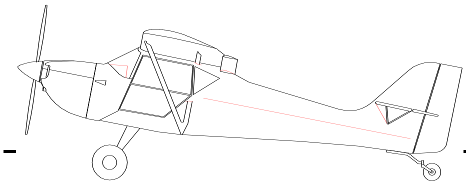


Pilot Operating Handbook

and

Flight Training Supplement

AEROPRO CZ
A220 - taildragger

Light Sport Aircraft

Aircraft Type: **A220 (taildragger)**

Serial Number: __________

Registration: N __________

Date of Issue: March 21, 2020

version 1.0

IMPORTANT NOTE:

This Aeropro CZ A220 POH provides some information about inspection, operation and procedures with the Rotax 912ULS engine installation.

However, the **ROTAX 912 OPERATORS MANUAL** included with the aircraft provides the most complete and definitive information. It is the aircraft owner and pilot's requirement that they completely familiarize themselves with all information provided in the **ROTAX 912 OPERATOR'S MANUAL** for proper and safe operation and maintenance and inspections.

The latest versions of the **ROTAX 912 OPERATORS MANUAL** and all Rotax 912 engine documentation is always available on the Rotax web site at...

https://www.rotax-owner.com/en/

This aircraft was manufactured in accordance with Light Sport Aircraft airworthiness standards and does not conform to standard category airworthiness requirements.

RECORD OF REVISIONS

Any revisions or amendments to the present manual shall be issued in the form of bulletins with attached new pages. It is in the interests of every user to enter such revision into the table of revisions and to replace the existing page by the new one. The revised or corrected text shall be indicated by a vertical line on left page margin and the page shall bear revision number and date of its issue.

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

TABLE OF CONTENTS:

0. General information

0.1 Introduction

This handbook is provided with your aircraft to allow you to attain as much knowledge about the aircraft and its operation as possible. This manual is following ASTM F2746-14 Standard Specification for Pilot's Operating Handbook (POH) for Light Sport Airplane. Read this manual thoroughly before your first flight and make sure you understand all the information contained within. This aircraft is equipped with a non-certified engine that meets the ASTM F2339-17 engine standard. Flying this aircraft must always be done with the possibility of a safe landing due to loss of engine power.

Pay attention to the fact that you as the pilot are fully responsible for the safety of your passengers and persons or property on the ground.

0.2 Certification basis

This aircraft was manufactured in accordance with Light Sport Aircraft airworthiness standards and does not conform to standard category airworthiness requirements.

0.3 Manufacturer

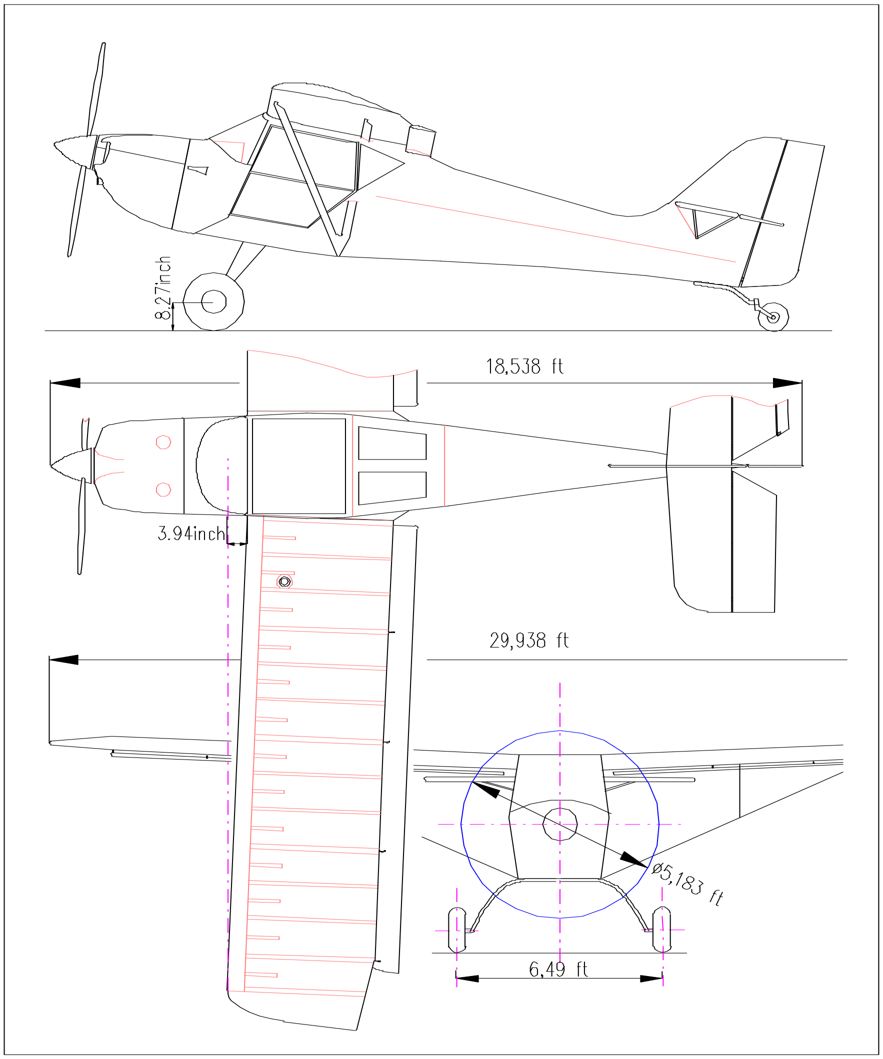
Aeropro CZ
Mladá 835
687 25 Hluk
Czech Republic

0.4 Warnings, cautions and notes:

In this handbook the following is used to highlight especially important information:

WARNING	**Information which could prevent personnel injury or loss of life**
CAUTION	**Information which could prevent damage to equipment**
NOTE	***Information of special importance to pilots***

1. Airplane and systems description



The Aeropro A220 is an S-LSA aircraft designed as a high-wing monoplane. A two-spar wing is equipped with external airfoil flaperons. Fuselage is an open truss structure welded of chromoly steel tubes. Tail unit is formed of a lattice-work tube frame. The A220 is equipped with taildragger landing gear and incorporates a steerable tail wheel.

Wing area including flaperons... 122.53 sq. ft
Chord length (including flaperon)…………………………….. 4.265 ft
Wing loading ………………………………………………… . 10.1 lbs/sq. ft
Power loading.. 12.35 lbs/HP
Aspect-ratio... 6.74:1
Propeller clearance (in-flight position).................................. 11.5 inches

1.1 Engine

The A220 is powered by the Rotax 912ULS 100-hp engine. It is a four-cylinder, four-stroke, horizontally-opposed, center-camshaft engine with overhead valves. Engine cooling is of a combined type; cylinder heads are water-cooled while cylinders are air-cooled. The engine has dry-sump lubrication. The ignition system is a dual, electronic and capacitor flywheel magneto type. The engine is equipped with an electric starter, AC generator and a mechanical fuel delivery pump. The propeller is driven by an integrated reduction gearbox with mechanical damping.

Engine manufacturer.. Rotax GmbH., Austria

Engine model.. Rotax 912ULS

Max. power - take-off.................. 100 hp
- continuous............ 94 hp

Max. engine speed (MSL) - take-off................ 5800 RPM (max. 5 min)
- continuous........... 5500 RPM

Max. coolant temperature.. 248° F (EIS warning at 228° F)

Min. oil temperature……………………………………………..… 122° F for full-throttle operation

Normal operating temperature…………………………….… 190 – 230° F

Max. oil temperature... 266° F (EIS warning at 242° F)

Minimum oil pressure………….................…...........……… 12 psi min oil pressure below 3,500 rpm

maximum oil pressure (cold start only)……………………..……. 102 psi (EIS warning at 92 psi)

normal oil pressure range.. 29 – 73 psi (EIS warning below 29 psi)

Oil consumption…………………………………………….…..… max 0.06 quarts/hour

Fuel pressure - minimum.. .18 bar (2.2 psi)
- maximum... .4 bar (5.8 psi)

Propeller gearbox reduction ratio... 2.43 : 1

2. For many more details see **Operator's Manual f**or all versions of **Rotax 912** supplied with the engine.

WARNING	**This aircraft is equipped with a non-certified engine that meets the ASTM F-2339-17 engine standard.** **Flying this aircraft must always be done with the possibility of a safe landing due to loss of engine power. The pilot is fully responsible for consequences of such failure.**

2.1 Propeller

The propeller is manufactured by DUC Helices in France. The propeller is a 3-blade, ground-adjustable prop. Propeller is 68" diameter.

For additional propeller information see **Operators Manual and Technical description** supplied with the propeller.

2.2 Fuel and fuel capacity

Fuel tank capacity - wing tanks (two)................................ 10.6 U.S. gallons each
- central connecting tank (header tank)........................... 1.3 U.S. gallons

Max. fuel quantity…………………………………………… 22.5 U.S. gallons

Usable fuel quantity………………………………………… 22.0 U.S. gallons

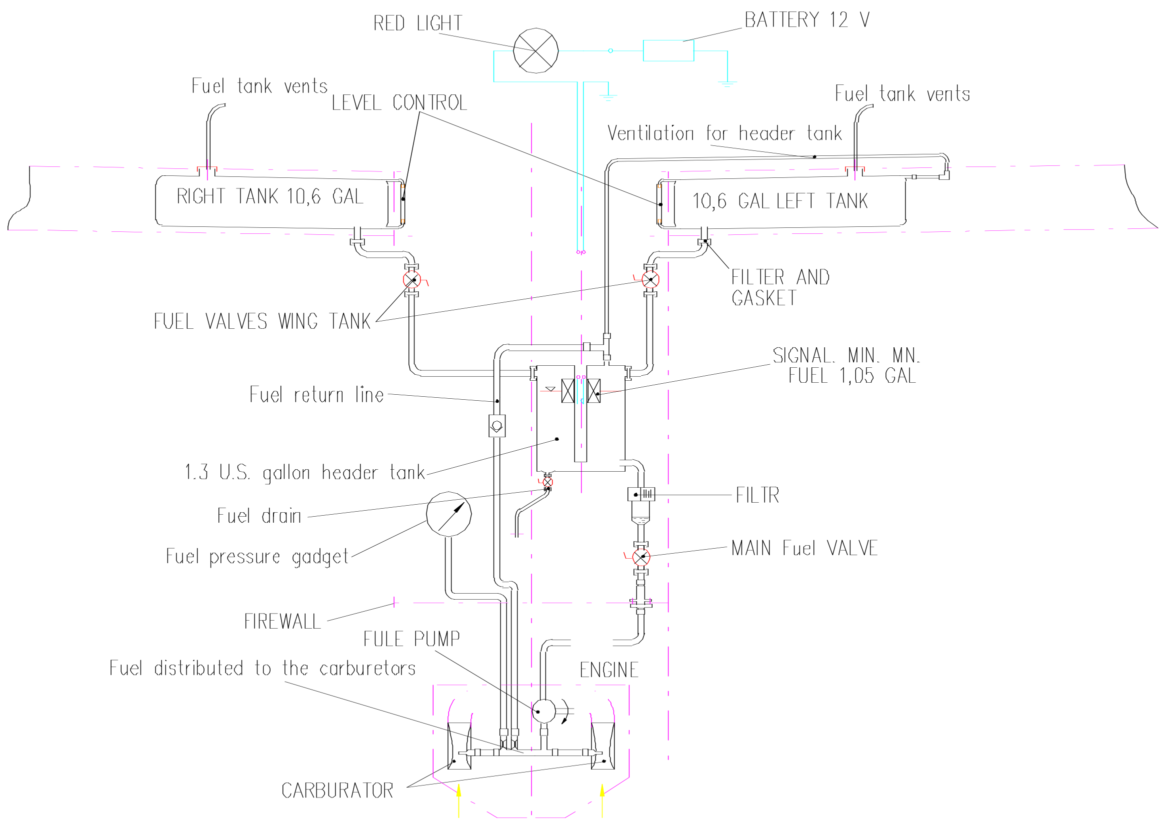
Unusable fuel quantity……………………………………… 0.5 U.S. gallons

Fuel specifications…………...... premium unleaded auto fuel (Standard Spec. for Automotive Spark-Ignition Engine, Fuel, ASTM D 4814) or AVGAS 100 LL

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

For additional information concerning fuel specification consult the **Operator's Manual for all versions of Rotax 912** supplied with the engine.

The fuel system consists of two 10.6 U.S. gallons wing tanks, a 1.1 U.S. gallon central header tank behind the left seat, a fuel drain valve positioned below the header tank, three fuel valves, one fuel filter, an engine driven fuel pump, a backup electric fuel pump (not shown in the diagram below), and the connecting fuel lines.



The fuel is gravity-fed from the right-hand and/or left-hand wing tank, through the wing tank fuel valves, into the central header tank. The fuel is then further directed from the central tank through the fuel filter and the electric fuel boost pump through the main fuel valve and to the mechanical fuel pump on the engine which then delivers the fuel to the carburettors.

The amount of fuel in each tank is indicated by a visual sight tube which is a part of each tank. Minimum fuel quantity in the central tank is indicated by a red warning light on the instrument panel. The remaining fuel (0.9 U.S. gallon), is enough for approximately 10 minutes of flight. The low fuel warning light can be tested at any time by pushing the control button next to the light on the instrument panel. If the red light does not light up when the control button is pushed and held, consider the bulb to be blown out and so do not rely on the minimum fuel quantity warning light: - In this case, make a more conservative estimate for fuel on board, regularly check the fuel quantity in wing tanks and land as soon as you are not confident of the fuel quantity in the wing tanks.

Although it is normal to leave both wing tank fuel valves open, occasionally one tank will drain faster than the other. Should this situation occur, manipulate the fuel tank valves to ensure continuous flow of fuel to the engine is maintained.

The fuel drain valve outlet is located behind and below the left seat on the outside of the fuselage; to check for water and dirt, push the neck of the drain pipe gently upwards, into the fuselage and subsequently a fuel sample can be taken.

For refuelling information see section 8.1

2.3 Oil

Oil tank capacity .... 3.2 quarts

Maximum oil quantity .... 2.6 quarts

Minimum oil quantity .... 2.1 quarts

Oil specification:

Use semi-synthetic 10w40 motorcycle type oil of a registered brand name. Caution**:** When selecting the most suitable lubricants refer to the additional information in the Rotax Service Information SI-18-1997. **Normally the recommended oil is Aeroshell Sport 4 (a 10w40 semi-synthetic oil).**

- Use only oil with API classification "**SF**" or "**SG**"!
- Due to the high stresses in the reduction gears, oils with gear additives such as high performance motor cycle oils are required
- Because of the incorporated friction clutch, oils with friction modifier additives are unsuitable as this could result in a slipping clutch during normal operation.
- Heavy duty 4-stroke motor cycle oils meet all the requirements. These oils are normally not mineral oils but are semi- or full synthetic oils.
- Oils primarily for Diesel engines are **insufficient** due to **high temperature properties and additives which favor clutch slipping, generally therefore are unsuitable.**

CAUTION**:** If the engine is mainly run on AVGAS **more frequent** oil changes will be required. See Rotax Service Information SI-18-1997.

For additional information concerning oil system consult **Operator's Manual for all versions of Rotax 912** supplied with the engine.

The maximum and minimum oil level is indicated by two marks on the dipstick in the oil tank.

2.4 Operating weights and loading (occupants, baggage, fuel, ballast)

Empty weight (with typical options) .... 650 lbs

Max. take-off weight.. 1235 lbs

Max. landing weight .... 1235 lbs

Max. fuel weight .... 135 lbs

Max. baggage weight in baggage compartment..................... 50 lbs

Maximum number of persons on board……………………… 2

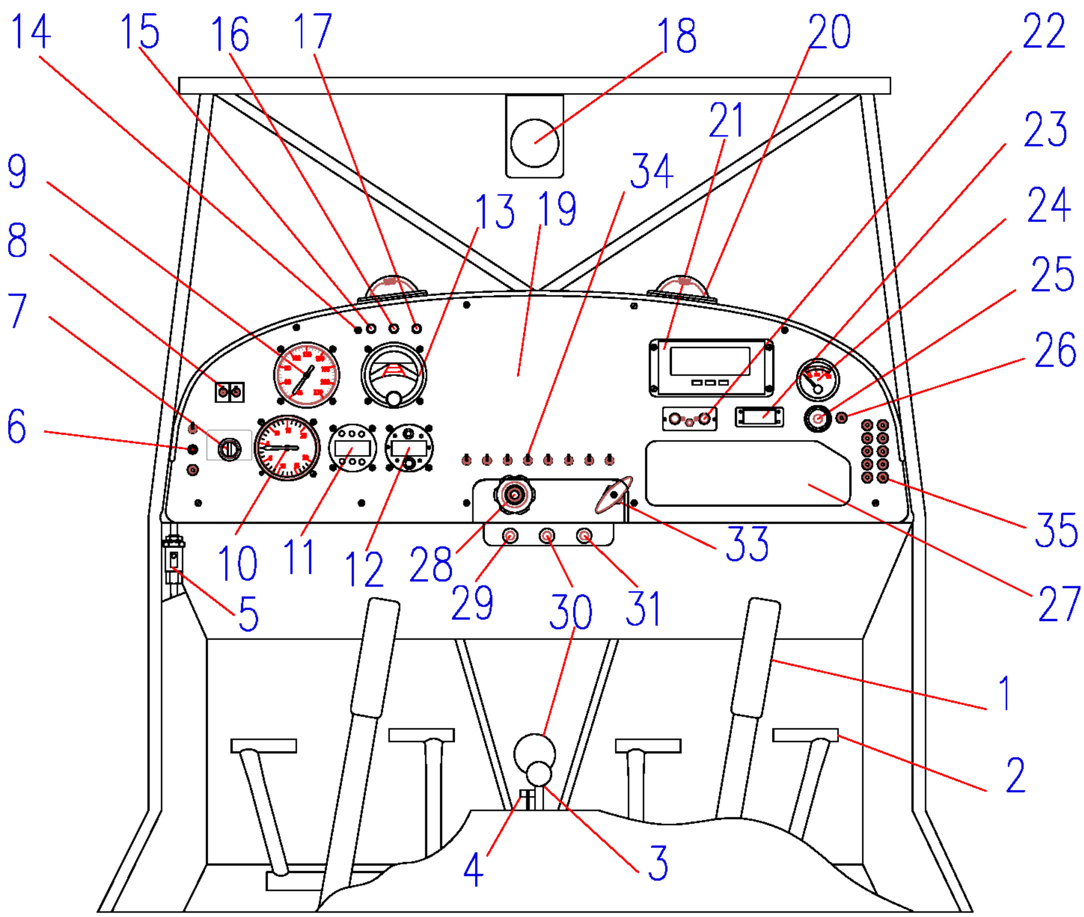
Minimum crew weight .... 121 lbs

WARNING

Make sure that above-mentioned weight limits are strictly followed. Structural failures which result from overloading of the aircraft may be dramatic and catastrophic.

The additional stress placed on the structural parts by overloading can accelerate the occurrence of metal fatigue failures. Also flight characteristics might change significantly when aircraft is overloaded. Take-off and landing distance is significantly longer for overloaded aircraft. Overloading of the aircraft is one cause of accidents.

2.5 Cockpit overview



LAYOUT OF CONTROLS AND INSTRUMENTS (see following pages for details concerning Figures 1-9)

Fig. 1 airspeed indicator	1. control stick	18. compass
Fig. 2 engine start up	2. rudder pedals	19. area for GPS or iPad installation
Fig. 3 main fuel valve	3. flap control lever	20. air vents
Fig. 4 EIS engine instrument	4. elevator trim control	21. EIS engine instrumentation
Fig. 5 central control panel	5. main fuel valve	22. intercom
Fig. 6 flaps, trim	6. boost pump switch	23. ELT panel controller
Fig. 7 switches and fuses panel	7. keyed ignition switch	24. Rotax fuel pressure gauge
Fig. 8 control lights	8. magneto switches	25. cigarette lighter type power socket
Fig. 9 door lock mechanism	9. airspeed indicator	26. power socket circuit breaker
	10. altimeter/VSI	27. mapbox
	11. transponder	28. throttle
	12 . radio	29. carb heat knob
	13. EFIS (optional)	30. cockpit heat knob
	14. annunciator test button	31. oil cooler flap knob
	15. low level fuel warning light	33. choke
	16. low voltage warning light	34. switches
	17. EIS warning light	35. circuit breakers

List of typical installed instruments and other equipment including options:

see aircraft Weight & Balance / Equipment List for specific equipment installed in the aircraft	Type	s/n.
airspeed indicator	ASI 150 M-3	
altimeter and vertical speed indicator	MGL ALT-6 electronic	
slip indicator	in the optional EFIS	
magnetic compass	CM - 13	
fuel pressure	Rotax BDT1/31/B	
Artex ELT	ELT345	
funke Avionics radio	ATR833-OLED	
funke Avionics transponder-encoder	TRT800H-OLED	
EFIS or attitude indicator (optional)		

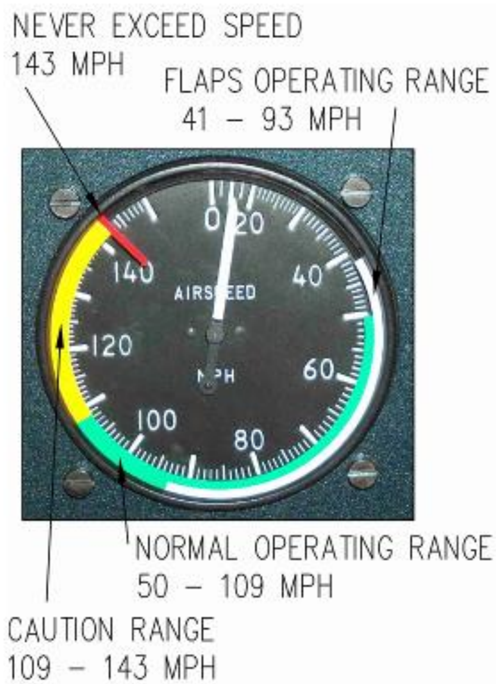


Figure 1 - Airspeed Indicator marking

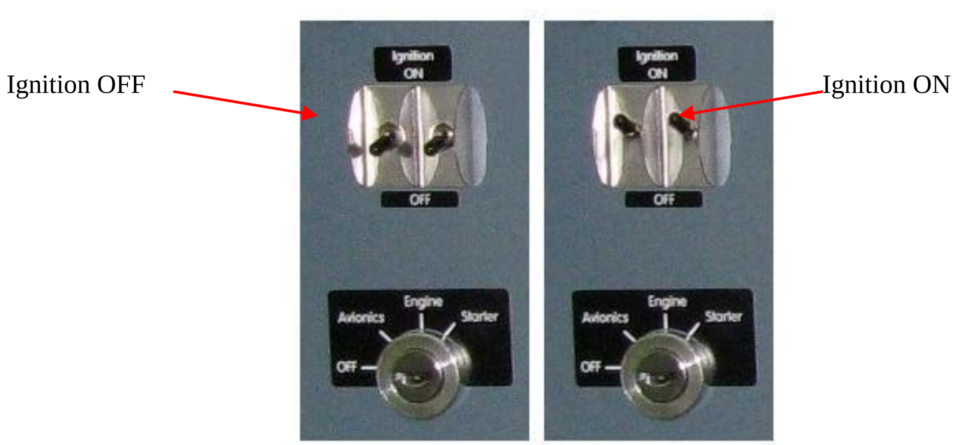


Figure 2 - Ignition and master switch

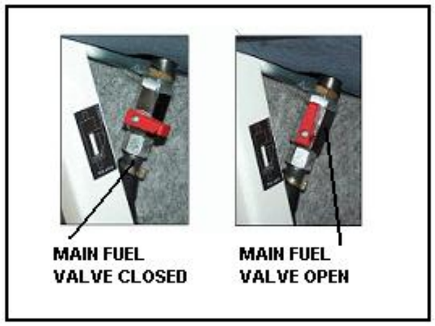


Figure 3 - Main Fuel Valve open and closed position

Figure 4 - EIS Model 4000 for Rotax 912-series engines

Display panel description (shown is EIS page 1 - default display page)
tachometer - engine RPM
OAT - outside air temperature
H2O - coolant temperature
oil temperature
flight timer
EGT - exhaust gas temperature (hottest EGT)
oil pressure

Indicator unit	alert limits	max limit
Engine rotation speed (rpm)	5800	5800
EGT/Exhaust gas temperature (ºF)	1650	1850
H2O - coolant temperature (ºF)	228	248
Oil temperature, (ºF)	260	300
Oil pressure, max (psi)	84	100
Oil pressure, min (psi)	28	12 (minimum)
Oil pressure, normal (psi)	29 - 72	

- The EIS system not only alerts you when reaching an actual system limit, it also has the capability to provide alerts when reaching a Warning Limit that is just short of the actual non-permissible limit.
- When one or more Warning Limits are exceeded – the corresponding value blinks on the EIS display, the alarm lamp on the instrument panel blinks. When the pilot presses the "Next/Ack" button on the EIS, the Alarm Lamp goes steady until the out of tolerance condition is corrected.
- When the actual limit is reached, the EIS reacts in the same manner as a new fault, except the alarm lamp blinks at longer intervals. The pilot must press Next/Ack again to turn both the blinking alarm light and EIS display to steady.

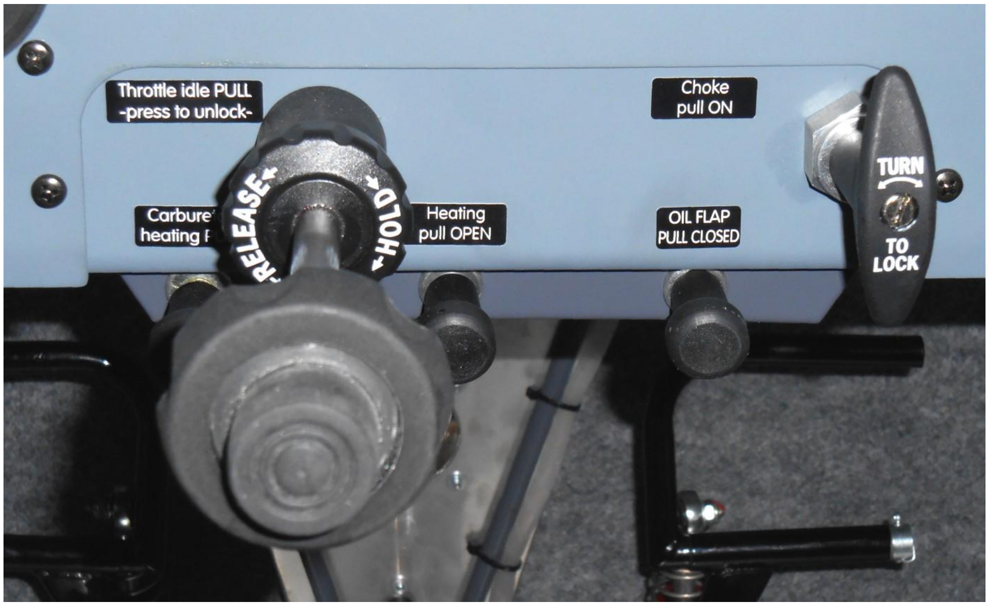


Figure 5 – central panel

Note: Rotate throttle lever knob for fine power settings (clockwise to increase power, counterclockwise to reduce power), for larger changes push/pull throttle when the button is pressed and held.

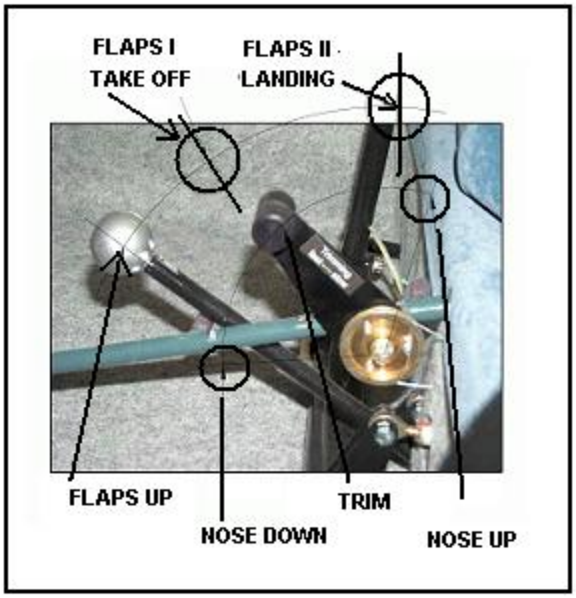


Figure 6 – Flaps and trim

Figure 7 – Switches and circuit breakers

Figure 8 – Control lights and fuel reserve bulb check button

Figure 9 – Door locking mechanism

The battery (Powersafe SBS8, 12v, 7 ah) is located behind the right-hand pilot's seat. Nominal voltage in aircraft system is 13.5 to 14.2 V. The engine is equipped with an integrated AC generator with external rectifier-regulator (12 V, 20A DC).

2.6 Aircraft lighting equipment

The A220 features the Whelen LED wingtip lights. This system consists of a white rearward-facing LED lights and a flashing LED strobe light on the side of both wingtips, a green forward-facing LED light on the right wingtip and a red forward-facing light on the left wingtip. There is also a landing light fitted to the lower nose cowling which also acts as a taxi light. Power for the light system is taken from the aircraft's main power supply.

NOTE: The A220 is NOT approved for night flight, and the exterior aircraft lighting does not comply with all the FAR requirements for night flight.

2.7 Electric fuel pump

The A220 is equipped with an electric fuel pump with an on/off switch and "on" indicator light on the instrument panel. The electric fuel pump serves as a booster or backup to the engine-driven mechanical fuel pump. **The electric fuel pump should be used at any time when the sudden failure of the engine-driven mechanical fuel pump and a loss of fuel pressure could cause a loss of engine power and compromise safety. Normally this will mean utilizing the electric fuel pump during takeoff, during climb-out to a safe minimum altitude, during any low-altitude operations, and during landing.**

2.8 Additional equipment

reserved

3. Operating limitations

Airspeed indicator system calibration:

MPH (Indicated Air speed)	MPH (Calibrated Air speed)
40	44
46	48
57	59
69	69
81	79
92	89
104	99
115	109

As requested by ASTM F2245-18 all flight speeds are presented as calibrated airspeeds in miles per hours (MPH). As the calibrated airspeed cannot be usually determined by a simple reading of the aircraft airspeed indicator, corresponding Indicated airspeeds in miles per hours (MPH) are also presented in this document. All airspeed values in this handbook assume no instrument error.

3.1 Stall speed at maximum take-off weight (V_S and V_{SO})

Aircraft configuration	Stall speed – angle of bank 0°	
	(Indicated Air speed)	(Calibrated Air speed)
Flaps down (V_{so})	43 mph	45 mph
Flaps up (V_s)	49 mph	50 mph

WARNING

The stall speed mentioned above are with wings level. Once any angle of bank (e.g. turn) is encountered the stall speed is significantly increasing.
Example: angle of bank 60° ……. V_S = 73 MPH

The more bank – the higher the stall speed. This simple rule is especially important when a turn at maximum permitted angle of bank (60°) is performed. Do not start the turn until you have sufficient airspeed reserve – recommended entry speed is 92 MPH. Full throttle is also essential to have sufficient thrust reserve as the drag is increasing during a steep turn.

3.2 Flaps extended speed range (V_{SO} to V_{FE})

	MPH (Indicated Air Speed)	MPH (Calibrated Air Speed)
Lower limit	41	45
Upper limit	93	90

3.3 Maximum maneuvering speed (V_A)

	MPH (Indicated Air Speed)	MPH (Calibrated Air Speed)
Max. maneuvering speed (V_A)	109	104

3.4 Never exceed speed (V_{NE})

	MPH (Indicated Air Speed)	MPH (Calibrated Air Speed)
Never exceed speed (V_{NE})	143	134

3.5 Crosswind and wind limitation

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

Max. headwind …………………………………….............. 28 mph (25 knots)

Crosswind………………………………………………..…. 17 mph (15 knots)

tail wind…………………………………………………… 7 mph (6 knots)

Crosswind take-offs and landings require training and experience, the higher crosswind component, the better your skill must be. Do not fly without proper experience when the wind speed is approaching the limit.

Avoid take-offs with a tail wind when possible – the total take-off distance is significantly longer and longer ground distance is required to gain altitude.

When landing with a tail wind the aircraft ground speed is higher resulting in longer landing distance.

3.6 Service ceiling

Service ceiling... 14,760 ft (standard day)

WARNING

Oxygen mask and/or other equipment as required to reach maximum ceiling, consult respective regulations.

3.7 Load factors

Flaps up:

Maximum positive load factor (measured at CG).................. + 4 Gs

Maximum negative load factor (measured at CG) .... - 2 Gs

Flaps down:

Maximum positive load factor (measured at CG).................. + 2 Gs

Maximum negative load factor (measured at CG) .... 0 Gs

3.8 Prohibited maneuvers

WARNING

Aerobatics and intentional spins are prohibited.
Maximum angle of bank : 60°

3.9 Other Limitations

WARNING	**No smoking**
WARNING	**Flights with rear cockpit cover removed are prohibited**
WARNING	**Flights at ambient temperature between 14° F and 32° F are permitted only under no icing conditions and when the carburetor heating is activated.**
WARNING	**IFR flights and flying in clouds is prohibited.** **Night Flights are prohibited.** **Flight into know icing conditions is prohibited.**

This aircraft is not certified for operation in IMC (Instrument Meteorological Conditions). Always stay clear of clouds and have visual contact with the ground. Follow the airspace classification regarding distance from clouds. Always evaluate weather during your flight and try to get weather information from your destination using radio whenever possible. When weather is deteriorating make a diversion or turn back before the low cloud base and/or low visibility are critical. The aircraft is not certified to be flown at night.

4. Weight and balance information

4.1 Installed equipment list

Airspeed indicator	X
Altimeter	X
Vertical speed indicator	X
Slip indicator	X
EIS engine instrumentation	X
Control light of EIS	X
Fuel pressure indicator	X
Magnetic compass	X
ELT	X
12v power socket	X
wingtip strobe/position lights	X
Attitude indicator or EFIS	optional
Radio-intercom	X
Transponder w/encoder	X
GPS	optional

4.2 Center of gravity (CG) range and determination

Aircraft handling and performances have been determined for this range of CG positions.

	Front limit (in)	Rear limit (in)
Center of gravity limits	10.2	16.4

4.2.1 Weight and balance determination for flight

WARNING

To assure safe flying, the aircraft must not be operated in violation of its approved weight and balance limitations.

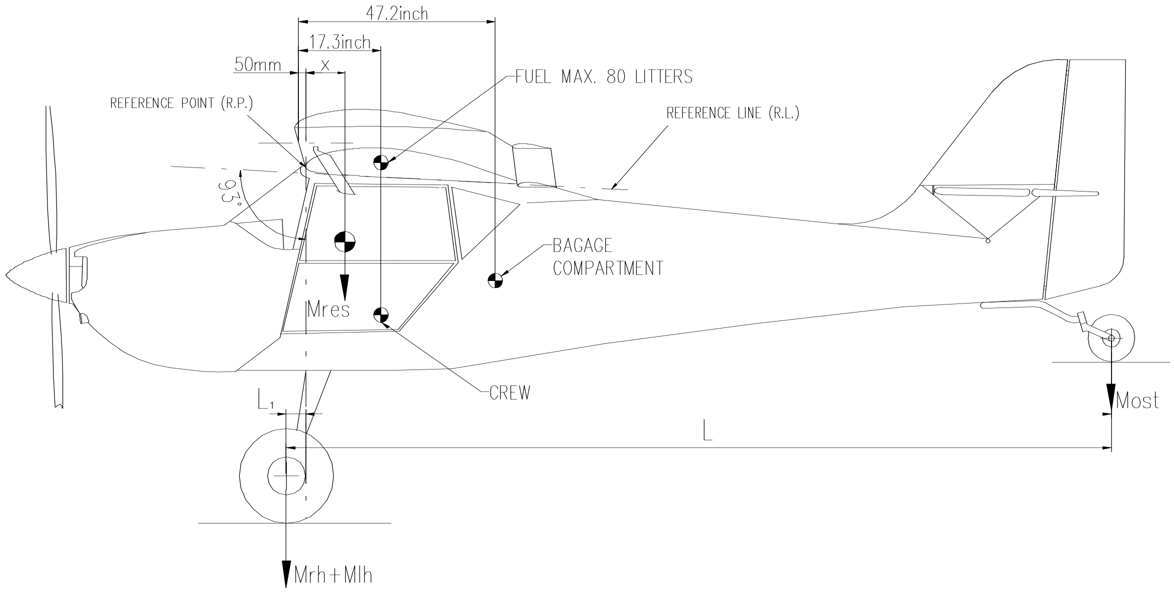
Maximum take-off weight is the maximum weight approved for the start of the take-off roll.

The table given below represents the maximum amount of fuel for given crew weight and given weight in the baggage compartment. The CG (center of gravity) position is within the approved range for all combination in the table and any interpolation between displayed values.

Maximum amount of fuel (U.S. gallons) for given crew and baggage weight									
Crew weight (lbs)		121	180	210	270	300	360	390	405
Weight in the baggage compartment (lbs)	0	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
	10	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
	20	22.5	22.5	22.5	22.5	22.5	22.5	22.5	20.9
	33	22.5	22.5	22.5	22.5	22.5	22.5	21.3	18.8

4.2.2 Detailed calculation of CG position

As all items are located behind the leading edge of the wing, the leading edge was selected as the reference plane. The table below shows a typical calculation including an example.



example only...

		Weight (lbs)	Arm (in)	Moment (lb.in)
example: **Empty aircraft**		example: **638**	example: **10.7**	example: **6826**
Crew		*Example: 250*	***17.3***	*Example: 4325*
Fuel	**U.S. Gallons** *Example: 18*	*Example: 108*	***17.3***	*Example: 1868*
Baggage		*Example: 33*	***47.2***	*Example: 1558*
Total		[2] *Example: 1029*		[1] *Example: 14577*
Loaded aircraft CG position in inches:		$X_T = \frac{\text{Total}\ [1]}{\text{Total weight}\ [2]}$		
		Example XT= 14577 / 1029 = 14.17 in		
Permitted C.G. range in inches		***10.2 in***	**………**	***16.4 in***

5. Performance

The data is based on particular flight measurements undertaken with the aircraft of this type in good service conditions and with application of average piloting technique. The performances stated below are calculated at sea level at the international standard atmosphere (ISA). Variations in pilot technique can cause significant differences as well as the other conditions such as runway slope, runway surface condition, humidity, etc.

Use the following data for guidance but do not plan a take-off or landing when only 50 ft excess runway is available or do not plan a cross country with only 2 gallons fuel planned when arriving at your destination. Always be conservative when planning a flight and be ready for the unexpected – not forecasted winds, atmospheric turbulence or sudden weather change at your destination, forcing you to divert to an airfield 60 NM away. Always plan a reasonable fuel reserve – 30 to 60 minutes seems to be sufficient time for most flights, but this time should be increased even more when complicated weather conditions (strong headwind or rain showers) are expected en route.

5.1 Take-off and landing distances

Surface	Take-off distance (ft)	
	Ground run	Take-off distance to 50 ft
Grass runway	392	849
Concrete runway	359	817

Surface	Landing distance (ft)	
	Landing distance from 50 ft	Ground run
Grass runway	1148	558
Concrete runway	1082	492

Both take-off and landing distances are significantly increased by the following factors:

- Tailwind
- High airport elevation
- High air temperature and or humidity
- Uphill runway slope
- Runway wet or covered with snow, dust or water

5.2 Rate of climb

	MTOW 1235 lb
Rate of climb	1000 fpm

5.3 Cruise speeds

Cruising speed at 75%... 120 mph (Indicated)
(112 mph Calibrated)

Cruising speed at 60%... 110 mph (Indicated)
(102 mph Calibrated)

5.4 RPM

Max. take-off power…………………………………………… 5800 rpm
Max. continuous power……………………………………….. 5500 rpm
Cruise flight... 4200-5200 rpm
Idle speed……………………………...................………... 1450-1800 rpm (preferably 1450-1650 rpm)

5.5 Fuel consumption

Engine settings	Fuel consumption (U.S. gallons per hour)
Take-off power performance	7.1
Max. continuous performance	6.6
Cruise performance	3.2 – 5.0

Fuel consumption during cruise flight is dependent on various factors. The most important one is the engine power setting. The higher the engine RPM is set during cruise, the higher the fuel consumption. When planning a flight, always consider these and other factors such as wind direction and speed or expected weather en route. Always plan for sufficient fuel reserve when arriving at the destination. Always carefully evaluate fuel consumption during the flight.

5.6 Other performance data

Max. endurance (at most economical cruise speed).......... 6 hours

Max. range (at most efficient cruise speed).................... 614 sm (534 nm)

6. Normal procedures

All air speed values in this chapter are presented in MPH Indicated Airspeed, as this value represents instrument reading better than the Calibrated Airspeed.

6.1 Daily inspection

Pre-flight inspection must be conducted before the first flight of the day. The preflight inspection is recommended prior to any flight or series of flights by one pilot on any given day. Prior to any flight at least the fuel and oil quantity should be checked.

If the aircraft has been stored outside, the engine area and other points of entry should be checked for evidence of bird occupancy. All control surfaces and travel stops should be examined for damage. Wheel fairings are not recommended for muddy field operation due to possibility of mud accumulation inside the fairings. When operating from gravel fields, pay special attention to propeller leading edges. Fuel caps should be periodically monitored for any deterioration to avoid fuel leakage in-flight or water infiltration.

The aircraft general condition should be noted during a visual inspection of the aircraft. Inspect any signs of deterioration, distortion and any damage to the fabric skin of the aircraft. In cold weather, all traces of ice, snow, and frost should be removed from the aircraft. Make sure that no ice, snow or debris is trapped between any movable control surfaces.

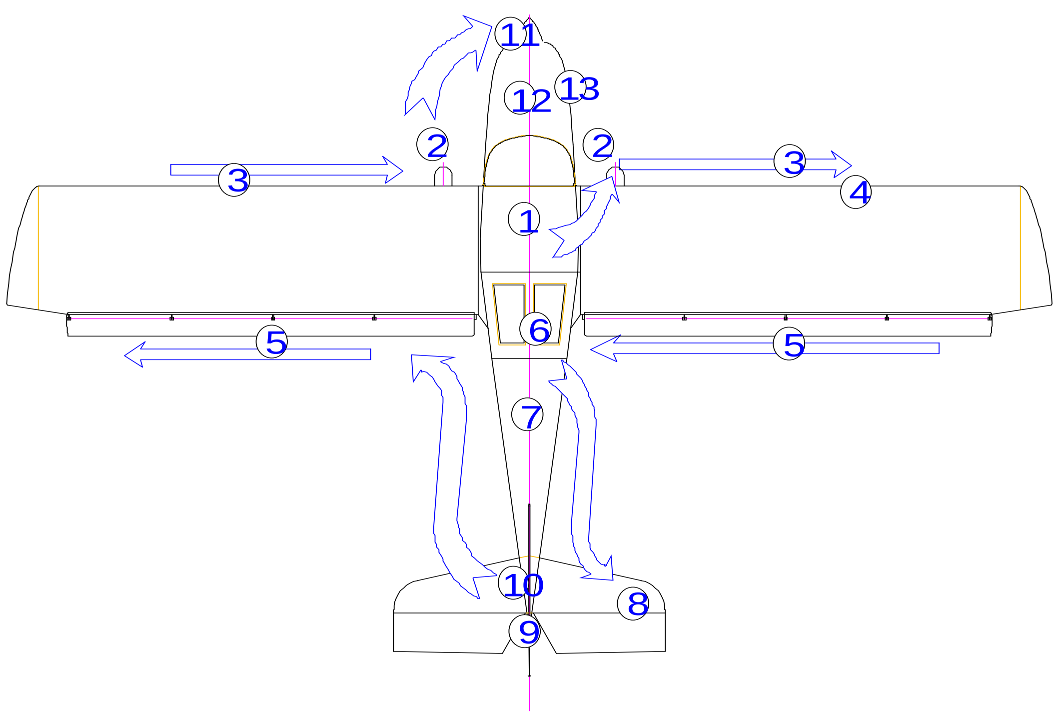
Make sure that all instruments are in good condition and that there is no cracked or broken glass. The Airspeed indicator should read zero and altimeter should be checked against ramp or field elevation.

Do not activate the electrical system when anyone is near the propeller in order to prevent injury that can possibly result from electrical system malfunction.

Pay special attention to the propeller area – make sure the ignition and master switches are OFF before touching the propeller. Avoid touching propeller when possible to prevent potential injury resulting from electrical system malfunction.

WARNING	**DO NOT FLY THE AIRCRAFT IF YOU FIND ANY DAMAGE OR PROBLEMS DURING A PREFLIGHT INSPECTION. ALWAYS CONSULT AUTHORIZED PERSONNEL FOR REPAIRS.**

6.1.1 Daily Inspection



1. Cockpit:

POH and other documentation	review and available to pilot inside the cockpit
master switch	OFF and key removed from switch
ignition (mag switches)	OFF
fuel valves	OPEN, fuel quantity check
instruments	INSPECT
safety belts	INSPECT
check of flaperon tie rods	INSPECT
control stick	INSPECT, freedom of movement
rudder pedals	INSPECT, freedom of movement
brakes	INSPECT
trim	freedom of movement, proper function
engine controls	INSPECT, freedom of movement
loose objects in cockpit	remove or secure
cockpit windows	INSPECT
doors	INSPECT -- shut and latched

2. Main landing gear:

gear legs and attachment	INSPECT
main wheels	INSPECT -- tire pressure 14.5 psi (tundra tires) or 29 psi (standard tires)
brakes	INSPECT

3. Wings	INSPECT – wing, struts, hinges, surface
4. Pitot tube	INSPECT (and remove any cover)
5. Flaperons	INSPECT – hinges, surface, proper connection to aircraft controls, freedom of movement, counterweights attachment.
6. Rear cockpit cover	INSPECT, secured
7. Fuselage	INSPECT
8. Stabilizer, elevator, hinges	INSPECT – surface, hinges, attachment of stabilizer struts, freedom of movement of elevator and trim tab.
9. Fin, rudder, hinges	INSPECT surface, attachment, freedom of movement, condition and attachment of balance tab.
10. Tailwheel	INSPECT
11. Propeller	INSPECT / blades, propeller hub, check propeller locking nuts (when visible)
12. Engine	Remove the top engine cowling and...
	INSPECT - engine mount
	INSPECT - air intake, carburetors and controls
	INSPECT - exhaust system
	INSPECT – coolant, quantity (0.4 inch above bottom) - (between MIN and MAX marks), leakages – (see picture 1 below)

Picture 1

12. Oil — INSPECT - oil quantity (between MIN and MAX marks) and for any leakage. If the oil level appears low, turn the propeller a few times in the direction of rotation until you hear a bubbling noise coming from the oil tank. Ensure the magneto switches are "off" and key out of the ignition switch before turning the propeller.

13. Engine — INSPECT - electrical system, ignition, cable connections

14. Fuel — INSPECT - fuel system and carburetors
INSPECT – draining-off water and dirt from the header tank. Fuel system must be sampled daily to assure lack of contamination. Inspect the type of fuel. Fuel caps secured, correct vent orientation – open end facing forward.

6.1.2 Preflight inspection (when not the first flight of the day)

Make a brief walk around before you board the aircraft. This short inspection might discover damage or problems that occurred during the last flight. It is especially important to make this inspection when you are taking over the aircraft from another pilot.

Use chocks for the main wheels when possible and practical to prevent the aircraft from moving. Always make sure that the person you asked to remove your chocks while engine is running is aware of propeller danger. The best practice is to use chocks only for engine warm-up and engine check, then shut-down the engine and remove chocks while the engine is stopped. Before using chocks make sure they do not collide with wheel fairings to prevent any damage.

Cockpit	- INSPECT COCKPIT INTERIOR EQUIPMENT
	- INSPECT SAFETY BELTS
	- CONTROL SYSTEM - FREEDOM OF MOVEMENT, DAMAGES
Wings	- INSPECT WING SURFACES
	- INSPECT WING AND STRUTS ATTACHMENTS
	- INSPECT FLAPERONS
Fuselage	- INSPECT
Tail unit	- INSPECT
Landing gear	- INSPECT
Engine and propeller	- INSPECT

6.2 Engine starting

Lack of oil pressure within 10 seconds after engine starting can lead to serious engine damage so be sure to shut the engine down immediately by turning off both the ignition switches.

Make sure nobody and/or nothing is near the propeller when starting the engine.

6.2.1 Use of external power supply

The aircraft is not provided with a connection for an external power supply - the external power supply may be connected to battery contacts when necessary. However, with proper battery maintenance this should normally not be needed.

6.2.2 Engine starting

- preflight inspection	COMPLETED
- safety belts	ADJUST AND SECURE
- brakes	APPLY BRAKES AND CHECK FUNCTION **(making very sure that the Parking Brake is completely disengaged)**
- control stick	FREEDOM OF MOVEMENT
- trim	FREEDOM OF MOVEMENT
- wing flaps	FREEDOM OF MOVEMENT, RETRACTED
- engine controls	FREEDOM OF MOVEMENT
- instruments	CHECK THE VALUES AND SETTINGS
- doors	CLOSED, LOCKED
- master switch	SWITCH ON
- main fuel valve	OPEN
- wing tank fuel valves	BOTH OPEN
- choke	SWITCH ON (COLD ENGINE ONLY)
- throttle	HALF A TURN OPEN (idle when choke is used)
- control stick	PULLED (clamped between legs)
- brakes	ON
- propeller area	“CLEAR”
- ignition (mag) switches	BOTH ON
- master switch	STARTER (8 seconds as maximum without interruption, followed by a cooling period of 1 minute)

- after starting the engine, adjust speed to smooth operation – avoid exceeding 3000 RPM until 90°F oil temperature had been achieved.

- instruments	CHECK READINGS (oil pressure must rise within 10 seconds. Increasing the engine speed is permitted only at a steady oil pressure reading of above 30 psi)
- choke	OFF (usually it is best to remove the choke gradually as the rpm will drop as the choke is removed. The throttle may need adjusting as the choke is removed.)
- avionics and other switches	SWITCH ON (radio, transceiver, etc.)

WARNING: The aircraft has a tendency to roll forward easily on paved surfaces even when the engine is at idle. A tailwind is also a significant factor. Make sure that the aircraft is not moving once the engine is started. If the aircraft is rolling and cannot be stopped with brakes, turn the engine immediately off using ignition switches.

6.3 Taxiing

6.3.1 Prior to taxiing

Be aware of the entire area around the aircraft to ensure that the aircraft will clear all obstructions and other aircraft. When first beginning to taxi, the brakes should be tested for proper operation as soon as the aircraft is put in motion. If braking action is unsatisfactory, the engine should be shut-down immediately.

- brakes	FUNCTIONAL CHECK
- time	record the time

6.3.2 Taxiing

- taxiing speed is 9 mph (8 knots) maximum. Steering is performed by the rudder pedals controlling the tailwheel. Avoid excessive speed and use proper braking technique to avoid brake overheating.
- in crosswind hold ailerons ‘upwind’, using the control stick.
- in strong crosswind perform the taxiing with an assisting person holding the wing by its windward side.
    - when taxing on gravel surfaces use as low engine power as possible to help prevent damage to the propeller leading edges.
    - When taxing on paved surfaces, avoid power settings that would result in prolonged braking. When taxing downhill, or with a tail wind, use periodic braking bringing the aircraft to a complete stop before beginning to taxi again. Short harder braking is preferable to long, weaker braking, as the brake system will heat up during prolonged use and can cause brake fade and even unexpected failure.

6.3.3 Engine warm-up, power check

- brakes on
- start the engine - see section 6.2
- warming-up to operating temperature - first at 2200 to 2500 RPM for 2 minutes, then at 2400 to 3000 RPM to reach oil temperature of 122 °F
- ensure temperature and pressure values - within operating limits
- ignition check (magnetos) – set 4000 RPM, RPM drop should not exceed 300 RPM on either magneto nor 115 RPM differential between magnetos
- idle speed – 1450-1800 RPM (preferably 1500-1600 rpm)
- all engine instrument readings must not exceed operating limits under any power setting

CAUTION	Perform the engine check heading upwind. Do not carry it out on loose terrain. Nobody is allowed to stand within dangerous proximity of the propeller. Also, select proper aircraft orientation – propeller blast can be surprisingly powerful and hazardous.

CAUTION	The engine cowling is designed for optimum cooling during flight. Use high power settings for limited time only during ground operation to avoid engine overheating.

CAUTION	After checking the ignition system, run the engine at a low power setting to cool-down the engine for a short time to avoid overheating of the coolant in cylinder heads.

6.4 Normal take-off

6.4.1 Prior to take-off

- brakes	BRAKES ON
- speed	4000 RPM
- magnetos	CHECK (R, BOTH, L, BOTH)
- carburetor heating	ACTIVATE WHEN NECESSARY
- choke	ENSURE IS COMPLETELY OFF
- trim	NEUTRAL

- flaperons	TAKE-OFF POSITION (typically half flap)
- master switch	ON
- ignitions	BOTH ON
- main fuel valve	OPEN
- tank fuel valves	FUEL QUANTITY CHECK, ENSURE BOTH ARE OPEN
- instruments	CHECK (and strobes on if desired)
- door	CLOSED, LOCKED
- safety belts	FASTENED, TIGHTENED
- controls	FREEDOM OF MOVEMENT
- BRS safety pin	BRS SAFETY PIN REMOVED (if optional BRS is installed)
- electric fuel pump	ON (see section 1.8)
- runway	not occupied by another aircraft or by an aircraft on short final

6.4.2 Take-off

Continuously increasing engine power to maximum , bring the aircraft into motion. Slightly pushing the control stick forward, raise the tail wheel off ground. At a speed of 43 mph, slightly pulling the control stick back, bring the main landing gear off the runway. Hold acceleration after unsticking until speed increases to 56-62 mph. Slowly pulling the control stick back, get the aircraft to climbing at a speed of 62 - 73 mph.

- throttle	FULL
- engine instruments	CHECK
- elevator control	ROTATE at 46 MPH
- initial climb speed	70 MPH
- engine instruments	CHECK
- wing flaps	slowly FLAPS UP ABOVE 150 FT (min)
- trimming	TRIM

WARNING

Take-off is forbidden...
- **if engine is not running smooth.**
- **if runway is occupied or a landing aircraft is in sight**

Perform a brief magneto check before the take-off after positioning the aircraft clear of other aircraft. When a magneto problem is present, do not take-off. Monitor power and engine RPM carefully as full throttle is applied during the initial stages of the take-off run – if the engine RPM is lower than expected or if the engine is not running smoothly abort the take-off immediately.
If the take-off is to be from a gravel surface apply the power slowly to prevent damage to the propeller leading edges.

Always retract wing flaps slowly – sudden retracting of wing flaps might cause a loss of attitude.

Always judge, based on your experience, whether the available runway is sufficient for normal take-off. Always make a realistic estimation and be ready to abort the take-off before critical speed is reached or before insufficient remaining runway distance available to brake.

6.5 Best angle of climb speed (V_X)

6.5.1 Climbing

- throttle	MAX RPM
- airspeed	69 MPH
- engine instruments	CHECK

6.6 Best rate of climb speed (V_y)

6.6.1 Climbing

- speed	MAX RPM
- airspeed	75 MPH
- engine instruments	CHECK

6.7 Cruise

6.7.1 Cruise flight

- put the aircraft into level flight

- engine speed	4000 – 5500 RPM as required
- airspeed	69 – 120 MPH as required
- engine instruments	CHECK
- fuel tank levels	CHECK

During cruise flight an RPM up to 5500 can be used. Always monitor all engine parameters during cruise flight, especially when high engine power settings are used. Higher RPM means higher speed, but fuel consumption is increased at the same time. An RPM setting around 4500 is usually the best compromise between speed and fuel consumption. Check the operation of the minimum fuel indicator bulb by pushing the control button when the fuel level is approaching the minimum fuel quantity (1.1 U.S. gallons) .

Monitor the atmospheric conditions as well – do not enter areas of turbulence at speeds above 110mph. Be ready for sudden weather changes during your flight – stronger headwinds can limit your ability to safely reach your planned destination.

When carburetor icing is possible, activate carburetor heating. The fuel consumption and remaining fuel on board should be monitored. Always make a comparison between estimated and actual time above any waypoint.

Take care when selecting the flight path – avoid flying over large urban areas, large forests or large water areas as well as over mountains. Landing possibilities are very limited in case of engine failure or other emergency over those areas. Always have some suitable landing area within a gliding range. When it is necessary to cross a large area not suitable for emergency landing, always climb to an appropriate altitude to reach a suitable landing site should an emergency occur.

Always monitor the airspace around you to prevent a mid-air collision.

6.8 Approach

6.8.1 Descent

- throttle	JUST ABOVE IDLE OR AS REQUIRED
- engine instruments	CHECK
- carburetor heating	ACTIVATE WHEN NECESSARY

WARNING	**During long approaches and when descending from a considerable height, it is not advisable to reduce the engine throttle control to idle. In such cases the engine becomes overcooled and a loss of power might occur. When descending, set the power to just above the idle so that engine instrument readings range within the limits for normal use.**

6.8.2 Downwind

- power	4000 – 5000 RPM
- airspeed	75 – 90 MPH
- engine instruments	CHECK

- fuel	FUEL QUANTITY CHECK,
- brakes	CHECK FUNCTION BY SHORT BRAKING (check proper system resistance)
- safety belts	TIGHTEN
- base leg and final leg airspace	CHECK FOR OTHER TRAFFIC
- landing site	SITUATION

6.9 Normal landing

6.9.1 On base leg

- power	3000 RPM
- airspeed	65-70 MPH
- engine instruments	CHECK
- wing flaps	TAKE-OFF (HALF)
- trimming	TRIM
- final leg	CHECK FOR OTHER TRAFFIC

6.9.2 On final

- airspeed	65-70 MPH
- power	ADJUST AS NEEDED
- carburetor heating	ACTIVATE WHEN NECESSARY
- electric fuel pump	ON (see section 1.8)
- engine instruments	CHECK
- wing flaps	LANDING (FULL)
- trimming	TRIM
- engine instruments	WITHIN LIMITS

- check for clear landing site (people, obstacles)

6.9.3 Landing

Always judge, based on your experience, whether the available runway is of sufficient length for a normal landing. Always make a realistic estimation and be ready to abort any landing.

At a height of about 50 feet, reduce the engine speed to idle. Maintain speed of 65-70 MPH until the flare. When flaring at a height of 1.5 to 3 feet above the runway, allow the airspeed to decrease by gradually pulling the control stick rearward. Ideally, the aircraft should touch down at a speed of about 40 – 45 MPH.

When landing with a significant crosswind component, do not set the flap to the landing position (FULL) – instead, use take-off setting to touch down at higher speed to ensure proper control over the aircraft during the latter stages of the landing.

Entry speed for a side slip .... 70 MPH

6.9.4 After landing

- brakes	APPLY WHEN NECESSARY
- wing flaps	RETRACT
- electric fuel pump	OFF

6.9.5 Engine shut-down

- power	cool down the engine at 2000 RPM as necessary
- engine instruments	CHECK
- avionics and other switches	OFF
- ignition (mag) switches	OFF
- master switch	OFF
- main fuel valve	CLOSED
- BRS safety pin	BRS SAFETY PIN REINSTALLED (if optional BRS is installed)
- secure the aircraft	chocks and tie-down ropes or other ways to prevent the aircraft from unintended movement, lock the controls (using seat belts)

During normal operation, the engine is usually sufficiently cooled during the approach and landing. Make sure that all avionics and other instruments are switched off before the engine is shut down.

Do not rely on only parking brake to hold unattended aircraft.

6.9.6 Post-flight check

- check	- check fuel system, check for fuel leakage
	- check oil system, check for oil leakage
	- check cooling circuit, check for liquid leakage
- check of aircraft exterior	- fuselage
	- wings, flaperons and tail unit
	- landing gear
	- fiberglass fairings and covers

- wash the aircraft as necessary and cover the cockpit with a protective cover if available.

6.10 Short field take-off procedure

The standard take-off procedure should be followed. The only difference is that the full throttle is applied with brakes on. Brakes are released when the maximum RPM is achieved by the engine.

6.11 Aborted landing procedures

- power	full throttle, maximum RPM
- airspeed	75 MPH
- engine instruments	CHECK
- wing flaps	TAKE-OFF
- trimming	TRIM as necessary
- wing flaps	RETRACT AT A HEIGHT OF 150 FT
- trimming	TRIM as necessary

Information on stalls, spins and any other useful pilot information:

WARNING **Aerobatics and Spins are prohibited.**

6.11.1 Rain

When flying in light rain, no additional steps are required. Aircraft qualities and performance are not substantially changed. Avoid flying in heavy rain where visibility could be reduced to less than VFR minimums and safety.

7. Emergency procedures

7.1 Introduction

This section contains procedures for various emergencies which may occur. Emergencies caused by aircraft or engine malfunctions are rare if proper pre-flight inspections and maintenance are practiced.

This chapter describes basic emergencies and recovery procedures. Not all emergencies that may occur can be listed here in full, therefore their solution depends on experience of the crew controlling the course of such events. All airspeed values in this chapter are presented in MPH Indicated Airspeed, as this value represents instrument readings better than the Calibrated airspeed.

7.2 Engine failure and emergency landings

7.2.1 Engine failure during take-off run

- throttle — REDUCE TO IDLE
- ignition (mag) switches — OFF
- master switch — OFF
- brakes — AS REQUIRED

7.2.2 Engine failure after take-off

- airspeed — 75 MPH
- choice of landing site
  - after take-off and up to 150 ft altitude - land in straight direction ahead, if possible
  - over 150 ft altitude - choose suitable landing site (landing site is preferably chosen in the direction of flight or the nearest suitable site clear of obstacles)
- master switch — OFF
- ignition — OFF
- main fuel valve — CLOSED
- tank fuel valves — CLOSED
- flaps — EXTEND AS NEEDED
- safety belts — TIGHTEN

after touchdown:

- brakes — AS REQUIRED

7.2.3 In-flight engine failure

- airspeed — 75 MPH
- landing site selection — SELECT
- transmit MAYDAY on 121.50, ELT ON, transponder set to 7700 (if time permits)

check

- master switch — ON
- ignition — ON
- main fuel valve — OPEN
- wing tank fuel valves — OPEN to tank with more fuel
- throttle — SET TO 1/3 OF TRAVEL
- starter — START THE ENGINE

If the engine cannot be restarted, proceed in accordance with the procedure 7.2.2 .

7.2.4 Additional information to engine failure and emergency landing procedures

If the engine failure occurs during the take-off run, the pilot's main concern should be to stop the aircraft on the remaining runway. Those extra items in the checklist are to add protection should the runway be too short to stop.

In-flight, prompt reduction of pitch attitude to obtain and maintain a proper glide speed upon experiencing an engine failure is the first priority. If the failure has occurred shortly after take-off, a landing should be planned straight ahead with only small changes in the flight direction to avoid obstacles. The best gliding ratio can be achieved with flaps up – flaps down will decrease the stall speed but at the same time reduce gliding performance. Try to stop rotation of propeller if restarting efforts are not successful – a windmilling propeller has higher drag than a stopped propeller.

While gliding towards a selected forced landing site, an effort should be made to determine and correct the cause of engine failure – time and altitude permitting. Do not concentrate on the cause of the engine failure or attempt an engine restart unless you have selected a suitable landing site and have sufficient altitude and time. Flying the aircraft (especially maintaining the proper gliding speed) is always the first priority. If the cause cannot be determined and corrected the emergency landing must be accomplished.

Always announce your intentions and position after engine failure using radio and other equipment when time permits. Turn radio to international emergency frequency – 121.5 and transmit MAYDAY message. Activate Emergency Locator Transmitter (ELT) – set the switch to ON position. Set transponder (XPDR) to emergency code 7700. When the above mentioned procedure cannot be performed due to time constrains, try to complete as many steps as possible. Transmitting MAYDAY message on the frequency already tuned on your radio should be the minimum procedure.

WARNING	**During a landing it is vital for the pilot to continue to fly the aircraft. Damages and/or injuries can be minimized if the pilot is fully concentrating on controlling the aircraft until it comes to complete stop**

7.2.5 Carburetor icing

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

- carburetor heating	ACTIVATE
- airspeed	75 MPH
- throttle	1/3 of power ≈ (3500 RPM)

- if possible, leave the icing area
- increase gradually the engine power to cruise power after 1 - 2 minutes.
- if you fail to recover the engine power, land on the nearest airfield (if feasible), or, depending on circumstance, off-airfield, following the procedure given under 7.2.2

7.3 In-flight engine starting

- airspeed	75 MPH
- landing site selection	SELECT
- master switch	ON
- main fuel valve	OPEN
- wing tank fuel valves	OPEN to tank with most fuel
- choke	SWITCH ON (cold engine only)
- throttle	- ADJUST to 1/3 of travel
	- IDLE (when choke is activated)
- ignition	ON
- starter	ACTIVATE

- if the engine cannot be restarted, increase the airspeed to 85 – 100 MPH so that air flow can rotate the propeller, thus enabling engine starting.

WARNING For in-flight engine restart, the altitude loss will be about 500 – 650 feet at a minimum

7.4 Fires

Follow these procedures when fire or smoke in the engine compartment or cockpit is detected (though fires are extremely rare in properly maintained aircraft).

7.4.1 Engine fire on the ground

- main fuel valve	CLOSED
- tank fuel valves	CLOSED
- throttle	FULL – to burn off carburetor fuel
- ignition	switch off when engine has stopped as all remaining fuel in carburetors was burned
- master switch	OFF

- abandon the aircraft and extinguish fire (if possible)

- Fire damage	INSPECT

NOTE Time needed to burn fuel remaining in carburetors after fuel valves are closed is around 30 seconds.

WARNING **DO NOT CONDUCT ANOTHER FLIGHT BEFORE THE FIRE CAUSE HAS BEEN DETERMINED AND REPAIRED BY AUTHORIZED PERSONNEL**

7.4.2 Engine fire during take-off roll (still on the ground)

- throttle	IDLE
- main fuel valve	CLOSED
- brakes	apply and STOP the aircraft. Avoid braking so hard that the nose drops and the propeller hits the ground as this may cause the plane to flip on its nose.

- abandon the aircraft immediately if conditions warrant for safety, otherwise...

- throttle	FULL
- ignition	switch off when engine has stopped as all remaining fuel in carburetors has burned

- abandon the aircraft and extinguish fire (if possible)

7.4.3 Engine fire in-flight

- main fuel valve	CLOSED
- throttle	FULL
- airspeed	INCREASE as required to find an airspeed which will provide an incombustible mixture. Do not exceed V_{NE}
- landing site selection	guide the aircraft to the nearest airfield, or choose a suitable landing site for emergency landing
- ignition	switch off when engine has stopped as all remaining fuel in carburetors was burned
- master switch	OFF
- airspeed	75 MPH
- wings flaps	EXTEND AS NEEDED
- safety belts	TIGHTEN

- perform emergency landing

- abandon the aircraft and extinguish fire (if possible)

WARNING **DO NOT ATTEMPT TO RESTART THE ENGINE**

WARNING **DO NOT CONDUCT ANOTHER FLIGHT BEFORE THE FIRE CAUSE HAS BEEN DETERMINED AND REPAIRED BY AUTHORIZED PERSONNEL**

7.4.4 Cockpit or electrical fire

Electrical fires are usually signalled by the odor of burning insulation.

- cockpit door	OPEN to remove smoke from the cockpit
- avionics and other switches	OFF

Land at the nearest suitable landing site. Consider shutting down the engine (and master switch) once the suitable landing site is reached. Extinguish fire as soon as possible.

7.5 Gliding

gliding ratio.. 10 : 1

optimum gliding speed.. 70 mph

rate of descent.. 550 fpm

Always consider that you might fly though areas of descending air when calculating gliding range. Do not forget to have sufficient altitude to perform a landing procedure once a suitable landing site has been reached.

7.6 Precautionary Landing

- choose suitable landing site, evaluate wind direction and speed, surface, surrounding obstacles and total safety of the maneuver under consideration

- perform approach and fly-over at a speed of 75 MPH along the selected landing site at a height of 150 ft to estimate the area condition, obstacles and to determine exact landing direction

- follow normal landing checklist and land

after touchdown

- ignition	OFF
- master switch	OFF

- fuel valves	CLOSED
- brakes	AS REQUIRED

Precautionary landing should be preferred instead of emergency landing. When engine vibration or engine roughness is presented, do not wait until the engine stops and instead perform a precautionary landing.

Precautionary landing is also used when a fuel exhaustion is imminent. This should not happen when proper flight preparation is performed. Always perform a precautionary landing before all fuel is consumed, emergency landing following the loss of power is more complicated and more risky.

Also, consider a precautionary landing when bad weather is encountered. Again, it should not happen when proper flight planning is done. When the cloud base is forcing you to fly in low altitude and/or visibility is limited, try to reverse course to avoid bad weather area. If the conditions are not getting better or even are deteriorating, perform a precautionary landing before the conditions get even worse. **Under no circumstances depart VFR and fly into IFR conditions - it would be illegal and highly dangerous.**

7.7 Landing with blown-out tire

- carry out normal approach-to-land
- when flaring at landing, keep the damaged wheel above ground as long as possible using ailerons (or elevator for the nose wheel)
- maintain the direction upon landing run, applying rudder

7.8 Landing with a damaged landing gear

- carry out a normal approach-to-land
- if the main landing gear is damaged, perform touch-down at the lowest speed possible and maintain direction upon landing, if possible

7.9 Vibrations or other engine problem

If any unusual or forcible vibrations appear in the aircraft, it is necessary:

- to set engine speed to such power setting where the vibrations are the lowest
- to land on the nearest airfield, or to perform a precautionary landing off-airfield
- if the vibrations are increasing, carry out an emergency landing off-airfield, following procedures given under 7.2.2

If the oil pressure reduces during a flight, an engine failure is probable. Reduce the engine power and execute a nearest airfield or precautionary landing before the engine failure occurs.

7.10 Inadvertent icing encounter

- carburetor heating	ACTIVATE
- throttle	INCREASE above normal cruise settings
- course	REVERSE or ALTER as required to avoid icing

WARNING — **EVASIVE ACTION SHOULD BE INITIATED IMMEDIATELY WHEN ICING CONDITIONS ARE ENCOUNTERED**

A prompt action must be taken immediately once icing conditions are encountered. A 180° turn and a climb is usually appropriate. If the airframe ice builds extremely rapidly, consider off-airport forced landing. Approach speed should be increased depending upon icing severity.

7.11 Extreme turbulence encounter

- airspeed	REDUCE to 85 MPH
- safety belts	SECURED
- loose objects	SECURED

When an area of extreme turbulence is entered, reduce airspeed to approximately 85 MPH. Do not reduce the airspeed to lower values to prevent the aircraft stalling due to turbulence.

7.12 Electrical system malfunctions

7.12.1 Low-charge indicator is illuminated

When a low charge red light is illuminated, no immediate action is required. All avionics and other equipment is powered from the battery, so the power source is limited. Try to switch off instruments not necessary for flight and land at the nearest airfield

7.13 Inadvertent stall and spin recovery

Stall or spin should not occur during normal aircraft operation and spins are prohibited.

7.13.1 The following general procedure should be followed should a stall occur:

- lower the nose by pushing the control stick forward
- gradually increase power

7.13.2 The following general procedure should be followed should a spin occur:

- throttle IDLE
- ailerons neutral
- rudder opposite to rotation
- Once the rotation is stopped, push stick forward enough to break the stall and then establish level flight.

6.14 BRS Rescue System (optional equipment)

The installation of the rescue system should be carried out complying with the recommendations of the BRS manufacturer and Aeropro CZ. The pilot must familiarize with the BRS Owners Manual for more complete information and instructions.

Attention: Do not make changes or modifications to any part of the rescue system to guarantee safety and proper operation. Follow the recommendations published by the manufacturer of your installed system and pay special attention to the maintenance intervals.

--- ATTENTION ---

Before each flight **please remove the securing pin at the emergency handle of the rescue system so the system is ready for use in case of an emergency.**

Reinstall the pin after each flight, so that the rescue system cannot be activated by mistake.

6.14.1 Operating the Rescue System

- Stop the engine by switching off the ignition
- Pull out the emergency handle

Refer to the BRS operator's manual for detailed advisory.

8. Aircraft ground handling and servicing

8.1 Refueling, servicing oil and coolant

8.1.1 Refueling

1. verify the main switch OFF and key removed from switch
2. remove fuel tank cap
3. refuel with correct fuel grade until level rises to near the filler opening (or any required level – do not over fill)
4. replace fuel cap and check for security
5. wipe off any spilled fuel from wings – **CAUTION:** take great care to prevent fuel getting on to windscreen, skylights, or door windows. (because it will immediately damage clear surfaces)
6. repeat for opposite fuel tank

Refuelling should be carried out in areas where there is not risk of endangering either the aircraft, personnel, other property, or the environment. It is recommended that the pilot/owner fuels the plane to avoid the possibility of the line-man making a mistake and causing damage. When refuelling from a container, a funnel with a screen or filter to trap impurities must be used. Before flight, it is necessary to check fuel system for evidence of water. Samples should be taken in a transparent container from the fuel drain valve located at the bottom of the fuselage below the cockpit area. The total content of fuel can be drained when necessary by means of the fuel drain valve.

When putting fuel into tanks, be careful to avoid getting any fuel onto the windscreen or window panels with fuel as fuel contains corrosive components that will cause **IMMEDIATE damage** to cockpit glazing. Make sure that the fuel tank caps are securely closed when refuelling is completed.

8.1.2 Servicing oil

The proper oil type should always be used – see this manual or the engine manual.

1. make sure that the ignition and master switches are off
2. remove the top engine cowling
3. remove oil tank filler cap and remove and inspect dipstick -- **CAUTION**: check when engine cold
4. when the oil level is not between minimum and maximum marks on the dipstick add oil. Do not add oil above the MAX level – the excess oil would be overflowed out of the engine anyway
5. replace oil tank filler cap
6. replace the top engine cowling

The oil is to be changed every 50 or 100 hours of operation – see Maintenance Manual and engine documentation for details. The first oil change is to be performed after the initial 25 hours of operation on a new or overhauled engine.

8.1.3 Servicing coolant

The proper coolant type should always be used – see this manual.

1. make sure that ignition and master switch are off
2. remove the top engine cowling
3. remove the cap of the coolant tank -- **CAUTION**: check when engine cold
4. add coolant as necessary -- **NOTE:** refer to Inspection Checklist note #10 for coolant info
5. replace coolant tank cap
6. replace the top engine cowling

8.2 Landing gear tire dimensions and pressure

Tundra tires main landing gear wheel tire dimensions............. 800-6 or 21x8x6
Tire pressure………………………………………………………. 22 - 25 psi
-- or --
Standard tires main landing gear wheel tire dimensions........... 15x6x6
Tire pressure.. 29 psi

tail wheel tire dimensions………………………………………….. 6x2.25 as standard
Tire pressure.. n/a -- hard rubber

8.3 Moving the aircraft on the ground and tie-down instructions

8.3.1 Moving the aircraft on the ground

1. make sure that parking brake is off
2. check the space around the aircraft and in the proposed direction of movement
3. use handle located on the fuselage close to the left horizontal stabilizer leading edge
4. push the aircraft in the desired direction

CAUTION **Never push, pull, or lift the aircraft by use of the control surfaces**

8.3.2 Aircraft tie-down instructions

1. turn the aircraft into the wind, if possible
2. lock the controls (using safety belts)
3. make sure that the parking brake is on if necessary, and install wheel chocks when possible
4. attach ropes to the rings located near the top of the front main wing struts.
5. the nose of the aircraft can be tied by attaching a rope to the area between the spinner and the cowling
6. attach rope to the tail by using the removable rear tie-down rings
7. secure all ropes to the tie-down points

It is recommended to install a soft foam rubber or fabric cover into engine intakes to prevent foreign matter from accumulating inside the engine cowling. Before using chocks, make sure they do not collide with the wheel fairings in order to prevent damage.

CAUTION **Never push, pull, or lift the aircraft by use of control surfaces**

8.4 Parking Brake

8.4.1 Parking brake usage.

When applying the parking brake, ensure that the toe-brakes are fully applied as the parking brake lever is moved to the ON position. When releasing the parking brake, again apply pressure on the toe-brakes when moving the parking brake to the OFF position. Avoid leaving the parking brake ON for long periods of time. If the aircraft is to be parked for any period, it is recommended that the aircraft is either hangared or properly tied down, facing the wind. **Be sure parking brake is disengaged and the pilot is firmly applying the toe brakes before ever starting the engine.**

Required placards and markings

8.5 Airspeed indicator range markings

Marking	MPH (Indicated Air Speed)	Signification
White arc	**41 - 93**	**Flaps operating range. The lower limit is the maximum-weight zero thrust stall speed in the landing configuration. The upper limit is the maximum speed allowable with flaps extended.**
Green arc	**50 - 109**	**Normal operating range. The lower limit is the maximum-weight zero thrust stall speed with flaps retracted, and the upper limit is maneuvering speed.**
Yellow arc	**109 - 143**	**Caution range – operation must be conducted with caution and only in smooth air.**
Red line	**143**	**Never exceed speed. Maximum speed for all operation.**

Overview of speed limits:

Speed		MPH (Indicated Air Speed)	Remarks
V_{NE}	Never exceed speed	143	Do not exceed this speed in any operation.
V_A	Maneuvering speed	109	Do not make full or abrupt control movements -- the maximum is 1/3 deflections of control surfaces above this speed or the aircraft might be overstress.
V_{FE}	Maximum flaps extended speed	93	Do not exceed this speed with wing flaps extended.
V_{S0}	Minimum steady flight speed	43	with extended wing flaps
V_{S1}	Minimum steady flight speed	50	wing flaps retracted

8.6 Operating limitations on instrument panel

Manufacturer: **AEROPRO CZ s.r.o., Hluk, Czech Republic**			
Max. take-off weight:		**1235 lbs**	
Never exceed speed	V_{NE}	**143**	**MPH**
Max. flap extended speed	V_{FE}	**93**	**MPH**
Stall speed			
– wings level, flaps down	V_{S0}	**43**	**MPH**

8.7 Passenger warning

This aircraft was manufactured in accordance with Light Sport Aircraft airworthiness standards and does not conform to standard category airworthiness requirements.

8.8 "Aerobatics and Spins are Prohibited"

The following placard is located on the instrument panel.

AEROBATICS AND SPINS ARE PROHIBITED

8.9 Miscellaneous placards and markings

Passenger warning

This aircraft was manufactured in accordance with Light Sport Aircraft airworthiness standards and does not conform to standard category airworthiness requirements.

Rotax 912 Engine Limitations

	Warning	Limit
Engine speed..........	5,500 RPM	5,800 RPM
Exhaust gas temp....	1,600 F	1,850 F
CHT temperature.....	250 F	280 F
Oil temperature........	260 F	300 F
Oil pressure max.....	78 PSI	100 PSI
Oil pressure min......	28 PSI	12 PSI

Fuel tank capacity: 10.6 U.S. gal.
Fuel specification:
Premium unleaded auto fuel
or
100LL Aviation fuel
(refer to Rotax operator's manual).

9. Supplementary information

9.1 Flight familiarization procedures

Familiarization flight procedures depends on the pilot's experience. The whole familiarization should start with a careful study of this document (Pilot Operating Handbook and Flight Training Supplement). The Maintenance Manual should also be read as well.

The recommended procedure for a well-experienced taildragger pilot usually consists of, as a minimum:

- local flight in duration of approximately 30 minutes with a qualified instructor
- 5 to 10 traffic patterns with instructor
- 5 flights reviewing emergency procedures
- local flight... 30 minutes solo
- 5 traffic patterns solo

Always perform as many flights as required to be able to properly control the aircraft, the syllabus above is for reference only.

9.2 Pilot operating advisories

reserved

9.3 Further information

The following general information is recommended for further study among other books that are available:

The ***Pilot's Handbook of Aeronautical Knowledge*** provides general basic knowledge that is essential for pilots.

The ***Airplane Flying Handbook*** is designed as a general technical manual to introduce basic pilot skills and knowledge that are essential for piloting airplanes.

Both handbooks are available online and paper copies are available from various sources.

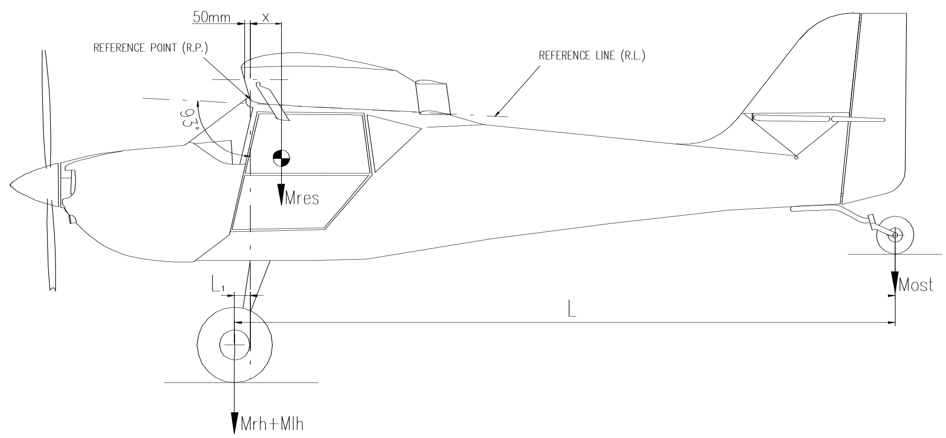
Aeropro CZ provides a "Safety of Flight Report" and a "Service Difficulty Report" form that is included with the Maintenance Manual.

Appendix 1. Airplane weight and balance statement - example

The CG position of empty aircraft is determined by weighing. The procedure is described in the Maintenance Manual. The whole procedure must be repeated and new **Airplane weight and balance statement** must be prepared whenever a modification or repair having impact to the weight of the aircraft occurs.

Serial Number [ ] **Registration:** [ ]

Aircraft Leveling:



Values weighed:

Main wheels	right-hand	Mrh =		L=	
	left-hand	Mlh =		L_1=	
Tail wheel		Most =			
Resulting weight		Mres =			

C.G. position

$$B = (M_{ost} \times (L - L_1) - M_{pr} \times L_1) / M_{rst} = \qquad [\text{mm}]$$

$$X = B + 50 = \qquad [\text{mm}]$$

$$\overline{X} = (X \times 100) / 1300 = \qquad [\%MAC]$$

Date: Performed by:

10. FLIGHT TRAINING SUPPLEMENT

Introduction

This supplement should enable you to familiarize yourself with the flight performance and flight characteristics of the A220. To carry out these instructions you may need to refer to the appropriate chapters provided in the aircrafts POH.

The following pages describe flight characteristics experienced during these various flights configurations and weather conditions:

Takeoff
Climbing
Cruise
Stall
Slip
Gliding
Descent
Approach
Touch down

This supplement was introduced only as an additional guide to experience the capabilities of the aircraft, it is not a substitute to flight school training! If you are not yet familiar with the aircraft, we strongly recommend you follow these instructions only when accompanied by a skilled flight instructor.

It is strongly recommended that all pilots new to the A220 fly as a minimum at least two hours with a qualified instructor, consisting of at least 5 to 10 traffic patterns and 5 practice emergency procedures. This should then be followed by an hour solo flight consisting of 5 traffic patterns while under instructor supervision. Pilots should seek further training with an instructor if they or the instructor are not completely sure that the pilot is capable and safe to fly the A220 aircraft. Of course, the pilot must have a current BFR (Biennial Flight Review) to be legal to fly without an instructor.

In addition, the pilot needs to be sure to meet their insurance company requirements and ascertain that their insurance will provide coverage during the training and subsequent flights. Many insurance companies require that the pilot have 5 hours flight time with an instructor and an instructor sign-off before they will provide insurance coverage -- so the pilot must check his insurance policy to be sure to comply with the prerequisites in the insurance policy.

Takeoff

Takeoff under normal conditions

1) After the preflight check has been carried out, extend half flaps.
2) Ensure that the elevator trim is in the correct position for takeoff.
3) Whenever possible, takeoff directly into the wind. The maximum crosswind limitation for takeoff is 17 mph (15 kts).
4) Smoothly apply full throttle and maintain runway heading.
5) As the aircraft accelerates:
For **taildragger** aircraft, gently push the stick forward to raise the tail, then soon pull back on the control stick until the aircraft becomes airborne.
6) Once airborne, slowly release the pressure on the control stick to allow the airspeed to increase to 70 mph (61 kts). Maintain this speed and avoid making any climbing turns until a sufficiently safe altitude has been reached.
7) When all obstacles have been cleared, retract the flaps (0˚ position).

Takeoff in tailwind conditions

Similar to normal takeoff except for an extended takeoff run distance.
The takeoff run distance is affected by weather and surface conditions, as well as the takeoff weight of the aircraft. However, average distance is 250 to 420 ft.

Climbing

Climbing after takeoff

Once airborne, establish an indicated airspeed of 70 to 80 mph (61 to 70 kts). This airspeed will achieve the aircraft's best rate of climb, usually resulting in an 800 to 1000 ft/min climb rate. During the climb it is essential to watch oil and coolant temperatures.

Climbing while in cruise

If you want to climb while in a cruise, select an airspeed between 80 to 92 mph (70 to 80 kts). At these speeds, the aircraft will climb between 600 to 800 ft/min, depending on weather conditions, altitude and weight of the aircraft.
It is strongly recommended to watch oil and coolant temperatures. Under no circumstances should any of the engine temperature limits be exceeded, otherwise, an engine failure may result.

Emergency climbing

If you have to climb at a maximum angle due to any circumstances, we recommend to establish an indicated airspeed of 60 to 65 mph (52 to 56 kts) at full power. This will give you the maximum angle of climb with a minimum horizontal speed. Watch engine temperatures during the climb!

Cruise

Normal cruise

The cruising speed in level flight and calm weather conditions is usually 110 to 120 mph (100 to 104 kts). To achieve these airspeeds, an average fuel consumption of 4.0 to 4.5 gallons per hour is typical. Fuel consumption is variable, depending on external circumstances like temperature, air pressure and payload of the aircraft.
Once the aircraft is trimmed for cruise, it should maintain its altitude for extended periods without making any corrections to the pitch control.

Cruising in gusty conditions

When flying in gusty weather conditions the maximum permissible airspeed of 110 mph (96 kts) should not be exceeded for safety reasons.

Stall

The A220 is fully controllable when flying at a wide range of airspeeds, however if the airspeed goes below the lower speed limit, the aircraft should display stable stall characteristics. If the airspeed is reduced by the pilot gradually pulling back on the control stick, aerodynamic buffet will occur, indicating that the aircraft is approaching the stall speed. Should the aircraft then be allowed to stall, the aircraft should remain controllable and the maneuver should result in a gentle nose drop followed by a stable descent and an increase of airspeed. The aircraft can be stalled both with flaps extended or retracted.
Conducting a stall maneuver does not require special skills; nevertheless, if not yet familiar with the aircraft we recommend doing this exercise only when accompanied by an experienced flight instructor for the first time.

Slipping

The A220 remains stable when slipping and a slip is easy to perform. This maneuver is used to increase aerodynamic drag to enable a high rate of descent, and normally with the power reduced to idle.
Before establishing a slip you have to ensure that the airspeed is within the required limits; the maximum permissible indicated airspeed of 110 mph (96 kts) (VA) should not be exceeded and if performing a slip with flaps extended, a maximum indicated airspeed of 94 mph (82 kts) should not be exceeded. You will achieve the maximum descent rate at an indicated airspeed of 65 mph (56 kts) with flaps fully extended. Ensure that a minimum safe airspeed of at least 60 mph (52 kts) is maintained during the slip.
Conducting a slip will not require additional skills; nevertheless, if not yet familiar with the aircraft, we recommend first carrying out this exercise only when accompanied by an experienced flight instructor.

Gliding

The aircraft can glide well with the engine set to idle or switched off. Best glide ratios are achieved within an indicated airspeed of 70 mph (61 kts). These speeds will establish a glide ratio of approximately 10:1 with the flaps retracted (0° position).

Descent

When descending from level flight it is important to watch engine temperatures. During descent, the temperatures will decrease and it is recommended not to allow temperatures to go below the lower limits.

Approach

Approach under normal conditions

Always land on the most suitable runway after considering the wind direction, size of the runway, obstacles on the approach, etc. Avoid airspeeds above 75 mph (65 kts) or below 65 mph (57 kts), as appropriate for aircraft load and conditions. Due to the good gliding performance of the A220, higher airspeeds would not be helpful during the flare and would extend landing distance.

Approach under tailwind conditions

When making a final approach with a slight tailwind, the A220 does not require any different approach or flare procedures to that when flown in calm or headwind conditions, you do however have to keep in mind, that the landing distances will increase and the float/hold-off stage may end abruptly. It must be noted that landing a taildragger with a tailwind does add some substantial controllability issues and greatly increases the risk of ground-looping.

Approach in crosswind conditions

Crosswinds will not have a big effect to the flight characteristics of the A220 as long as the wind speeds stay within the maximum permissible speed up to 17 mph (15 kts). Conducting a crosswind landing will require a little more skill than an into wind landing, and so if not yet familiar with the aircraft, we recommend to initially exercise crosswind landings only when accompanied by an experienced flight instructor until sufficient experience and confidence has been gained.

Approach in turbulent weather conditions

If turbulence is indicated or wind shifts are expected, we recommend establishing an airspeed of 70 mph (61 kts) while on the approach. This will give you reserve airspeed to balance any unexpected deviations in altitude and heading. In more gusty conditions it may beneficial to stabilize the glide approach by keeping the flaps retracted. Increasing airspeed above 70 mph (61 kts) will not be helpful to stabilize the aircraft, so this should be avoided.

Approach in rain showers

Raindrops on the wing surfaces influence the aerodynamic characteristics of the airfoil, drag will increase while lift decreases. The A220 airfoil demonstrates stable flight characteristics in rain conditions. So there are no special advisories for flights within rain; however, we recommend operating the aircraft like in turbulent weather conditions (see "Approach in turbulent weather conditions").

Approach in the slip configuration

If a high descent rate is required on final, we recommend conducting a slip maneuver. Always avoid pushing the control stick forward too far, as this will cause higher airspeeds and result in a missed approach. Hold an attitude that will maintain 65 to 75 mph (57 to 65 kts) during the slip. Ensure the airspeed does not fall below a minimum safe airspeed of 60 mph (52 kts) during the slip.
Conducting an approach in the slip configuration will not require special skills; nevertheless, if not yet familiar with the aircraft we recommend initially conducting this exercise only when accompanied by an experienced flight instructor.

Touch down

Touch down under normal conditions

The A220 has very good low speed characteristics and so is very controllable all the way through the landing phase.
It is important to establish a safe and stable airspeed during the approach. The most common problem transitioning pilots have is to over-control the aircraft. Often a lighter touch than expected is required to ensure a smooth touchdown.

Touch down in tailwind conditions

The touch down when tailwinds are present, does not require different procedures to that of normal conditions. You have to keep in mind, however, that landing distances will increase due to a higher ground speed and with a taildragger landing with a tailwind there are significant controllability concerns, as mentioned.

Approach in crosswind conditions

Crosswinds will not have a big effect to the landing characteristics on the A220 as long as wind speed is within the maximum crosswind speed up to 17 mph (15 kts).