
2. Set the aircraft to take-off configuration (use manual propeller control).
3. Start slowly taxiing to tighten the rope.
4. Check in the rear mirror if the glider wings are levelled and an area in front of glider is clear.

4.5.5. Before take-off

1.	Control stick:	Freedom of movement.
2.	Elevator trim control:	Set neutral position.
3.	Wing flaps:	Set take-off position (15°) (see also Chapter 4.5.14).
4.	Fuel selector:	Select non-empty tank.
5.	Main and auxiliary fuel pumps:	Both switched ON.
6.	Landing gear:	Set DOWN.
7.	Hydraulic pump:	Switch ON.
8.	Powerplant instrument:	Check for correct readings.
9.	Flight instrument:	Check altimeter setting.
10.	Seat and safety harness:	Adjust and lock.
11.	Canopy:	Latched and locked.
12.	Landing lights:	Switch ON.

4.5.6. Normal take-off

1.	Throttle lever:	Full open.
2.	Control stick:	Set into neutral position.
3.	Direction on the ground:	Control by rudder pedals.
4.	Unstick:	At speed at 49-51 kts (90-95 km/h) (according to take-off weight).
5.	Accelerating:	Accelerate to 65-70 kts (120-130 km/h) (acceleration after unstuck).

With glider:

1.	Throttle lever:	Full open.
2.	Control stick:	Set into neutral position.
3.	Direction on the ground:	Control by rudder pedals.
4.	Unstick:	At speed at 49-51 kts (90-95 km/h).
5.	Glider:	Check in mirror if the glider is airborne. If not, keep the aircraft approx. 7 ft (2 m) above ground and wait until the glider is airborne.
6.	Accelerating:	Accelerate up to the glider towing speed.

For take-off from short runway keep the wing flaps retracted and at speed 32 kts (60 km/h) set the flaps to the take-off position (15°) (see also the Chapter 4.5.14).

4.5.7. Climbing

Monitor cylinder head temperature and oil pressure during climb. Oil temperature limits must not be exceeded. In the case of high readings, increase airspeed and reduce engine power setting.

Without glider:

1.	Throttle lever:	Throttle lever to max. continues power.
2.	Airspeed:	Conduct at speed 70-76 kts (130-140 km/h).
3.	Flaps retracting:	At height 200 ft (60 m) AGL retract the wing flaps slowly.
4.	Landing lights:	Switch OFF.
5.	Auxiliary fuel pump:	Should be switched OFF after take-off in safety altitude 500 ft (150 m).

With glider:

1. Throttle lever: Throttle lever to max. continues power.
2. Airspeed: Conduct at glider towing speed.
3. Flaps retracting: At height 200 ft (60 m) AGL retract the wing flaps slowly. If the towing speed is below 59 kts (110 km/h), let the flaps in take-off position.
4. Landing lights: Switch OFF.
5. Auxiliary fuel pump: Should be switched OFF after take-off in safety altitude 500 ft (150 m).

WARNING

Switching off both fuel pumps cause the running engine stops immediately!

6. Glider release: Climb to the releasing area and check in the rear mirror if the glider got released.

4.5.8. Cruise

The range of cruising speeds is from 79-121 kts (146 to 225 km/h). The economy airspeed for best fuel economy is 108 kts (200 km/h), the optimum operation is between 99-121 kts (184 -225 km/h). In case of turbulence reduce the cruising speed below 121 kts (225 km/h). Under certain conditions the aircraft may be overstressed. The aircraft is able to be trimmed through the range of the cruising speeds.

Due to economy reasons is recommended to maintain the following parameters:

Engine Rotax 912 iS Sport Engine power setting	Engine Speed (min^{-1})	Performance (kW)	Torque (Nm)
Take-off power	5 800	73,5	121,4
Max. continuous power	5 500	72,0	126,4
75 %	5 000	54,0	103,1
65 %	4 800	46,7	93,3
50 %	4 300	35,9	78,5

4.5.9. Approach

Without glider:

Approach is conducted at airspeeds 65-70 kts (120-130 km/h) with the appropriate power (min. pitch in manual regime or 5500 min^{-1} constant speed). For increasing the rate of descent, it is recommended setting of wing flaps to landing position (35° flaps deflection) and proceeds at airspeed 65 kts (120 km/h). In this configuration, the gliding range is 1:8.

Side slipping is conducted with airspeed 65 kts (120 km/h), idle power setting and approximate bank angle 30° with help of full rudder deflection. The side slip direction is controlled by the bank.

With glider (in the case of tow release mechanism malfunction):

Approach is conducted at airspeeds 59-65 kts (110-120 km/h) or at glider towing speed, whichever is less, with a small descent slope considering the glider characteristics. Use the appropriate power setting (min. pitch in manual regime or 5500 min^{-1} constant speed).

Check the glider position in a rear mirror.

4.5.10. Landing

Without glider:

1.	Check:	Fuel, brakes and harness.
2.	Fuel selector:	Select non-empty tank.
3.	Auxiliary fuel pump:	Switch ON.
4.	Landing lights:	Switch ON.
5.	Approach:	Conduct at speed 65-70 kts (120-130 km/h) according to the weight.
6.	Wing flaps:	As required extend the flaps down at speed below 79 kts (146 km/h).
7.	Elevator trim:	Adjust as required.
8.	Levelling:	Begin approximately 7-10 ft (2-3 m) above ground.
9.	Touchdown:	Touchdown should be made with power-off and on the main wheels first. The nose wheel should be lowered smoothly to the runway as speed is diminished.
10.	Control during landing:	Control the aircraft with the help of rudder pedals.
11.	Braking:	Apply braking as required.

With glider (in the case of tow release mechanism malfunction only):

1.	Check:	Fuel, brakes and harness.
2.	Fuel selector:	Set LEFT
3.	Auxiliary fuel pump:	Switch ON.
4.	Landing lights:	Switch ON.
5.	Approach:	Conduct at speed 59-65 kts (110-120 km/h) or glider towing speed, whichever is less, with a small descent slope.
6.	Wing flaps:	Retracted or take-off position (depending on glider approach speed).
7.	Elevator trim:	Adjust as required.
8.	Levelling:	Begin approximately 7-10 ft (2-3 m) above ground.
9.	Touchdown:	Touchdown should be made with power-off and on the main wheels first. The nose wheel should be lowered smoothly to the runway as speed is diminished.
10.	Control during landing:	Control the aircraft with the help of rudder pedals.
11.	Braking:	Apply braking as required.

WARNING

Beware of towing rope collision with the obstacles under the aircraft!

4.5.11. Balked landing

1.	Throttle lever:	Smoothly adjust the throttle lever to full open (a thrust yawing moment manifests in the case of steep setting of the throttle lever).
2.	Airspeed:	Modify to 65 kts (120 km/h).
3.	Wing flaps:	Retract if safe.
4.	Landing gear:	Set UP.
5.	Elevator trim:	Adjust as required and proceed in climbing.

4.5.12. After landing

1.	Engine RPM:	Adjust throttle for taxiing.
2.	Wing flaps:	Retract.
3.	Elevator trim:	Set to most rear position of neutral.
4.	Landing gear:	Check switch to be set DOWN.
5.	Hydraulic pump:	Switch OFF
6.	Auxiliary fuel pump:	Switch OFF.
7.	Landing lights:	Switch OFF.
8.	Taxiing:	To the parking position.

4.5.13. Securing aircraft

1.	Brakes:	Set to "park" position.
2.	Throttle lever:	Set to idle.
3.	Instruments:	Switch OFF all electronic instruments (avionics).
4.	Lane A/Lane B:	Switch OFF the Lane B and then switch OFF the Lane A.
5.	Main fuel pump:	Switch OFF.
6.	ACL lights:	Switch OFF.
7.	Starter key:	Switch OFF.
8.	Master switch:	Switch OFF.
9.	Fuel selector:	Set OFF.
10.	Rescue system:	Lock the actuator.
11.	Cockpit leaving:	After cockpit leaving the canopy should be covered with the cloth dust-cover, to avoid of the sun effects.

4.5.14. Take-off and landing within crosswind

Operation in direct crosswind of 24 kts (12,4 m/s) has been demonstrated. For glider towing is limitation direct crosswind of 24 kts (12,4 m/s) or allowed crosswind limitation of glider, whichever is less.

Take-offs under strong crosswind conditions normally are performed with the minimum flap setting (position 0 or 1) necessary for the field length, to minimize the drift angle immediately after take-off. With the ailerons partially deflected into the wind, the aircraft is accelerated to a speed slightly higher than normal, then the elevator control is used to quickly, but carefully; lift the aircraft off the ground and to prevent possible settling back to the runway while drifting. When clear of the ground, make a coordinated turn into the wind to correct for drift and continue in take-off.

When landing in a strong crosswind, use the minimum flap setting (position 1 or 2 maximum, never position 3) required for the field length. Although the crab or combination method of drift correction may be used, the wing low method gives the best control.

After touchdown, hold a straight course with the steerable nose wheel, with aileron deflection as applicable and occasional braking if necessary.

5. PERFORMANCE

5.1. Introduction

Chapter 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 aircraft 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

KIAS	KCAS	**IAS**	CAS
27	30	50	55
30	32	55	60
32	35	60	65
36	38	67	70
42	43	78	80
48	49	89	90
54	54	100	100
60	59	112	110
67	65	125	120
73	70	136	130
79	76	146	140
84	81	155	150
89	86	165	160
95	92	176	170
99	97	184	180
110	108	203	200
121	119	225	220
132	130	245	240
144	140	267	260
154	151	285	280

5.2.2. Stall speed

At MTOW 472,5 kg, CG is 30% MAC, engine at idle:

Position of wing flaps	**KIAS**	KCAS	**IAS**	CAS
0°	37	39	69	72
15°	36	38	67	70
35°	32	35	60	65

5.2.3. Take-off performance

The data is valid for following conditions: H = 0 ft (0 m) ISA, Temperature t = 15 °C, wing flaps position 15°, MTOW 472,5 kg.

Runway surface	Ground roll		50 ft (15 m)	
	ft	m	**ft**	m
Paved runway	**650**	198	**1165**	355
Non paved – grass	**764**	233	**1280**	390

5.2.4. Landing distance

The data is valid for following conditions: H = 0 ft (0 m) ISA, Temperature t = 15 °C, wing flaps position 35°, landing speed 1,3 V_{S0}, MTOW 472,5 kg, braking during roll.

Runway surface	50 ft (15 m)		Ground roll	
	ft	m	**ft**	m
Paved runway	**863**	263	**246**	75
Non paved - grass	**892**	272	**276**	84

5.2.5. Climb performance

The data is valid for following conditions: Wing flaps retracted, MTOW 472,5 kg.

Altitude		Airspeed		Rate of climb	
ft	m	**KIAS**	IAS	**ft/min**	m/s
0	0	**70**	130	**1083**	5,5
3280	1000	**70**	130	**1024**	5,2
6560	2000	**70**	130	**886**	4,5
9840	3000	**70**	130	**787**	4,0
13120	4000	**70**	130	**689**	3,5

5.3. Additional information

5.3.1. Balked landing climb

The data is valid for following conditions: MTOW 472,5 kg, wing flaps position 35° (retracted during balked landing). Introduced rate of climb is after 5 seconds from full throttle application.

Altitude		**Airspeed**		**Rate of climb**	
ft	m	**KIAS**	IAS	**ft/min**	m/s
0	0	**65**	120	**945**	4,8

5.3.2. Effect on flight performance and characteristics

No disturbing effects on flight performance and characteristic of the aircraft WT9 Dynamic Speed were recorded during the flight tests.

5.3.3. Demonstrated crosswind performance

The maximum demonstrated crosswind speed for take-off and landing is 24 kts (12,4 m/s).

5.3.4. Towing performance

The following table shows the take-off and climbing performance with glider Duo Discus with MTOW 750 kg:

Distance				**Time of climb up to**				**Airspeed**		**Rate of climb**	
Take-off roll		**Take-off up to 50 ft (15 m)**		**ft**	m	**ft**	m				
				1312	400	**1968**	600				
ft	m	**ft**	m	**(min:sec)**		**(min:sec)**		**KIAS**	IAS	**ft/min**	m/s
1047	319	**2356**	718	**4:33**		**6:06**		**65**	120	**354**	1,8

6. WEIGHT AND BALANCE AND EQUIPMENT LIST

6.1. Introduction

This chapter contains the payload range with which the aircraft may be safely operated. CG position is very important parameter that affects the safety of flight.

6.2. Weighting procedure

To define the aircraft CG it is necessary to weigh the empty aircraft with standard and optional equipment, with operating fluids of the engine but without the fuel in the fuel tanks (for empty weight and empty moment see Weight and balance record).

The aircraft is weighted with the help of three weighting-machines located under the left and right main wheels and under the nose wheel.

The aircraft position for weighting has to be adjusted to be levelled the side edge of the cockpit. The datum reference point (RP) is leading edge of wing root section where wing-fuselage radius starts. Measure the distance from datum point (RP) to centre of main landing wheel axle and nose wheel axle.

The leading edge of Mean Aerodynamic Chord (MAC) is located in distance 77 mm rearward from RP. CG position is expressed as a distance from MAC leading edge (X_T (mm)) and as a MAC ratio (X_{CT} (% MAC)).

CG position after loading of aircraft (crew, fuel and baggage or additional equipment) can be calculated as follows (see CALCULATION OF FLIGHT CG POSITION in Chapter 6.3):

1. Determine the partial weights of crew(G_C), fuel(G_F)*, baggage(G_B)and add them to empty weight(G_E)to get total weight(G_T).
2. Calculate the partial moments of crew (M_C), fuel (M_F)*, baggage (M_B)and add them to empty moment(M_E) to get total moment(M_T).
3. Calculate the position of CG on MAC (X_T) (in mm). Calculate the position of CG on MAC(X_{CT})(in %MAC)
4. Check if the flight CG is inside of allowed range (For safety flight it must be considered that the fuel is consumed during flight what results in moving of CG forward!).

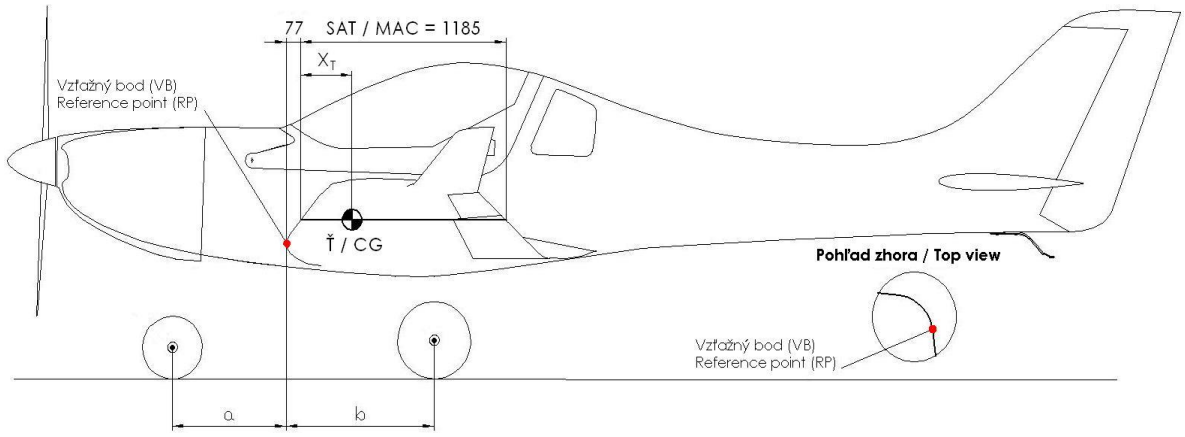
* Be careful to use fuel weight (in kg) not fuel volume (in litres)!

6.3. Weight and balance record and permitted payload range

Permitted crew + passenger weight with											
Date	Empty weight (kg)	Empty moment (kg.mm)	CG Position (%)	Max. baggage 40 kg		Half baggage 20 kg		No baggage		Approved	
				Max. (kg)	Min. (kg)	Max. (kg)	Min. (kg)	Max. (kg)	Min. (kg)	Date	Signed

Condition: Aircraft in the range from maximum possible fuel amount of 126 litres to minimum fuel of 15 litres.

CALCULATION OF FLIGHT CG POSITION



Empty aircraft (G_E)* (See Weight and balance record)	**kg**	**Empty moment** (M_E)* (See Weight and balance record)	**kg.mm**
	Weight (G_i) **(kg)**	**Distance from RP** (l_i) **(mm)**	**Moment** $(M_i = G_i . l_i)$ **(kg.mm)**
Crew (G_C)	kg	720 mm	kg.mm
Fuel** (G_F)	kg	240 mm	kg.mm
Baggage (G_B)	kg	1100 mm	kg.mm
Total weight (G_T) $G_T = G_E + G_C + G_F + G_B$	**kg**	**Total moment** (M_T) $M_T = M_E + M_C + M_F + M_B$	**kg.mm**

Calculation of CG position X_T on MAC (in mm):

$$X_T(mm) = \frac{M_T}{G_T} - 77 = \text{\_\_\_\_\_} - 77 = \quad mm$$

Calculation of CG position X_{CT} on MAC (in %MAC), (MAC = 1185 mm):

$$X_{CT}(\%MAC) = \frac{X_T}{MAC} \cdot 100 = \frac{\text{\_\_\_\_\_}}{1185} \cdot 100 = \quad \%MAC$$

Permitted flight CG position is in range 20,00-30,00 %MAC!

Calculated flight CG position is whitin permitted range:

☐ **YES** ☐ **NO**

Date, place ..... Signature .....

* Empty weight includes operating fluids of engine and standard equipment.

** Attention, make sure that weight of fuel (**in kg**) was used in calculation!

6.4. Equipment list

The aircraft is fitted with following avionic equipment:

Manufacturer	Type	Description
Dynon Avionics, USA	SV-D1000 (2pc)	EFIS / EMS / GPS
Funkwerk Avionics GmbH, Germany	TRT800H	Transponder Mode S
Funkwerk Avionics GmbH, Germany	ATR833	VHF
Microel s. r. l., Italy	Flybox PR1-P	Propeller regulator
Airpath Instrument Company, USA	C-2400-P	Magnetic compass
Winter GmbH&Co. KG, Germany	7FMS511	Airspeed indicator
Winter GmbH&Co. KG, Germany	4FGH40	Analogue altimeter
Winter GmbH&Co. KG, Germany	QMII	Slip indicator
Winter GmbH&Co. KG, Germany	5STWM10	Vertical speed indicator
PS Engineering Inc., USA	PM-1000 II	Intercom
Garrecht Avionik GmbH, Germany	TRX-500	PCAS
Winter GmbH&Co. KG, Germany	FSZM	Flight hours
Honeywell International, USA	85094	Engine hours
SkyDrive Limited, UK	FP-912/10	Fuel pressure indicator
Ameri-King Corp., USA	AK-451	ELT
UMA Instruments , Inc., USA	7-100-10	Manifold pressure indicator
Aerospool, spol. s r. o., Slovak republic	DYN-130-56.A00	Landing gear controller
Funkwerk avionics GmbH, Germany	SP2000	Radio antenna
R. A. Miller Industries Inc., USA	AV-22	Transponder antenna
Dynon Avionics, USA	SV-GPS-250	GPS antenna

7. AIRCRAFT AND SYSTEM DESCRIPTION

7.1. Introduction

This chapter provides a description of the operation of the aircraft and its systems. Refer to the Chapter 9, Supplements, for details of optional systems and equipment.

7.2. Airframe

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 a gas strut. The wing central panel with span 2,45 m is fixed at the fuselage. There are integral tanks in the forward box of the wing central panel.

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 top of central tunnel in the cockpit. The movement by help of the rods and the bellcranks is transmitted to the flap's torsion tube in the wing, next the movement from the flap's torsion tube is transmitted to the flaps. There are wing fuel tanks are integral part of wing structure. They are connected with central section tanks with simple hose connection and tightened with clamps.

Horizontal tail:

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 (similar 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:

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. The rudder is attached by three hinges at the fin.

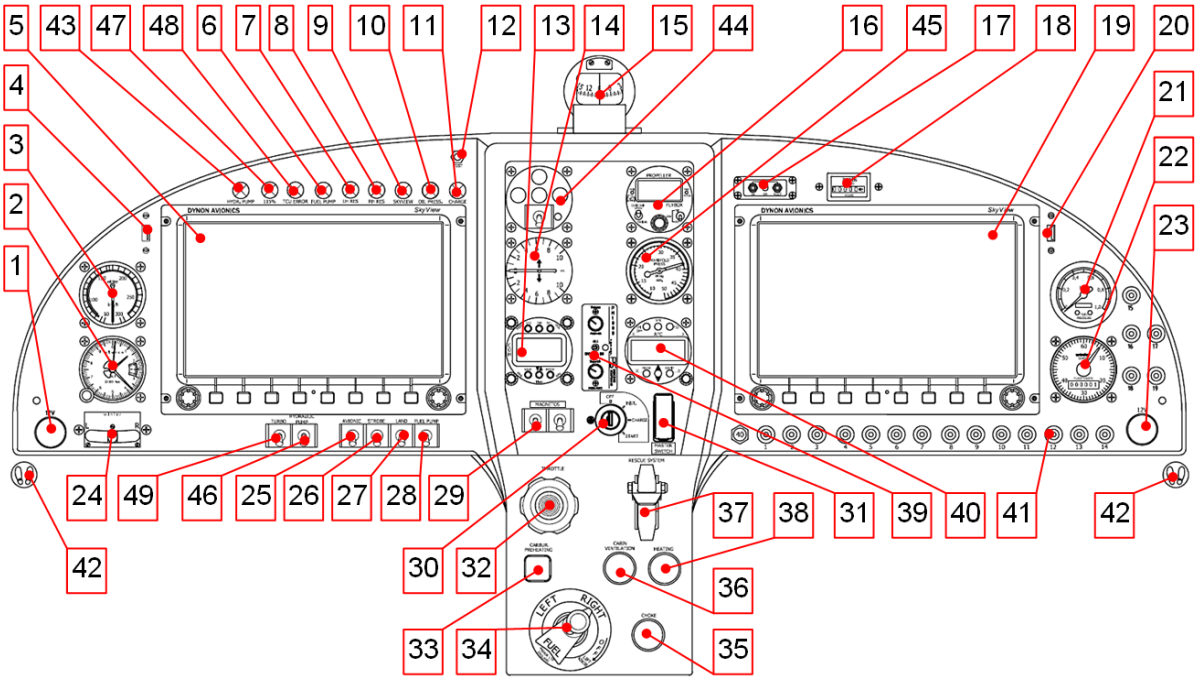
7.3. Flight controls

The aircraft has dual controls with two control sticks. The ailerons are controlled by means of control sticks, connecting rods and levers. The elevator is controlled by means of control sticks, connecting rods and levers. The rudder is controlled by means of steel cables attached at the rudder pedals and guided alongside the fuselage sides to the rudder. The rudder pedals position is adjustable (see Chapter 1.6.5 in the Maintenance Manual for WT9 Dynamic).

The wing flaps are controlled manually by a flap lever located on the top of central tunnel. The slotted link allows four positions of the flaps: retracted, take-off (flaps deflection 15°), landing position (flap deflection 24°) and landing position (flap deflection 35°). Movement with help of rods and bellcranks is transmitted onto the flap's torsion tube and from the flap's torsion tube is transmitted onto the flaps with help of the rod.

7.4. Instrument panel

The instrument panel arrangement is shown in the following figure (fig. 7.4-1):



1.	12V Power outlet	26.	NAV/POS/Strobe lights
2.	Standby Altimeter	27.	Landing Lights Switch
3.	Standby Airspeed Indicator	28.	Auxiliary Fuel Pump Switch
4.	USB Connector	29.	Lane A/Lane B
5.	Multifunction Display (EFIS)	30.	Starter Ignition Box
6.	Fuel Pump Control Lamp	31.	Master Switch
7.	Fuel Reserve Warning Lamp - Left Tank	32.	Throttle Controller
8.	Fuel Reserve Warning Lamp - Right Tank	33.	Carburettor Pre-heating Controller
9.	EMS Warning Lamp	34.	Fuel Selector
10.	Oil Press Warning Lamp	35.	Choke Controller
11.	Charge Warning Lamp	36.	Cabin Ventilation Controller
12.	Lamps Test Button	37.	Ballistic Recovery System Actuator
13.	Radio	38.	Cabin Heating Controller
14.	Standby Vertical Speed Indicator	39.	Intercom
15.	Magnetic Compass	40.	Transponder
16.	Propeller Regulator	41.	Circuit Breakers (see next page)
17.	ELT Remote Control	42.	Pedals Remote Control
18.	Engine Hours Counter	43.	Hydraulic Pump Control Lamp
19.	Multifunction Display (EMS)	44.	Landing Gear Controller
20.	USB Connector	45.	Manifold pressure gauge
21.	Fuel Pressure Indicator	46.	Hydraulic Pump Switch
22.	Flight Hours Counter	47.	LANE A Control Lamp
23.	12V Power Outlet	48.	LANE B Control Lamp
24.	Standby Bank Indicator	49.	Emergency Switch
25.	Avionic Switch	-	Traffic Sensor (fitted behind panel)

Fig. 7.4-1 Instrument panel

Circuit breakers installed at instrument panel		
No.	**Protected instrument**	**Circuit breaker value (A)**
1.	Hydraulic pump	40
2.	Avionic	1
3.	ACL/NAV	5
4.	Land	1
5.	SPR	1
6.	ASR	1
7.	RDST	4
8.	XPDR	2
9.	LH D1000	8
10.	RH D1000	8
11.	Oil pressure	1
12.	Fuel reserve	1
13.	Socket 12V	10
14.	Spare	5
15.	SVI	1
16.	PCAS	1
17.	Hydraulic	5
18.	Propeller	10
19.	Gear signalisation	1
20.	SPSR	30
21.	BBSR	30
22.	Magneto Fuel pump	2

7.5. Landing gear system

The model Speed is equipped with a retractable landing gear, which is actuated by a hydraulic system with the help of the electrical driven hydraulic pump. The emergency extension of the landing gear is carried out by its own mass with help of gas struts. The drag struts arrest the landing gear legs with the help of the springs. The main landing gear legs are attached to the wing central panel and retract inwards. The nose landing gear leg is attached to the engine mount and retracts backwards (fig. 7.5-1).

The main wheels on both legs are equipped with hydraulic disc brakes. The main wheels are braked by a brake system that is located under the pilot seats. The main wheel brakes are actuated via the brake lever handle placed on the top of central tunnel between the pilot seats. This handle actuates the parking brake too.

The tyres of the main landing gear have dimensions 15x6,00-6, the tyre of the nose wheel has dimensions 13x5,00-6.

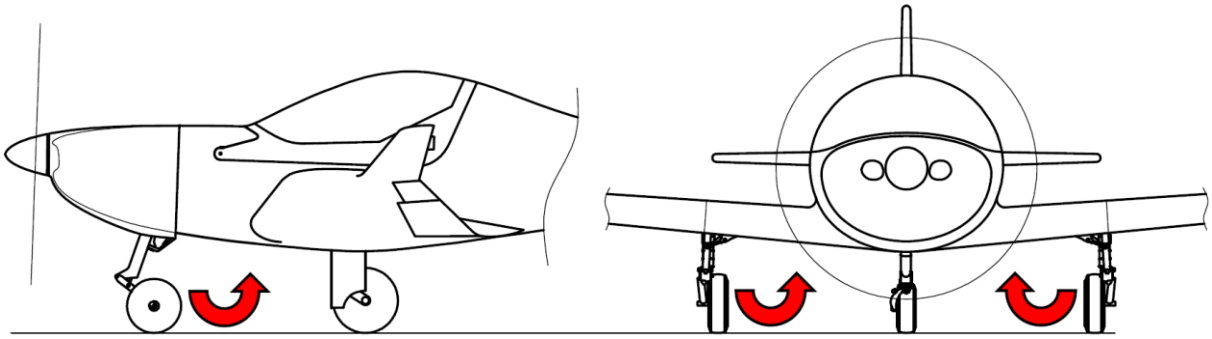


Fig. 7.5-1 Retractable landing gear

Hydraulic system consists of hydraulic unit installed under the co-pilot seat and hydraulic cylinders operated the retracting and extending of landing gear legs (fig. 7.5-2).

Hydraulic pump (1) creates the pressure that is distributed to the hydraulic accumulator (2), return valve (3), pressure sensors (4) and 4-way 3-position distributor (5). Pressure sensors control the pressure of hydraulic oil in the system and control turning the hydraulic pump ON or OFF. 4-way 3-position distributor directs the hydraulic oil to the distribution boxes (6, 7) from which leads the hydraulic hoses to the hydraulic cylinders in dependence on landing gear controller switch position. In the case of electric power loss the return valve (3) releases the pressure and emergency landing gear extending is ensured by landing gear legs mass and acting of gas struts.

For wiring diagram see Annex A.4.2.15.

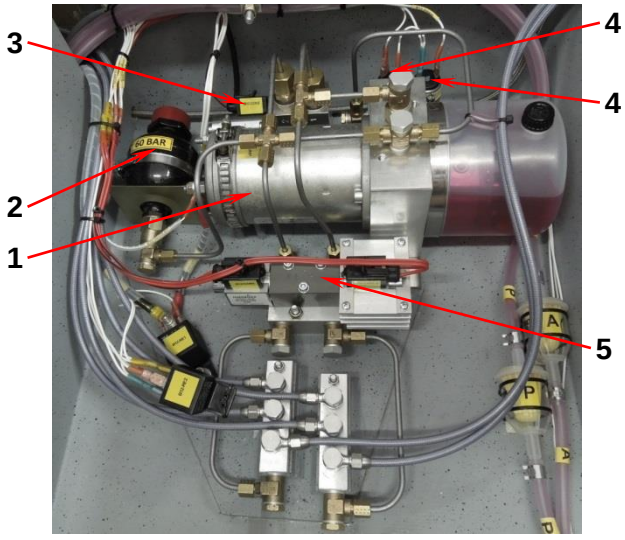


Fig. 7.5-2 Hydraulic unit

The aircraft with retractable landing gear is equipped with non-opening signalization and retraction blockage on the ground. No opening of the landing gear when a flaps are in a 2nd and 3rd position (landing configuration) is signalized by acoustic signalisation in cabin and flashing red control light situated in the centre of landing gear control panel.

Disabling of the possibility to retract a landing gear when the speed is below 43 kts (80 km/h) (if a pilot by mistake would retract the gear on the ground, a system of blockage does not allow gear retracting and signalizes this operation error by flashing of three green control lights on the landing gear control panel).

CAUTION

In case that the Hydraulic pump indication light shines for more than 20 seconds switch off the hydraulic pump circuit breaker (see the Chapter 7.4). The continuous running of hydraulic pump will cause damage of hydraulic system!

7.6. Seats and safety harness

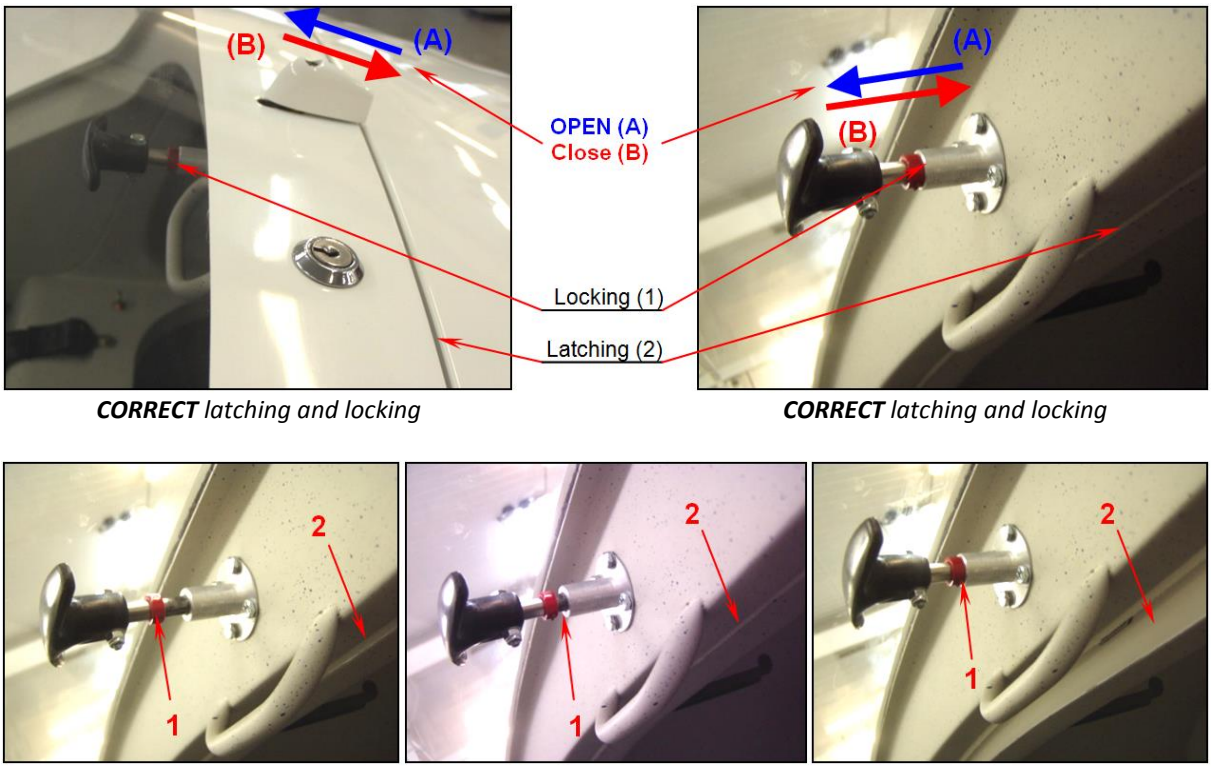
The aircraft has two side-by-side seats which are fixed, un-adjustable. The back support of the seats is glued into the fuselage construction as the frame. The safety belts – 4 point static harness restraint system is attached to the left and right seat side panel and to the strut behind the back support 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. There are four fixing points to which can be attached the baggage.

7.8. Doors, windows and exits

The cockpit canopy consists of one part. The Plexiglas is glued on the composite frame. The canopy is attached to the front section of the fuselage by pins which make it possible for the canopy to be tilted forward. For easier manipulation there are two gas struts that allow canopy to open effortlessly by counterbalancing the weight of the canopy. 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. 7.8-1) and the red ring on lock pin as the correct cockpit canopy locking indicator.



CORRECT *latching and locking*

CORRECT *latching and locking*

Latched (2) but unlocked (1)
WRONG!

Latched (2) but partially locked (1)
WRONG!

Clearly locked (1) but unlatched (2)
WRONG!

Fig. 7.8-1 Cockpit canopy latching and locking

7.9. Powerplant

Powerplant consists of 4 cylinder horizontally opposed 4-stroke engine Rotax 912 iS Sport and a 3-bladed in-flight electrically adjustable propeller WOODCOMP SR2000DN.

These engines are suitable for 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.

Engine (fig. 7.9-1):

Rotax 912 iS Sport is 4-stroke, 4 cylinders horizontally opposed, spark ignition engine, one central camshaft-push-rods-OHV. Combined liquid cooled cylinder heads and ram air cooled cylinders. Dry sump forced lubrication. The engine is fitted with an electric starter, AC generator, mechanical fuel pump and the reduction gear with integrated shock absorber. For more information see the Maintenance Manual for Rotax Engine Type 912 i Series, Ref. No.: OM-912 i).

WARNING

Due to carburettors, flying in icing conditions is prohibited!

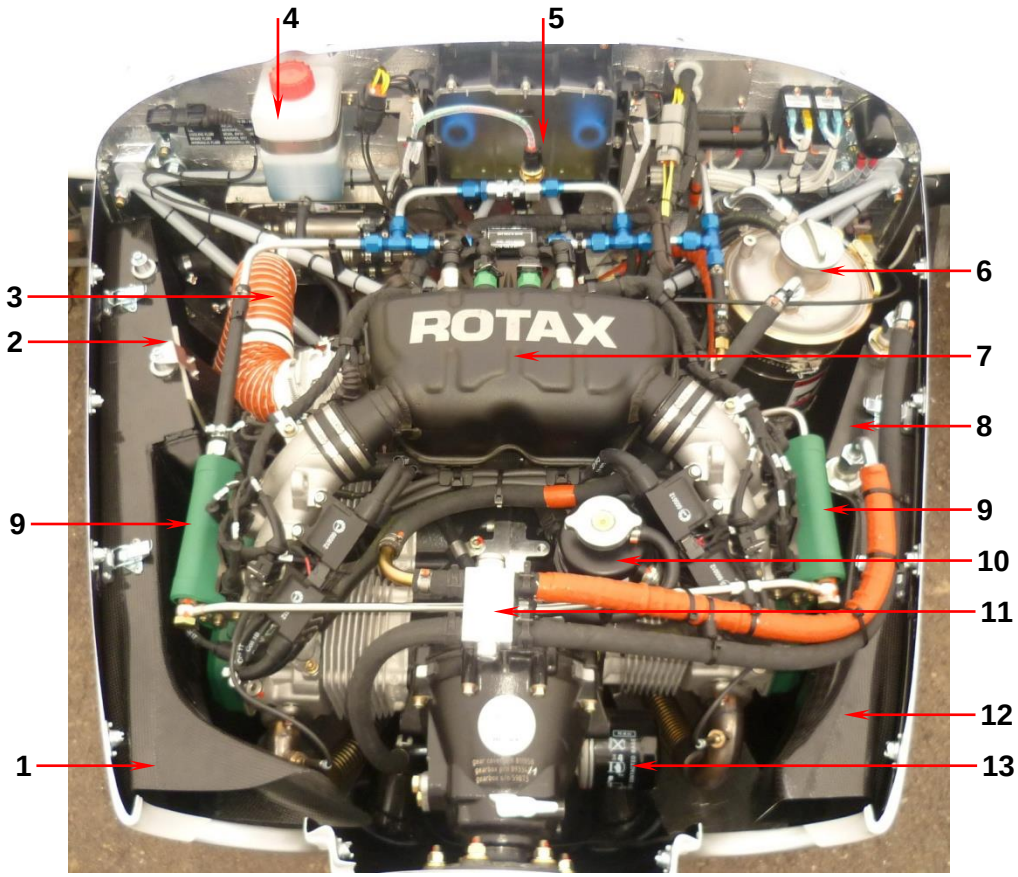
The periodic inspections must be performed according to the maintenance schedule (see the Maintenance Manual for Rotax Engine Type 912 i Series, Ref. No.: MML-912 i).

There are two laminated cowlings (upper and lower) which cover the engine compartment. 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. The oil level in the oil tank should be between two marks (max./min.) on the dip-stick, but must never fall below the min. mark.
2. Coolant quantity check: Remove the cover of the expansion tank and check if it is filled fully. Warning, never check the coolant level when the engine is hot!!! Always let the engine to cool down before!!! Check the coolant level in the overflow bottle should be between min. and max. mark.

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



1. Coolant cooler holder	9. Injection
2. Coolant cooler	10. Expansion tank
3. Air hose for airbox	11. Oil thermostat
4. Coolant overflow bottle	12. Oil cooler holder
5. Fuse box	13. Oil filter
6. Oil tank	-
7. Airbox	-
8. Oil cooler	-

Fig. 7.9-1 Engine systems

Propeller:

WOODCOMP SR2000DN is 3-bladed in flight electrically adjustable aircraft propeller with diameter 1700 mm of mixed structure. For operation instruction see Operator's Manual – Electrical Adjustable Aircraft Propeller SR2000DN.

The propeller is controlled with propeller regulator Flybox (fig. 7.9-2) is located on the instrument panel (see the Chapter 7.4). For operation instruction see the Propeller Regulator PR1-P – Installation and Operating Manual.

Fig. 7.9-2 Propeller regulator

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7.10. Fuel system

The integral fuel tanks are located in the forward box of the wing central section and both halves of wing. The wing and central section tanks are connected by a simple hose connection with clamps. There is one large diameter hose between tanks, which serves the fuel from the wing tanks to central section tanks. There are two small diameter hoses, one of them is venting line of wing tank and second one is connects the both tanks (air connection). The integral fuel tanks are covered by a special paint resistive to fuel with a less electrical resistance. There is a rib in the each tank for preclusion of a rapid fuel flowage during the flight manoeuvres. The fuel tank filler caps are located on a wing upper surface. There is a drain valve in the lowest point of each tank.

The fuel flows to the fuel selector through the fuel filters from the left or right fuel tank (in dependence on position of fuel selector). Fuel from the fuel selector flows through the gascolator, main and auxiliary electric fuel pumps (each fuel pump is by-passed and fitted with check valve), fuel flow sensor to the fuel pressure regulator. Unconsumed fuel is returned from the fuel pressure regulator through the fuel selector to the same fuel tank from which is supplied to the engine. In the fuel system are installed also fuel pressure sensor (in the engine compartment) and analogue fuel pressure indicator (at the instrument panel) that are connected to the fuel pressure regulator.

Fuel tank venting is outgoing from the upper part of each wing fuel tank (close to the filling cap), proceeds through central section tank and along the rescue system board, inside of central tunnel and discharge through the lower surface of fuselage in front of main spar (fig. 7.10-1).

Amount of fuel in the left and right fuel tanks indicates Dynon SkyView SV-D1000. Due to design of fuel tanks it indicates the fuel volume in the fuel tank within the range 0 - 45 litres. If there is more fuel in the fuel tank, Dynon indicates "45+". Red light annunciator illuminates when 15 litres of fuel remain in the corresponding fuel tank.

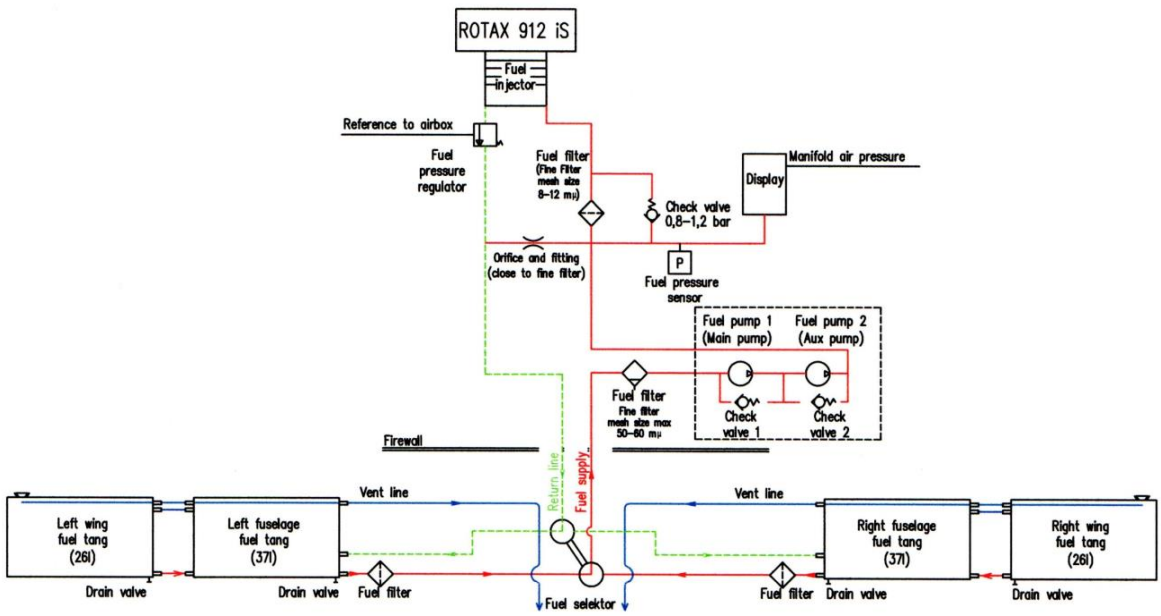

Fig. 7.10-1 Fuel system

Low fuel pressure indications are possible and allowed. But the pressure must stabilize to the operating limit within 5 seconds. If not, the cause should be determined and rectified.

Due to the technical design and installation conditions (construction of the return line, etc.) pressure fluctuations, at the fuel pump are possible. These pressure fluctuations within the specified operating limits are not considered to a problem.

Fuel management:

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 creates space for the return fuel without venting it overboard. To maximize endurance when the red annunciator lights illuminates, the following procedure is recommended: Select the right tank and use this tank until became empty. Change back to the left tank where should be slightly more than 7 litres (due to return fuel) what allows around 20 minutes of flying depending on power settings.

CAUTION

Electric fuel pump running when the left fuel tank is not selected can cause its damage!

NOTE

The tanks in wings are connected with the fuselage tanks with a hose. The hose diameter is not enough to fill the fuselage tank from wing tank when refuelling. Please wait when the fuel from the wing tank comes into the fuselage tank, and then fill up till the wing tanks are full!

7.11. Electrical system

Refer to the Chapter 1.6.9 in the Maintenance Manual for WT9 Dynamic.

Detailed description of the ignition and the AC generator is listed at the Operators Manual for Rotax Engine Type 912 i Series, Ref. No.: OM-912 i.

7.12. Pitot and static pressure system

The Pitot probe for the airspeed indicator is located bellow the right wing. 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.

Refer to the Chapter 1.6.10 in the Maintenance Manual for WT9 Dynamic.

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7.13. Avionics

Installed avionics is described in the Chapter 7.4. For right operation of the instruments and for more details see the corresponding manuals supplied with installed instruments.

Dynon Skyview SV-D1000 displays the information in the following display arrangements:

a) EFIS (fig. 7.13-1)
b) EMS (fig. 7.13-2)
c) MAP (fig. 7.13-3)
d) EFIS / EMS (fig. 7.13-4)
e) EFIS / MAP / EMS (fig. 7.13-5)

Fig. 7.13-1 EFIS display arrangement

Fig. 7.13-2 EMS display arrangement

Fig. 7.13-3 MAP display arrangement

Fig. 7.13-4 EFIS/EMS display arrangement

Fig. 7.13-5 EFIS/MAP/EMS display arrangement

WARNING

Do not forget perform backup battery check regularly.

For more details see Dynon Skyview manual!

7.14. Miscellaneous equipment

Ballistic recovery system Magnum 501 :

Ballistic recovery system is mounted as a miscellaneous equipment of the aircraft. For operation instructions see Manual for Mounting and Use – Ballistic recovery Systems Series Magnum.

8. AIRCRAFT HANDLING, SERVICING AND MAINTENANCE

8.1. Introduction

This chapter contains factory recommended procedures for proper ground handling and servicing of the aircraft. It also identifies certain inspection and maintenance requirements which must be followed if the aircraft 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 aircraft parking or storing, due to contamination by foreign objects (insects, birds).

The external surfaces of the aircraft 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 aircraft.

It is advisable to park the aircraft 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 magnify and may cause spot heating, which can create damage to the cockpit area and the upholstery.

8.2. Aircraft 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 i Series, Ref. No.: MML-912 i.

Daily inspection:	Is carried out in accordance with the instructions for execution of the pre-flight inspection, which are contained in Chapter 4, item 4.4.
Check after 25 hr. of operation:	Must be carried out according to the Maintenance Manual for Rotax Engine Type 912 i Series, Ref. No.: MML-912 i.
Check after 50 hr. of operation:	Must be carried out according to the Maintenance Manual for Rotax Engine Type 912 i Series, Ref. No.: MML-912 i.
100 hr. check or once a year:	Must be performed according to the Maintenance Manual for Rotax Engine Type 912 i Series, Ref. No.: MML-912 i every 100 hours of operation or once a year, whichever comes first. The renewal of the spark plugs, the fuel filter and the coolant are carried out after 200 hours of operation.
TBO (Time Between Overhaul):	2000 hr. or 15 years, whichever comes first.

Oil change

It must be performed according to the Maintenance Manual for Rotax Engine Type 912 i Series, Ref. No.: MML-912 i. There is an oil drain screw at 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, 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 must be maintained according to Operator's Manual for – Electrical Adjustable Aircraft Propeller SR2000DN. In operation does not require any special maintenance. In the 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 which are noted in Operator's Manual for – Electrical Adjustable Aircraft Propeller SR2000DN. Any other dismantling is forbidden. The repairs of large damage must be carried out by the manufacturer or by an authorised service centre.

TBO (Time Between Overhaul): 1200 hours or 5 years whichever comes first.

8.2.3. Airframe

Daily inspection: Is carried out in accordance with the instructions for the execution of the pre-flight inspection, which are contained in Chapter 4.4.

Check after 25 hr. of operation: It must be performed according to the Maintenance Manual for WT-9 Dynamic after the first 25 $\pm$ 2 hr. operation together with the engine check.

Check after 50 hr. of operation: It must be performed according to the Maintenance Manual for WT-9 Dynamic after the first 50 $\pm$ 3 hr. of operation together with the engine check.

100 hr. check: Must be performed every 100 hr. of operation or once a year, whichever comes first. This inspection must be performed by qualified staff.

Lubrication:

The manufacturer recommends using grease and oil without acid for lubrication only. Apply the lubricants sparingly without contaminating of the airframe. For more information refer to the Chapter 3.7.3 in the Maintenance Manual for WT9 Dynamic.

Battery:

The aircraft is equipped with 17 Ah lead-acid battery. The powerplant is equipped with an AC generator, which recharges the battery in the flight.

Battery is dry and hermetically closed. It doesn't release any toxic or explosive gas. The battery needs a visual check of the attachment and security.

Rubber parts:

All rubber parts (hoses, tyres, etc.) have to be changed after 5 years of operation.

8.3. Approved fuel and oil grades

8.3.1. Oil grade

Use only oil with API classification „SG" or higher! Due to the high stresses in the reduction gears, oils with gear additives such as good quality 4 stroke motorcycle oils are highly recommended. Heavy duty semi- or fully synthetic (depending on fuel type used) brand name oils are recommended.

WARNING

Do not use AVGAS 100 LL with fully synthetic engine oils!

8.3.2. Fuel grade

Following types of fuels can be used:

- Min. RON 95 EN 228 Super (Unleaded Automotive Gasoline RON 95)
- EN 228 Super Plus (Unleaded Automotive Gasoline RON 98)
- AVGAS 100 LL (Due to higher lead content in AVGAS, the wear of the valve seats, depositing 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.)

8.4. Aircraft alterations or repairs

It is essential that the responsible airworthiness authority be contacted prior to any alterations on the aircraft to ensure that the airworthiness of the aircraft 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 aircraft repairs, repainting or mounting of additional instruments or equipment it is necessary to check weights and CG positions!

8.5. Ground handling / Road transport

The aircrafts can suffer higher stress loads on the ground than in the air. In this case it can result a potential menace of the safety, as the aircraft construction is designed for the manoeuvring load. The high aircraft normal accelerations are occurred at the hard landing, during the taxiing at the rough surface and during the driving through a hole at road.

Don't use unnecessary transportation in the road.

CAUTION

The aircraft 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 aircraft from the propeller blade root only, never at the wing tips or the control surfaces!

8.6. 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. 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 Plexiglass 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 that 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!

CAUTION

Do not use pressure washers!

8.7. Winter operation

Pre-flight inspection:

In addition during the pre-flight inspection in winter operation must be done:

- Remove the ice from the aircraft surfaces.
- Check control surfaces free movement and cleanness of slots of control surfaces and flaps.
- Check cleanness of the fuel tank venting.

Engine and oil pre-heating:

There is possible to start an engine without need of pre-heating if outside temperature is not below +5 °C. It is recommended to pre-heat the engine and oil if temperature falls below +5 °C. Use suitable air heater or a dryer.

Blow the hot air from the front into the hole around the propeller hub. Temperature of hot air should not exceed 100 °C. Pre-heat until cylinder head temperature and oil temperature exceed +20 °C.

Parking and taxiing:

Check wheel brakes for freezing when parking outside and temperature is below 0 °C. Check wheels free rotation prior to taxiing (hold a propeller and tow the aircraft). Heat the brakes with the hot air to remove ice. Do not remove the ice by braking during taxiing!

WARNING

Never use open fire to pre-heat an engine!

CAUTION

If cylinder heads and oil temperatures fall during parking among flights than is recommended to start and warm up engine from time to time. Do not open choke when starting hot engine!

9. SUPPLEMENTS

9.1. Introduction

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

NOTE

Additional individual equipment in accordance with a customer's request may increase the aircraft empty weight and reduce the allowed useful load!

9.2. List of inserted supplements

None.

9.3. Supplements inserted

None.

10. ANNEXES

Annex Page

ANNEX 1

AEROSPOOL SPOL. S R.O. Form No.*: Received*:	**SAFETY OF FLIGHT AND SERVICE DIFFICULTY REPORT**	Aerospool spol. s r. o. Letisková 10 973 01 Prievidza Slovak republic airworthiness@aerospool.sk www.aerospool.sk

Type of Report:

☐ SAFETY OF FLIGHT ISSUE ☐ SERVICE DIFFICULTY

Reporting Person Name:

Date and Place:

Contact Information (phone, e-mail, address):

Aircraft model, S/N:	Engine model, S/N:
Total Time of Airframe (hours):	Total Time of Engine (hours):

Description:

**Do not fill in any data. This field is for manufacturer purposes.*

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