CZECH AIRCRAFT WORKS Ltd.
LUČNÍ 1824, STARÉ MĚSTO, 686 02, CZECH REPUBLIC

FLIGHT MANUAL FOR AIRPLANE

ZENAIR CH 601 XL ZODIAC

CZECH REPUBLIC

Technical Commission of Light Aircraft Association of the Czech Republic

represented by:

.....

and as the organization authorized by the Ministry of Transportation and Communications of the Czech Republic to prove compliance with the microlight airplane category airworthiness requirements, certifies, that the airplane design, used materials, flight performance and characteristics comply with the Czech UL-2 airworthiness requirements and the airplane is categorized to the following group of microlight airplanes:

ULLa
Aerodynamically Controlled Microlight Airplanes

Signature: .....

Stamp:

Airplane - Type: ZENAIR CH 601 XL ZODIAC

Serial Number:

Registration:

This airplane must be operated in compliance with information and limitations contained in herein.
This Flight Manual must be available aboard the airplane.

0.1 Record of revisions

Any revision of the present manual, except actual weighing data, must be recorded in the following table.

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

Revision No.	Affected Section	Affected Pages	Date of Issue	Approved by	Date of approval	Date inserted	Signature

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0.3 Table of Contents

SECTION 1

1. GENERAL

1.1 Introduction

The airplane Flight Manual has been prepared to provide pilots with information for the safe and efficient operation of ZENAIR CH 601 XL ZODIAC .

It also contains supplemental data supplied by the airplane manufacturer.

1.2 Certification basis

This aircraft type has been approved in compliance with UL-2 regulation, which is mandatory certification basis for Microlight category airplanes approved by *Light Aircraft Association of the Czech Republic (LAA CR)*.

Type Certificate No.: .....

Approved by: Technical Commission of LAA CR
Date of approval: . .....

Certificate of Airworthiness: **„P“**

1.3 *Warnings, cautions and notes*

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

WARNING

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

CAUTION

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

NOTE

Draws 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

ZENAIR CH 601 XL is microlight airplane intended especially for recreational and cross-country flying, with a limitation to non-aerobatics operation.

ZENAIR CH 601 XL is a single-engine, all metal, low-wing monoplane of semimonocoque construction with two side-by-side seats. The airplane is equipped with a fixed tricycle undercarriage with steerable nose wheel.

The powerplant is composed of ROTAX 912 (80 hp or 100 hp), four cylinder, four stroke engine and optional propeller by customer's request.

1.4.2 Technical data

Wing span .....8.23 m

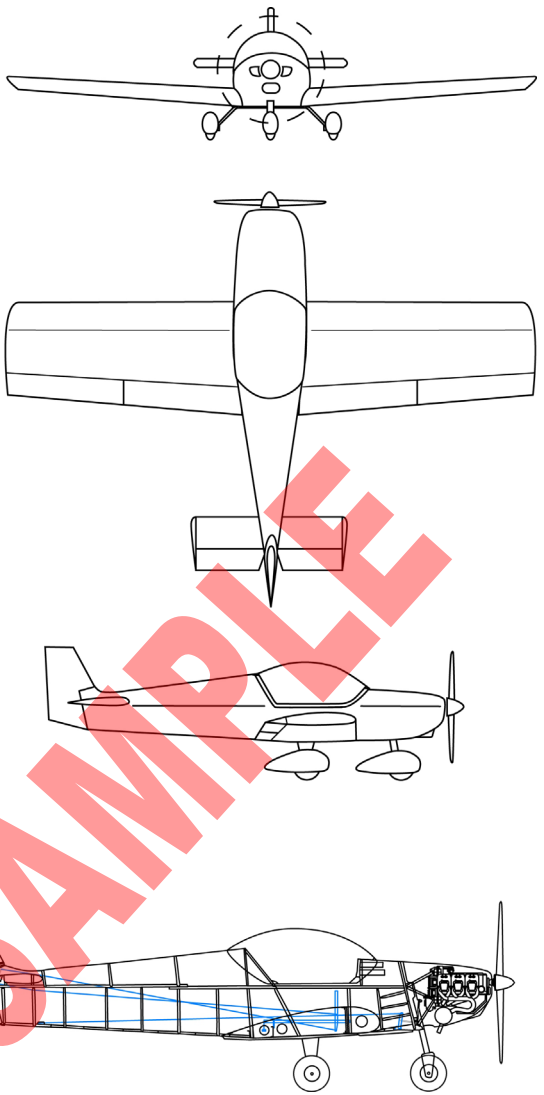
Wing area .....12.3 m^2

Length .....6.1 m

Cockpit width .....1.12 m

Height1.98 .....m

1.5 Three-view drawing



SECTION 2

2. LIMITATIONS

2.1 Introduction

Section 2 includes operating limitations, instrument markings and basic placards necessary for the safe operation of the aircraft, its engine, standard systems and standard equipment. Limitations for optional systems and equipment are shown in Section 9. Supplements.

2.2 Airspeed

Airspeed limitations and their operational significance are shown below:

Speed		IAS [km/h]	KIAS	Remarks
V_{NE}	Never exceed speed	260	140	Do not exceed this speed in any operation.
V_{NO}	Maximum structural cruising speed	210	113	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering speed	160	86	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	120	65	Do not exceed this speed with flaps extended.

2.3 *Airspeed indicator markings*

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

Marking	IAS value or range		Significance
	[km/h]	KIAS	
White arc	55÷120	30-65	Positive Flap Operating Range.
Green arc	70÷210	38-113	Normal Operating Range.
Yellow arc	210÷260	113-140	Maneuvers must be conducted with caution and only in smooth air.
Red line	260	140	Maximum speed for all operations.

2.4 Powerplant

ZENAIR CH 601 ZODIAC, S/N:
is fitted with ROTAX 912 , S/N
and prop, Type / S/N

Engine Model:		**ROTAX 912A** (or UL)		**ROTAX 912S** (or ULS)	
Engine Manufacturer:		Bombardier-Rotax GMBH			
Power	Max Take-off:	59.6 kW / 80 hp at 5800 rpm, max.5 min.		73.5 kW / 100 hp at 5800 rpm, max.5 min.	
	Max. Continuous:	58 kW / 78 hp at 5500 rpm		69 kW / 93.8 hp at 5500 rpm	
	Cruising:	53 kW / 71 hp at 4800 rpm		53 kW / 71 hp at 4800 rpm	
Engine speed	Max. Take-off:	5800 rpm, max. 5 min.			
	Max. Continuous:	5500 rpm			
	Cruising:	4800 rpm			
	Idling:	~1400 rpm			
Cylinder head temperature:	Minimum:	60 °C	*140 °F*	60 °C	*140 °F*
	Maximum:	150 °C	*302 °F*	135 °C	*275 °F*
Oil temperature	Minimum:	50 °C	*122 °F*	50 °C	*122 °F*
	Maximum:	140 °C	*284 °F*	130 °C	*266 °F*
	Optimum:	90 °C - 110 °C *194 - 230°F*		90 °C - 110 °C *194 - 230°F*	
Oil pressure:	Minimum:	7,0 bar			
	Maximum:	1,5 bar			
	Optimum:	1,5-4,0 bar			
Fuel:		see 2.13			
Oil:		Automotive engine oil of registered brand with gear additives, but not aircraft oil (refer to engine Operator's Manual). API classification „SF" or „SG".			
Propeller type and Manufacturer		♦ WOODCOMP KLASSIC 170 R ♦ WOODCOMP VARIA 170 ♦ WARP DRIVE ♦ SR 2000 For technical data refer to documentation supplied by the propeller manufacturer.			

WARNING
The Rotax 912 UL has not been certified as an aircraft engine and its failure may occur at any time. The pilot is fully responsible for consequences of such a failure.

2.5 *Powerplant instrument markings*

Analogue engine instruments markings and their color-code significance are shown below.

Function		Minimum Limit	Normal Operating Range	Caution Range	Maximum Range
Engine speed [RPM]		1400	1400-5500	5500-5800	5800
Cylinder Head Temp. (CHT)	R 912 (80 hp)	60 °C *140 °F*	60-100 °C *140-212 °F*	100-150 °C *212-302 °F*	150 °C *302 °F*
	R 912 (100 hp)			100-135 °C *212-275 °F*	135 °C 275 °F
Exhaust Gases Temp. (EGT)					880 °C *1616 ° F*
Oil Temp.	R 912 (80 hp)	50 °C *122 °F*	90-110 °C *194-230 °F*	50-90 °C *122-194 °F* 110-140 °C *230-284 °F*	140 °C *284 °F*
	R 912 (100 hp)			50-90 °C *122-194 °F* 110-130 °C *230-266 °F*	130 °C *266 °F*
Oil Pressure		1.5 bar *22 psi*	1.5-4.0 bar *22-58 psi*	4.0-5.0 bar *58-73 psi*	7.0 bar *102 psi* cold engine starting

2.6 Miscellaneous instrument markings

2.7 Weight

Empty weight (standard equipment)..... 270 kg *595 lbs.*

NOTE
Actual empty weight is shown in SECTION 6, par. 6.2

Max. take-off weight	450	kg	*992 lbs.*
Max landing weight.....	450	kg	*992 lbs.*
Max. weight of fuel	65	kg	*143 lbs.*
Max.baggage weight	18	kg	*40 lbs.*

2.8 Center of gravity

Operating C.G. range..... 20÷30 % MAC

2.9 Approved maneuvers

Airplane Category: Normal

ZENAIR CH 601 ZODIAC airplane is approved for normal and below listed maneuvers:

- Steep turns not exceeding 60° bank
- Lazy eights
- Chandelles
- Stalls (except whip stalls)

WARNING
Aerobatics and intentional spins are prohibited !

2.10 Maneuvering load factors

Maximum positive limit load factor.....+4 g
Maximum negative limit load factor .....-2 g

2.11 Crew

Number of seats..... 2
Minimum crew weight.....55 kg *121 lb.*
Maximum crew weight.....see 6.2

WARNING
Do not exceed Maximum takeoff weight 450 kg (992 lbs.) !

2.12 Kinds of operation

There are permitted day VFR (Visual Flight Rules) flights only.

WARNING
IFR (Instrument Flight Rules) flights and intentional flights under icing conditions are PROHIBITED!

Instruments and equipment for VFR flights:

1 Airspeed indicator (marked according to 2.3)
1 Altimeter
1 Vertical speed indicator
1 Magnetic compass
1 Bank indicator
2 Safety harnesses

2.13 Fuel

- EUROSUPER RON 95 unleaded according to EN 228 or DIN 51607
- AVGAS 100 LL or 100/130
  Due to higher lead content in AVGAS, the wear of valve seats and deposits in the combustion chamber will increase. Therefore, use AVGAS only if other fuel types are not available.
- BA 95 Natural is recommended for Czech Republic

Wing fuel tank volume.....	2x 45l	2x *11.9*	*USgal*
Unusable fuel quantity.....	2x 0,9	2 x 0,2	U*Sgal*

2.14 Maximum passenger seating

Number of seats.....2

2.15 Other limitations

- No smoking on board the airplane !

2.16 *Limitation placards*

The airplane must be placarded with:

- All fuses
- Ignition switches
- Choke
- Starter
- Trim: Nose heavy and Tail heavy
- Fuel quantity indicator according to the engine manual
- Maximum baggage weight
- Instruments
- Cockpit opening
- Fuel type and its quantity – at filler neck
- Identification plate located on the fuselage port side below the stabilizer (plate must show required information)

Operating data and Limitations

Weights:

- Empty weight
- Maximum takeoff weight
- Useful load
- Max. baggage weight
- Placard showing maximum permitted crew weight for given fuel volume and baggage weight.

Airspeeds:

- Never exceed speed V_{NE}
- Stalling speed Vso
- Max. flap extended speed V_{FE}

CAUTION

The owner (operator) of this airplane is responsible for the readability of placards during the aircraft service life.

SECTION 3

3. EMERGENCY PROCEDURES

3.1 Introduction

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

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 during take-off run

1. Throttle - reduce to idle
2. Ignition - switch off
3. Apply brakes

3.2.2 Engine failure during take-off

1. Speed - gliding at 120 km/h (*65 KIAS*)
2. Altitude - below 50 m (*160 ft*): land in take-off direction over 50 m (*160 ft*): choose a landing area
3. Wind - find direction and velocity
4. Landing area - choose free area without obstacles
5. Flaps - extend as needed
6. Fuel cock - shut off
7. Ignition - switch off
8. Propeller - set to the horizontal position by means of starter
9. Safety harness - tighten
10. Master switch - switch off before landing
11. Land

NOTE

Skip 6-10 if necessary.

3.2.3 Engine failure in flight

1. Push control stick forward
2. Speed - gliding at 120 km/h (*65 KIAS*)
3. Altitude - below 50 m (*160 ft*): land in take-off direction over 50 m (*160 ft*): choose a landing area
4. Wind - find direction and velocity
5. Landing area - choose free area without obstacles
6. Flaps - extend as needed
7. Fuel cock - shut off
8. Ignition - switch off
9. Propeller - set to the horizontal position by means of starter
10. Safety harness - tighten
11. Master switch - switch off before landing
12. Land

3.3 *In-flight Engine Starting*

1. Electric pump - ON
2. Fuel cock - switch to second fuel tank
3. Starter - switch on

3.4 *Smoke and fire*

3.4.1 Fire on ground at engine starting

1. Starter - keep in starting position
2. Fuel cock - close
3. Throttle - full power
4. Ignition - switch off
5. Leave the airplane
6. Extinguish fire by yourself or call for a fire-brigade if you cannot do it.

3.4.2 Fire on ground with engine running

1. Heating - close
2. Fuel cock - close
3. Throttle - full power
4. Ignition - switch off
5. Leave the airplane
6. Extinguish fire by yourself or call for a fire-brigade if you cannot do it.

3.4.3 Fire during take-off

1. Speed - 120 km/h (*65 KIAS*)
2. Heating - close
3. Fuel cock - close
4. Throttle - full power
5. Ignition - switch off
6. Land and stop the airplane
7. Leave the airplane
8. Extinguish fire by yourself or call for a fire-brigade if you cannot do it.

3.4.4 Fire in flight

1. Heating - close
2. Fuel cock - close
3. Throttle - full power
4. Master switch - switch off
5. Ignition - switch off after the fuel in carburetors is consumed and engine shut down
6. Choose of area - heading to the nearest airport or choose emergency landing area
7. Emerg. landing - perform according to par. 3.6.1
8. Leave the airplane
9. Extinguish fire by yourself or call for a fire-brigade if you cannot do it.

NOTE
Estimated time to pump fuel out of carburetors is 30 seconds.

WARNING
Do not attempt to re-start the engine!

3.4.5 Fire in the cockpit

1. Master switch - switch off
2. Heating - close
3. Use an extinguisher fire

3.5 Glide

An example of the use of gliding is in the case of engine failure

1. Speed - recommended gliding speed 120 km/h (*65 KIAS*)

3.6 Landing emergencies

3.6.1 Emergency landing

Emergency landings are generally carried out in the case of engine failure and the engine cannot be re-started.

1. Speed - adjust for optimum gliding
2. Trim - adjust
3. Safety harness - tighten
4. Flaps - extend as needed
5. COMM - if installed then report your location if possible
6. Fuel cock - close
7. Ignition - switch off
8. Master switch - switch off
9. Perform approach without steep turns and land on chosen landing area.

3.6.2 Precautionary landing

A precautionary landing is generally carried out in the cases where the pilot may be disorientated, the aircraft has no fuel reserve or possibly in bad weather conditions.

1. Choose landing area, determine wind direction
2. Report your intention to land and land area location if a COMM is installed in the airplane
3. Perform low-altitude passage into wind over the right-hand side of the chosen area with flaps extended as needed and thoroughly inspect the landing area
4. Perform circle pattern
5. Perform approach at increased idling with flaps fully extended
6. Reduce power to idle when flying over the runway threshold and touch-down at the very beginning of the chosen area
7. After stopping the airplane switch off all switches, shut off the fuel cock, lock the airplane and seek for a help

NOTE

Watch the chosen area permanently during precautionary landing.

3.6.3 Landing with a flat tire

1. During landing keep the damaged wheel above ground as long as possible using the ailerons control
2. Maintain the direction at landing run, applying foot control

3.6.4 Landing with a defective landing gear

1. If the main landing gear is damaged, perform touch-down at the lowest practicable speed and if possible, maintain direction during landing run
2. If the nose wheel is damaged perform touch-down at the lowest practicable speed and hold the nose wheel above the ground by means of the elevator control as long as possible

3.7 Recovery from unintentional spin

WARNING
Intentional spins are prohibited!

There is no uncontrollable tendency of the airplane to enter into a spin provided the normal piloting techniques are used.

Unintentional spin recovery technique:

1. Throttle - idle
2. Lateral control - ailerons neutralized
3. Rudder pedals - full opposite rudder
4. Longitudinal control - push forward and hold until the rotation stops
5. Rudder pedals - neutralize rudder immediately when rotation stops
6. Dive recovery

3.8 Other emergencies

3.8.1 Vibration

If any forced aircraft vibrations appear, it is necessary:

1. To set engine speed to such power rating where the vibrations are lowest.
2. To land on the nearest airfield or to perform a precautionary landing according to 3.6.2.

3.8.2 Carburetor icing

Carburetor icing mostly occurs when entering into an area of ice formation. The carburetor icing shows itself through a decrease in engine power and an increase of engine temperatures.

To recover the engine power, the following procedure is recommended:

1. Speed - 120 km/h (*65 KIAS*)
2. Throttle - set to 1/3 of power
3. If possible, leave the icing area
4. Increase the engine power gradually up to cruise conditions after 1-2 minutes

If you fail to recover the engine power, land on the nearest airfield (if possible) or depending on the circumstances, perform a precautionary landing according to 3.6.2.

SECTION 4

4. NORMAL PROCEDURES

4.1 Introduction

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

4.2 Assembly and disassembly

Refer to the Technical Description, Operating, Maintenance and Repair Manual.

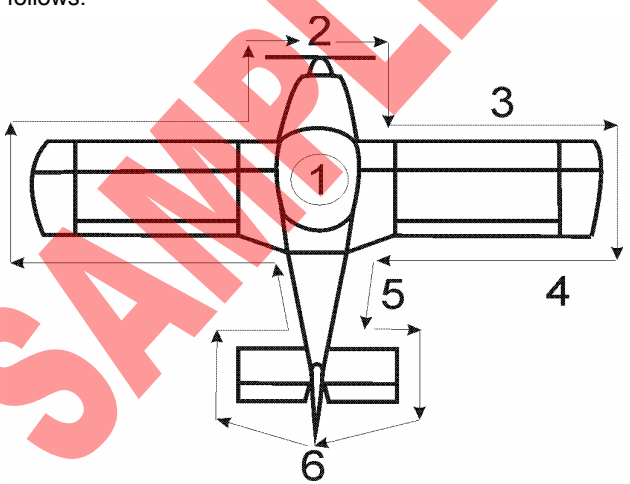
4.3 Pre-flight inspection

Carry out the pre-flight inspection every day prior to the first flight or after airplane assembly. Incomplete or careless inspection can cause an accident. Carry out the inspection following the instructions in the Inspection Check List.

NOTE

The word "condition" in the instructions means a visual inspection of surface for damage deformations, scratching, chafing, corrosion or other damages which may lead to flight safety degradation.

The manufacturer recommends to carry out the pre-flight inspection as follows:



Inspection Check List

①	– Ignition	- OFF
	– Master switch	- OFF
	– Avionics	- check condition
	– Fuel gauge ind.	- check fuel quantity
	– Control system	- visual inspection, function, clearance, free movement up to stops - check wing flaps operation
	– Canopy	- condition of attachment, cleanness
	– Check cockpit for loose objects	
②	– Engine cowling condition	
	– Propeller and spinner condition	
	– Engine mount and exhaust manifold condition	
	– Oil and coolant quantity check	
	– Visual inspection of the fuel and electrical system	
	– Fuel system draining	
	– Other actions according to the engine manual	
③	– Wing surface condition	
	– Leading edge condition	
	– Pitot head condition	
④	– Wing tip	- surface condition, attachment
	– Aileron	- surface condition, attachment, clearance, free movement
	– Wing flap	- surface condition, attachment, clearance
⑤	– Landing gear	- wheel attachment, brakes, condition and pressure of tires
	– Wing lower surface and fuselage bottom condition	
⑥	– Vertical tail unit	- condition of surface, attachment, free movement, rudder stops
	– Horizontal tail unit	- condition of surface, attachment, free movement, elevator stops

WARNING

Physically check the fuel level before each takeoff to make sure you have sufficient fuel for the planned flight.

CAUTION

In case of long-term parking it is recommended to turn the engine several times (Ignition OFF!) by turning the propeller. Always handle by palm the blade area i.e. do not grasp only the blade edge.

4.4 Normal procedures

4.4.1 Before engine starting

1. Control system - free movement
2. Canopy - clean
3. Brakes - fully applied
4. Safety harness - tighten

4.4.2 Engine starting

1. Start the engine according to its manual procedure
2. Master switch - switch on
3. Fuel cock - open
4. Choke (cold engine) - pull to open and gradually release after engine start
5. El. pump - switch on
6. Starter - hold activated to start the engine

CAUTION

The starter should be activated for a maximum of 10 sec., followed by 2 min. pause for engine cooling.

After starting the engine, adjust the throttle for smooth run. Check the oil pressure, which should increase within 10 sec. Increase the engine speed after the oil pressure has reached 2 bars (*29 psi*) and is steady.

To avoid shock loading, start the engine with the throttle lever set for idling or 10% open at maximum, then wait 3 sec to reach constant engine speed before new acceleration. Only one magneto should be switched on (off) during ignition magneto check.

4.4.3 Engine warm up, Engine check

Prior to engine check block the main wheels using chocks. Initially warm up the engine to 2000 rpm then continue to 2500-2750 rpm till oil temperature reaches 50°C (*122 °F*). The warm up period depends on ambient air temperature.

Check both ignition circuits at 3850 rpm (4000 rpm for Rotax 912S). The engine speed drop during the time either magneto switched off should not overcome 300 rpm. The Max. engine speed drop difference between circuits A and B should be 115 rpm.

Set max. power for verification of max. speed with given propeller and engine parameters (temperatures and pressures).

Check acceleration from idling to max. power. If necessary, cool the engine at 3000 rpm before shutdown.

Check the function of the pitch setting mechanism if in-flight variable prop is installed.

CAUTION

The engine check should be performed with the aircraft heading upwind and not on a loose terrain (the propeller may suck impurities which can damage the leading edges of blades).

4.4.4 Taxiing

Apply power and brakes as needed. Use nose wheel steering to change direction of taxiing. Do not apply brakes to control movement on ground. Taxi carefully when wind velocity exceeds 10 m/s (20 knots). Hold the control stick in neutral position or pull it.

4.4.5 Before take-off

1.	Altimeter	- set
2.	Trim	- set neutral position
3.	Control system	- check free movement
4.	Cockpit canopy	- closed
5.	Safety harness	- tighten
6.	Fuel	- open
7.	Ignition	- switched on
8.	Wing flaps	- 1/2

4.4.6 Take-off

1.	Brakes	- apply to stop wheel rotation
2.	Take-off power	- throttle fully forward
3.	Engine speed	- check rpm
4.	Instruments within limits	- check
5.	Nose wheel unstick	- 55 km/h (30 KIAS)
6.	Airplane lift-off	- 70 km/h (38 KIAS)
7.	Wing flaps	- retract when speed of 120 km/h (65 KIAS) is reached, at altitude of 50 m (150 ft)
8.	Make transition to climb	

WARNING

The Take-off is prohibited if:

- The engine is running unsteadily
- The engine instruments values are beyond operational limits
- The crosswind velocity exceeds permitted limits (see 5.3.3)

4.4.7 Climb

1. Best rate-of-climb speed - 130 km/h (70 KIAS)
2. Throttle - Max. take-off power (max. 5800 rpm for 5 minutes)
   - Max. cont.power 5500 rpm
3. Trim - trim the airplane
4. Instruments - oil temperature and pressure, cylinder temperature within limits

CAUTION

If the cylinder head temperature or oil temperature exceed their limits, reduce the climb angle to decrease airspeed and thus fulfil the limits.

4.4.8 Cruise

Refer to Section 5, for recommended cruising regimes.

4.4.9 Descent

1. Optimum glide speed - 120 km/h (65 KIAS)

CAUTION

It is not advisable to reduce the engine throttle control lever to minimum on final approach and when descending from very high altitude. In such cases the engine becomes undercooled and a loss of power may occur. Descent at increased idle at 3000 rpm, speed between 120-140 km/h IAS (65-76 KIAS) and check that the engine instruments indicate values within permitted limits.

4.4.10 Before landing

1. Approach speed - 120 km/h (65 KIAS)
2. Throttle - as needed
3. Wing flaps - extend as needed
4. Trim - tail heavy
5. Fuel - check quantity

4.4.11 Balked landing

1. Throttle - full power (max.5800 rpm)
2. Wing flaps - 1/2
3. Trim - adjust as needed
4. Wing flaps - retract at 50 m height (150 ft) after reaching 120 km/h (65 KIAS)
5. Trim - adjust
6. Repeat circle pattern

4.4.12 Landing

1. Touch-down on main wheels
2. Apply brakes as needed after the nose wheel touch-down

4.4.13 After landing

1. Engine speed - set as required for taxiing
2. Wing flaps - retract

4.4.14 Engine shutdown

1. Engine speed - idle
2. Instruments - engine instruments within limits
3. COMM+ ICom - switch off
4. Ignition - switch off
5. Circuit breakers - switch off
6. Master switch - switch off
7. Switch box - turn key to switch off
8. Fuel cock - close

CAUTION

Rapid engine cooling should be avoided during operation. This happens above all during aircraft descent, taxiing, low engine rpm or at engine shutdown immediately after landing.
Under normal conditions the engine temperatures stabilize during descent, taxiing and at values suitable to stop engine by switching the ignition off. If necessary, cool the engine at 2500 – 2750 rpm to stabilize the temperatures prior to engine shut down.

NOTE

Engine hours count from the moment of engine starting.

4.4.15 Anchoring

1. Ignition check - OFF
2. Master switch check - OFF
3. Anchor the airplane

NOTE

Use anchor eyes on the wings and fuselage rear section to fix the airplane. Move control stick forward and fix it together with the rudder pedals. Make sure that the cockpit canopy is properly closed and locked. The anchoring before leaving the airplane is important since the airplane is not equipped with a parking brake.

4.4.16 Flight in rain

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

SECTION 5

5. PERFORMANCE

5.1 Introduction

Section 5 provides data for airspeed calibration, stall speeds, take-off performance and additional information.

The presented data has been computed from actual flight tests with the aircraft and engine in good conditions and using average piloting techniques.

If not stated otherwise, the performance stated in this section is valid for maximum take-off weight and under International Standard Atmosphere (ISA) conditions..

The performance shown in this section is valid for aircraft fitted with given engine and propeller.

5.2 Performance

5.2.1 Airspeed indicator system calibration

IAS [km/h]	CAS [km/h]
50	62
60	70
70	77
80	85
90	93
100	101
110	108
120	116
130	124
140	132
150	139
160	147
170	155
180	163
190	170
200	178
210	186
220	193
230	201
240	209
250	217
260	224
270	232
280	240
290	248
300	255

KIAS	KCAS
30	36
35	40
40	44
45	47
50	51
55	55
60	59
65	63
70	67
75	71
80	74
85	78
90	82
95	86
100	90
105	94
110	98
115	102
120	105
125	109
130	113
135	117
140	121
145	125
150	129
155	132
160	136
162	138

5.2.2 Stall speeds

Conditions: Max.take-off weight Engine idle run	Wing flaps pos.	IAS		CAS		Altitude loss at recovery	
		[km/h]	KIAS	[km/h]	KCAS	[m]	[ft]
Wing level stall	0	60	32	70	70	20	65
	1/2	52	28	64	35	15	49
	1	50	26	62	33	10	33
Co-ordinated turn 30 degree bank	0	65	35	73	39	25	82
	1/2	58	31	68	37	20	66
	1	55	29	66	36	15	49

5.2.3 Take-off performance

Take-off distances shown in the table below are valid at sea level and ambient temperature of 15 °C (*59 °F*).

RWY	Take-off run distance		Take-off distance over 15 m (*50 ft*) obstacle	
	[m]	*[ft]*	[m]	*[ft]*
CONCRETE	100	328	250	820
GRASS	110	361	280	918

5.2.4 Landing distances

Landing distances shown in the table below are valid at sea level and ambient temperature of 15 °C (*59 °F*)..

RWY	Landing distance over 15 m (*50 ft*) obstacle		Landing run distance (braked)	
	[m]	*[ft]*	[m]	*[ft]*
CONCRETE	180	591	45	148
GRASS	170	558	38	124

5.2.5 Climb performance

Conditions: Max.Cont.Power –5500 rpm Weight- 450 kg (992 lb).	**Best rate-of-climb speed IAS**		**Rate of climb Vz**	
	[km/h]	*KIAS*	[m/s]	*[fpm]*
0 ft ISA	130	*70*	6.1	*1200*
3000 ft ISA	130	*70*	4.3	*850*
6000 ft ISA	120	*65*	2.8	*550*
9000 ft ISA	110	*59*	1.6	*315*

5.3 Additional information

5.3.1 Cruise

Conditions:
Valid for ROTAX 912 ULS and prop WOOCOMP

Altitude [ft ISA]	Engine speed [rpm]	IAS		CAS	
		[km/h]	KIAS	[km/h]	KCAS
O	4500	150		139	
	4800	170		155	
	5000	180		163	
	5300	190		170	
	5500	200		178	
	5800	215		190	
3000	4500	120		116	
	4800	160		147	
	5000	170		155	
	5300	180		163	
	5500	190		170	
	5800	195		174	
6000	4500	110		108	
	4800	140		132	
	5000	150		139	
	5300	160		147	
	5500	170		155	
	5800	175		155	
9000	4500	90		93	
	4800	110		108	
	5000	120		116	
	5300	145		136	
	5500	155		143	
	5800	167		154	

5.3.2 Endurance and Range

The table below shows fuel consumption, endurance and range at given engine speed.

Altitude	[ft ISA]	3000 ft				
Fuel quantity	[l]	88		USgal	23,2	
Engine speed	[rpm]	4500	4800	5000	5300	5500
Fuel consumption	[l/h]	12	14	15	18	20
IAS	[km/h]	120	160	170	180	190
	KIAS	65	86	92	97	103
CAS	[km/h]	116	147	155	163	170
	KCAS	63	79	84	88	92
Endurance	[hh:mm]	07:18	06:14	05:51	04:48	04:24
Range	[km]	850	924	909	796	748
	[NM]	458	499	491	430	403

5.3.3 Effect of rain on flight performance and characteristics

Neither flight performance nor characteristics are substantially affected by rain or accumulation of insects on the airplane surface..

5.3.4 Demonstrated crosswind performance

Max. permitted cross wind velocity
for take-off and landing ..... 5 m/s *10 kts*

Max. permitted head wind velocity
for take-off and landing ..... 12 m/s *23 kts*

5.3.5 Optimum glide speed

Optimum glide speed ..... 120 km/h IAS *65 KIAS*

5.3.6 Ceiling

Service ceiling ..... 3000 m *10.000 ft*

SECTION 6

6. WEIGHT AND BALANCE

6.1 Introduction

6.2 Weight and balance record / Permitted payload range

6.1 *Introduction*

This sections contains the payload range within which the ZENAIR CH 601 ZODIAC microlight may be safely operated..

Procedures for weighing the aircraft and the calculation method for establishing the permitted payload range are contained in the Technical Description, Operating, Maintenance and Repair Manual for Microlight Airplane ZENAIR CH 601 ZODIAC.

6.2 Weight and balance record / Permitted payload range

Permitted crew weight [kg] or [lbs.]										
Crew weight = Max.Take-off weight - Empty weight - Baggage weight - Weight of fuel										
Date	Empty weight [kg] or [lbs.]	C.G. position [% MAC]	**FUELLING**						**Approved**	
				Fuel gauge	1	3/4	1/2	1/4	Date	Signature
				Fuel volume	50 liter 13.2 USgal	35 liter 9.2 USgal	25 liter 6.6 USgal	13 liter 3.4 USgal		
				Fuel weight	36 kg 79 lbs.	25 kg 55 lbs.	18 kg 40 lbs.	9 kg 20 lbs.		
			BAGGAGE	max. 18 kg 40 lbs.						
				1/2 9 kg 20 lbs.						
				No baggage						
				max. 18 kg 40 lbs.						
				1/2 9 kg 20 lbs.						
				No baggage						
				max. 18 kg 40 lbs.						
				1/2 9 kg 20 lbs.						
				No baggage						
				max. 18 kg 40 lbs.						
				1/2 9 kg 20 lbs.						
				No baggage						

SECTION 7

7. AEROPLANE AND SYSTEMS DESCRIPTION

7.1 Introduction

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

7.2 Airframe

All-metal construction, stressed skin, single curvature metal skins riveted to stiffeners. Construction is of 6061-T6 aluminum sheet metal riveted to aluminum angles with Avex rivets. This high strength aluminum alloy construction provides long life and low maintenance costs thanks to is durability and corrosion resistance characteristics.

The wing has a high lift airfoil with Hoerner wing tips to maximize the aircraft's effective wingspan. The wings are fitted with near full-length ailerons.

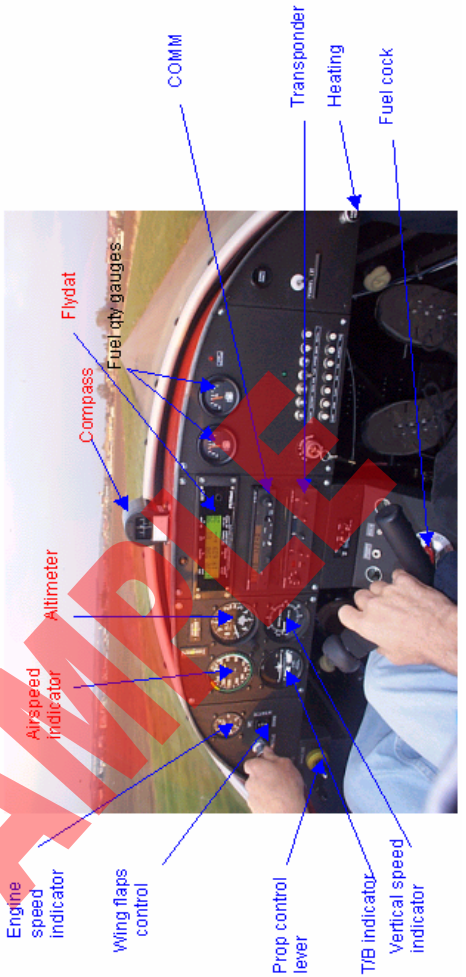
Split wing flaps controlled by the electric strut operated by the pilot.

7.3 Control system

The plane is equipped with a dual flight control stick between the pilot and passenger which branches in the form of a convenient "Y" handle. The classic rudder pedals, connected to steerable nose wheel for ease of ground handling.

The elevator trim control as well as wing flaps are electrically operated from the rocker switches located on the left side of instrument panel or on the control stick.

7.4 Controls in the cockpit / Instrument panel



7.5 Landing gear

Tricycle landing gear with steerable nose wheel. Main landing gear uses two fiberglass spring elements.

7.6 Seats and safety harness

Side-by-side seating. Seat cushions are removable to make more easy cleaning and drying. Three-point safety belts provided to each seat.. Optional is an additional seat upholstery to raise the small pilot or move him forward.

NOTE

Prior to each flight, ensure that the seat belts are firmly secured to the airframe, and that the belts are not damaged. Adjust the buckle so that it is centered on the body.

7.7 Baggage compartment

The Baggage Compartment is the inner space provided behind the seat. It may accommodate up to 18 kg (40 lbs.). The baggage may be loaded also into the baggage compartment inside each wing

Make sure that baggage does not exceed maximum allowable weight, and that the aircraft CG is within limits with loaded baggage. All baggage must be properly secured.

7.8 Cockpit

Access to the cabin is from both sides. Make sure that the canopy latching mechanism is securely locked into position on both sides before operating the aircraft.

7.9 *Powerplant*

ROTAX 912 engine (80 or 100 hp) is standardly installed in ZENAIR CH 601 ZODIAC. Rotax 912 is 4-stroke, 4 cylinder horizontally opposed, spark ignition engine with one central camshaft-push-rod-OHV.

Liquid cooled cylinder heads, ram air cooled cylinders.

Dry sump forced lubrication.

Dual breakerless capacitor discharge ignition.

The engine is fitted with an electric starter, AC generator and mechanical fuel pump. Prop drive via reduction gear with integrated shock absorber.

The props which comply with the Czech UL-2 requirements may be installed.

Recommended props:

- WOODCOMP KLASSIC 170 R
- WOODCOMP VARIA 170
- WARP DRIVE
- SR 2000

7.9.1 Throttle

Dual throttles of the push/pull type with adjustable friction clamp. Springs are added to the throttle push rods to ensure that the engine will go to full power if the linkages fail.

7.9.2 Choke

The choke is located near the pilot's throttle (push/pull) control.

7.9.3 Carburetor pre-heating

Optional equipment.

7.9.4 Heating

Heating consists of a heat exchanger on the exhaust manifold and control mechanism located on the right hand side of instrument panel.

CAUTION

Incidents involving exhaust gases entering the heating or ventilation system may result in fatal accidents due to carbon monoxide poisoning of the aircraft occupants. A carbon monoxide detector is recommended.

7.10 Fuel system

Wing tanks volume 2 X 45 liters

Each tank equipped with a vent outlet and screen filter.

Drain valve located in the lowest point of the tank and on the bottom edge of the firewall.

Main fuel cock on the central console in the cockpit.

Electric fuel pump.

CAUTION

Do not fill the tanks over to avoid fuel overflow through venting hoses.

7.11 Electrical system

7.11.1 Battery

The battery is mounted on the foreside of the firewall.

7.11.2 Master switch

connects the electrical system to the 12 Volt battery and charger/coils, controlled by the regulator and a 15 amp reset breaker for safety. See Engine Manual for electrical system details.

NOTE

Ignition system is independent on the power source and will operate even with Master switch and/or breaker off.

7.11.3 Ignition

Ignition must be ON to operate the engine: For safety, remove key when engine is not running..

7.11.4 Starter button

Starter button is located near the throttle lever.

NOTE

All switches and or engine controls are "up" or "push forward" for operation, except the choke which is "Pull" for "on". Optional equipment, switches and/or fuses are subject to change or installed as requested. See Aircraft Equipment List.

7.12 Pitot and static pressure system

Pitot-static head is located below the left wing. Pressure distribution to the instruments is through flexible plastic hoses.

Keep the pitot head clean to ensure proper function of the system.

7.13 *Miscellaneous equipment*

There is installed the following equipment in ZENAIR CH 601 ZODIAC

7.14 Avionics

- *Flight and NAV instruments:*
  1 Airspeed indicator
  1 Altimeter
  1 Magnetic compass
  1 Vertical speed indicator
  1 Inclinometer

NOTE

For operating instructions refer to the documentation supplied with the instruments.

- *Engine instruments*
  Tachometer
  Cylinder Head Temperature indicator
  Oil temperature indicator
  Oil pressure gauge
  Engine hours
  Fuel gauge(s)

SECTION 8

8. Airplane handling, servicing and maintenance

8.1 Introduction

This section contains factory-recommended procedures for proper ground handling and servicing of the airplane. It also identifies certain inspection and maintenance requirements which must be followed if the airplane is to retain that new-plane performance and dependability.

8.2 Aircraft inspection periods

Periods of overall checks and contingent maintenance depends on the condition of the operation and on overall condition of the airplane.

Inspections and revisions should be carried out in the following periods, at least:

a) after the first 25 flight hours
b) after every 50 flight hours
c) after every 100 flight hours or at least annual inspection

Refer to the Engine Operator's Manual for engine maintenance.

Maintain the prop according to its manual.

Refer to the Technical Description, Operating, Maintenance and Repair Manual for ZENAIR CH 601 ZODIAC microlight to see more details on maintenance.

8.3 Aircraft alterations or repairs

It is recommended to contact the airplane manufacturer prior to any alternations to the aircraft to ensure that the airworthiness of the aircraft is not violated. Always use only the original spare parts produced by the airplane (engine, prop) manufacturer.

If the aircraft weight is affected by that alternation, a new weighing is necessary, then record the new empty weight into the Weight and Balance record / Permitted payload range in 6.2 and up-date the placard showing weights in the cockpit.

Refer to the Technical Description, Operating, Maintenance and Repair Manual for ZENAIR CH 601 ZODIAC microlight to see more details on repairs.

8.4 Ground handling

8.4.1 Towing

To handle the airplane on ground the engine mount may be raised or fuselage rear pushed down in the place of a bulkhead.

CAUTION

Avoid excessive pressure at the airplane airframe - especially at control surfaces.

Keep all safety precautions, especially in the propeller area.

8.4.2 Parking

It is advisable to park the airplane inside a hangar or alternatively inside any other proof space (garage) with stable temperature, good ventilation, low humidity and dust-free environment.

It is necessary to moor the airplane when it is parked outside a hangar. Also when parking for a long time, cover the cockpit canopy, possibly the whole airplane by means of a suitable tarpaulin.

8.4.3 Mooring

The airplane should be moored when parked outside a hangar after the flight day. The mooring is necessary to protect the airplane against possible damage caused by wind and gusts.

For this reason the aircraft is equipped with mooring eyes located on the lower surfaces of the wings.

Mooring procedure:

1. Check: Fuel cock shut off, Circuit breakers and Master switch switched off, Switch box switched off.
2. Fix the hand control using e.g. safety harness
3. Close venting windows
4. Close and lock canopy
5. Moor the aircraft to the ground by means of a mooring rope passed through the mooring eyes located on the lower surfaces of the wings. It is also necessary to moor the nose wheel landing gear.

NOTE

In the case of long term parking, especially during winter, it is advisable to cover the cockpit canopy or possibly the whole aircraft by means of a suitable tarpaulin attached to the airframe.

8.4.4 Jacking

Since the empty weight of this aircraft is relatively low, two people can lift the aircraft easily.

First of all prepare two suitable supports to support the aircraft.

It is possible to lift the aircraft by handling the following parts:

- By pushing the fuselage rear section down in the place of a bulkhead the fuselage front section may be raised and then supported under the firewall.
- By holding the fuselage rear section under a bulkhead the fuselage rear may be raised and then supported under that bulkhead.
- To lift up a wing, push from underneath that wing only at the main spar area. Do not lift up a wing by handling the wing tip.

8.4.5 Leveling

Refer to the Technical Description, Operating, Maintenance and Repair Manual for ZENAIR CH 601 ZODIAC microlight to find more details about leveling.

8.4.6 Road transport

The aircraft may be transported after loading on a suitable car trailer. It is necessary to dismantle the wings before road transport. The aircraft and dismantled wings should be attached securely to protect these parts against possible damage.

8.5 Cleaning and care

Use efficient cleaning detergents to clean the aircraft surface. Oil spots on the aircraft surface (except the canopy!) may be cleaned with petrol.

The canopy may only be cleaned by washing it with a sufficient quantity of lukewarm water and an adequate quantity of a detergents. Use either a soft, clean cloth sponge or deerskin. Then use suitable polishers to clean the canopy.

CAUTION

Never clean the canopy under “dry“ conditions and never use petrol or chemical solvents!

Upholstery and covers may be removed from the cockpit, brushed and eventually washed in lukewarm water with an adequate quantity of detergents. Dry the upholstery thoroughly before insertion into the cockpit.

CAUTION

In the case of long term parking, cover the canopy to protect the cockpit interior from direct sunshine.

SECTION 9

9. SUPPLEMENTS

9.1 Introduction

9.2 List of inserted supplements

9.3 Supplements inserted

9.1 Introduction

This section 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 airplane.

9.2 List of inserted supplements

Date	Doc.No.	Title of inserted supplement

9.3 Supplements inserted