



SE Aviation Aircraft

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Ref: Q EX NO 11 E

FLIGHT MANUAL

MCR 4S EVOLUTION

MCR- 4S Rotax 914 UL/F (113.3hp / 84.5kW)

MCR- 4S Rotax 915 iS (141hp / 105kW)



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GENERAL

INTRODUCTION

The flight manual for the aircraft was designed to provide pilots and instructors with the information necessary to efficiently and safely fly this very light aircraft.

This manual contains information that are imperative to be given to the MCR 4S pilot. It also contains supplementary information given by the builder.

The builder should complete the information appropriate to the particular configuration and selection of options.

A special place must be reserved on the luggage compartment floor in order to store this flight manual.

BASIS OF CERTIFICATION

This type of aircraft has been approved by the Ministry of Civil Aviation in accordance with the regulations in force for CNSKs.

Airworthiness Category: FAR 23 Amdt 7

WARNING, ALARMS, AND NOTES

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

Alarm:

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

Warning:

Means that the non-observance of the corresponding procedure leads to a minor degradation or to a more or less long term degradation of flight safety.

Note:

Calls attention to any particular item not directly related to safety but which is important or unusual.

SPECIFICATIONS

Aircraft of type MCR-4S EVOLUTION:

- Cantilever low-mounted wing.
- Carbon structure and wing skin with control surface skin made in light alloy.
- The aircraft might be equipped with a parachute (optional equipment).

Three view diagram



Dimensions

- Span : 8,66 m
- Wing surface : 8,15 m²
- Aspect ratio : 9,2
- Cabin width : 1,17 m
- Fuel capacity : 2x60 Litres (or 2X100)
- Overall Length : 6,72 m
- Height : 1,95 m

Control surfaces deflection

- Ailerons	-20° (-3;+0,5) trailing edge upwards +10° (+3;-0,5) trailing edge downwards
- Flaps	0; +17; +30° (±0,5°)
- Rudder	± 20°(-0+5)
- Tailplane	-10° (-6;+0) trailing edge upwards +3,5° (+3;-0,5) trailing edge downwards

Powertrain

Engine

The MCR-4S820kg is equipped with a Rotax 915is turbocharged piston engine with a maximum power of 139.5 hp / 104 kW at 5800 RPM and 132.8 hp / 99 kW continuous at 5500 RPM.

It can also be equipped with a Rotax 914 UL/F engine with a maximum power of 113.3 hp / 84.5 kW at 5800 RPM and 98.6 hp / 73.6 kW continuously at 5500 RPM.

Propeller

List of propellers compatibles depending on the engine:

Refer conformity statement.

Fuel

Type: AVGAS 100LL or UL91

Capacity:

- Total : 2 X 60 (or 2x100) litres
- Usable : 118 (or 198) litres

Unusable fuel: 2 litres

Lubricant

Semi or synthetic type oil¹

Coolant fluid

Type: Eau or Glycol

Flight crew

The minimum crew is one pilot. Maximum of four seats.

Tyre pressures

	Ø	Pressure
Front wheel	280 mm (4.00-4)	2,2 bar
Main gear	5.00-5	2,5 bar

¹

Refer to the latest edition of the engine manufacturer's maintenance manual and service bulletins, as variations may occur depending on the type of engine used and the fuel used.

LIMITATIONS

INTRODUCTION

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

The limitations included in this section have been approved by the French Civil Aviation Authority.

AIR SPEED

	Speed	IAS	Remarks
VNE	Velocity never exceed	315 km/h - 170 kt	Velocity never exceed
VNO	Maximum speed structural cruising	250 km/h - 135 kt	Do not exceed this speed, except in calm air and with care
VA	Manoeuvring speed	229 km/h - 124 kt	Do not make full or abrupt control movements above this speed, because under certain conditions the aircraft may be subjected to undue stress by full control movement.
VFE	Maximum speed with flaps 17° or 30°	170 km/h - 92 kt	Do not exceed this speed with flaps down.

Maximum mass 820 kg		
	Speed	IAS
Vs0	Stall speed landing configuration	87 km/h - 47 kt
Vs1	Stall speed specific configuration (flaps 1)	94 km/h - 51 kt
Vx	Maximum slope speed (best angle of climb)	120 km/h - 65 kt
Vy	Vz max speed (best rate of climb)	140 km/h - 76 kt
Vo	Maximum manoeuvring speed	-
Vg	Best glide speed	170 km/h - 92 kt

AIR SPEED INDICATOR MARKERS

The airspeed indicator markings and their color-coded meanings are shown below:

Arc	Value (km/h or Kt)		Meaning
White	86 → 170 km/h	46 → 92 kt	Operating range with flaps down
Green	117 → 250 km/h	63 → 135 kt	Normal operating range
Yellow	250 → 315 km/h	135 → 170 kt	Manoeuvres should be performed with care and only in calm air.
Red limit	315 km/h	170 kt	VNE

FLIGHT REGIME

Only day VFR out of icing conditions.

MANEUVERING LOAD FACTOR

+3.8 / -1.8 g

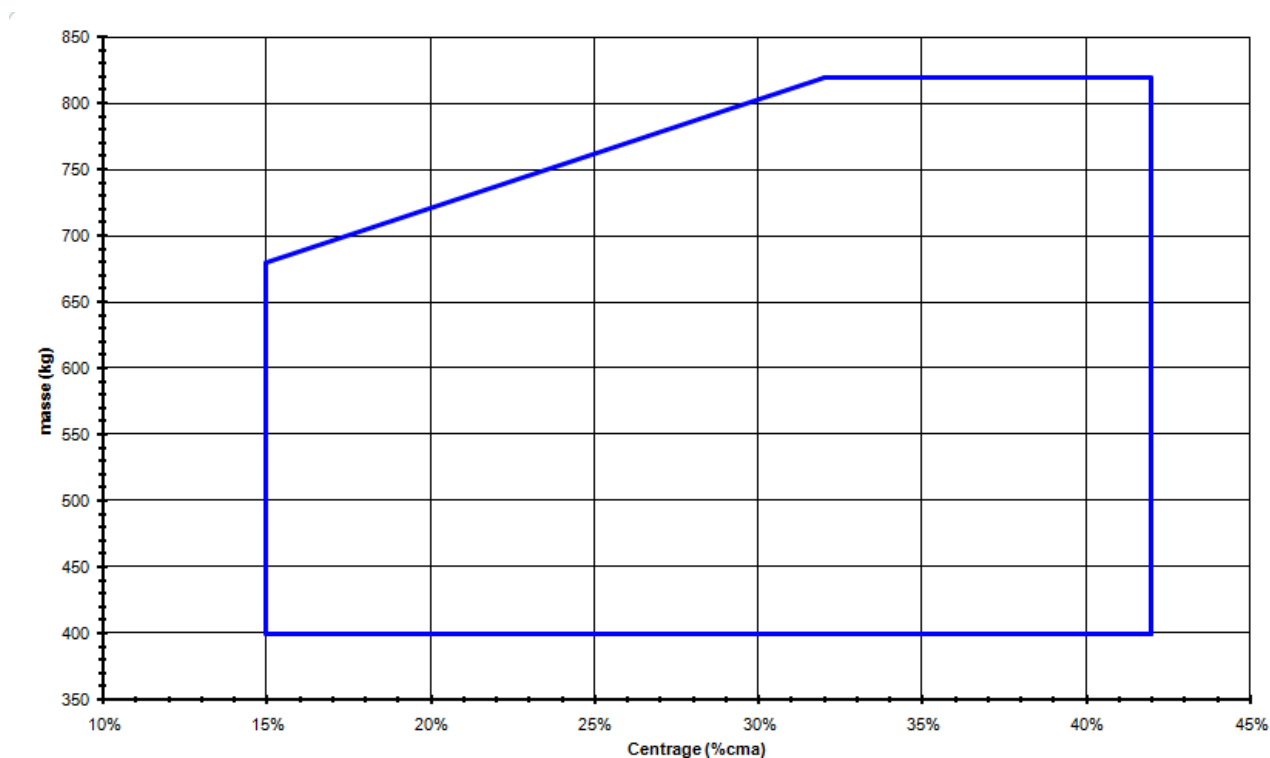
MASSES

	Without Parachute	With Parachute
Maximum take-off and landing mass	820 kg	820 kg

BALANCE

Balance range: 15% to 42% of MAC²

The balance reference is located at the leading edge of the wing.



MASS LIMITATION OF INSTRUMENT PANEL

The maximum weight of the fully equipped and wired dashboard is increased to 15 kg.

STALL SPEEDS (APPROVED DATAS)

Mass 820 kg (MTOW without parachute):

<u>Bank angle</u>	<u>Flaps</u>	
	0°	17°
0°	112 km/h - 60 kt	94 km/h - 51 kt
30°	121 km/h - 65 kt	101 km/h - 55 kt
60°	159 km/h - 86 kt	132 km/h - 71 kt

²

MAC : Mean Aerodynamic Chord - 960 mm

Mass 600 kg:

<u>Bank angle</u>	<u>Flaps</u>	
	0°	17°
0°	105 km/h - 57 kt	87 km/h - 47 kt
30°	112 km/h - 60 kt	94 km/h - 51 kt
60°	148 km/h - 80 kt	123 km/h - 66 kt

APPROVED MANOEUVERS

NO ACROBATIC MANEUVERS ARE ALLOWED.

SPINS ARE PROHIBITED.

CROSS WIND LIMITATIONS

Cross wing tested: 20 kt.

SOLO FLIGHT

For any solo flight, it is imperative to fasten the harness around the unused seat.

POWER PLANT

Engine: Rotax 914 UL/F

Instrument	Unit	Minimum red limit	Orange arc Orange (Attention range)	Green arc (Normal operating range)	Yellow arc (Attention range)	Maximum red limit
Tachymeter	RPM	1400	1400 → 3500	3500 → 5500	5500 → 5800	5800
Oil temperature	°C	50	50 → 90	90 → 110	110 → 130	130
	°F	122	122 → 194	194 → 230	230 → 266	266
Cylinder head temperature (CHT)	°C	60	60 → 80	80 → 110	110 → 135	135
	°F	140	140 → 176	176 → 230	230 → 275	275
Fuel pressure	Bar PSI	0,15 2,20		0,15 → 0,35 2,20 → 5,08		0,35 5,08
Oil pressure	Bar	0,8* 12*	0,8 → 2 12 → 29	2 → 5 29 → 73	5 → 7 73 → 102	7 102
Fuel quantity	Litres	1				2 X 60 (or 2x100)

Engine: Rotax 915 iSc/iS:

Instrument	Unit	Minimum red limit	Orange arc Orange (Attention range)	Green arc (Normal operating range)	Yellow arc (Attention range)	Maximum red limit
Tachymeter	RPM	1800	1800 → 3500	3500 → 5500	5500 → 5800	5800
Oil temperature	°C °F	50 122	50 → 90 122 → 194	90 → 110 194 → 230	110 → 130 230 → 266	130 266
Cylinder heat temperature (CHT)	°C °F	*	50 → 80 122 → 176	80 → 110 176 → 230	110 → 120 230 → 248	120 248
Fuel pressure	Bar PSI	2.5 36		2.9 → 3.1 42 → 45		3.5 51
Oil pressure	Bar PSI	0,8* 12*	0,8 → 2 12 → 29	2 → 5 29 → 72.5	5 → 7 73 → 102	7 102
EGT	°C °F	-	-	-	-	950 1742
Manifold temp	C°			0° → 50°	51° → 80°	
ECU charge A and B	V	12,4	12,4 → 13,5	13,5 → 14,2	14,2 → 14,5	14,5
MAP	Bar inHg	0.06 1.77	-	-	-	1,73 51
Fuel quantity	Litre	5				2 X 60 (or 2x100)

Important notes:

Never turn off the master switch before turning off the engine

Never run the engine at more than 5500 RPM and 42 hgin for more than 5 continuous minutes

* Never start the engine if the temperature is below -20°C (- 4°F)

FUEL

Type: AVGAS 100LL

Capacity:

- Total : 2 X 60 (or 2x100) litres
- Usable : 118 (or 198) litres

Unusable fuel: 2 litres

EMERGENCY PROCEDURES

INTRODUCTION

This section provides a checklist and detailed procedures for dealing with emergencies that may occur. Emergencies due to aircraft or engine malfunction are extremely rare, if proper pre-flight inspections and maintenance are practiced.

However, if an emergency does occur, the basic guidelines outlined in this section should be considered and applied as necessary to resolve the problem.

ENGINE FAILURE

Engine failure during take-off (during take-off run)

If there is enough runway length remaining:

- Fully reduce Power and apply brakes

If there is insufficient runway length remaining:

Engine: Rotax 914 UL/F:

- | | |
|----------------------|---------------|
| – Fully reduce power | |
| – Brake hard | |
| – Fuel tap | Closed |
| – Magnetos | OFF |
| – Battery | OFF |

Engine: Rotax 915 iSc/iS:

- | | |
|----------------------|---------------|
| – Fully reduce power | |
| – Brake hard | |
| – Fuel tap | Closed |
| – ECU A and B | OFF |
| – Key selector | OFF |
| – Battery | OFF |

Engine failure immediately after take-off

Engine: Rotax 914 UL/F:

- Airspeed	170 km/h - 92 kt
- Fuel tap	Closed
- Magnetos	OFF
- Flaps	As required
- Battery	OFF

Never attempt to make a U turn to return to the runway

Engine: Rotax 915 iSc/iS:

- Airspeed	170 km/h - 92 kt
- Fuel tap	Closed
- ECU A and B	OFF
- Key selector	OFF
- Flaps	As required
- Battery	OFF

Never attempt to make a U turn to return to the runway

IN-FLIGHT RESTART

Starter motor restart

If the altitude is sufficient to attempt to restart the engine:

Engine: Rotax 914 UL/F :

- Airspeed	170 km/h - 92 kt
- Fuel tap	Open
- Electric pump	ON
- Throttle setting	1/2
- Magnetos	« BOTH »
- Starter	ON

If the motor does not start, plan to make a forced landing.

Engine: Rotax 915 iSc/iS:

- Airspeed	170 km/h - 92 kt
- Fuel tap	Open
- Backup battery	ON
- Electric fuel pump	ON
- Throttle setting	55% 70%
- ECU	ON
- Key selector	Starter

If the motor does not start, plan to make a forced landing.

Dive restart

If the altitude is sufficient to attempt to restart the engine (minimum altitude lost 1500 feet):

Nose dive as explained:

Engine: Rotax 914 UL/F:

- Airspeed	250 km/h - 135 kt
- Throttle setting	1/2
- Fuel tap	Open
- Electric pump	ON
- Magnetos	« BOTH »

Engine: Rotax 915 iSc/iS:

- Airspeed	250 km/h - 135 kt
- Throttle setting	55% 70%
- Fuel tap	Open
- Backup battery	ON
- ECU A and B	ON
- Electric pump	ON
- Key selector	Pump

SMOKE AND FIRE

Fire on engine start

Continue starting the engine (or leave it running if it has already started)

Engine: Rotax 914 UL/F:

- Throttle setting	Fully open
- Electric fuel pump	OFF
- Fuel tap	Closed

If the fire persists:

- Magnetos	OFF
- Battery	OFF

EVACUATE THE AIRCRAFT

Engine: Rotax 915 iSc/iS:

- Throttle setting	Fully open
- Electric fuel pump	OFF
- Key selector	Pump
- Fuel tap	Closed

If the fire persists:

- ECU A and B	OFF
- Battery	OFF

EVACUATE THE AIRCRAFT

Airborne engine fire

Engine: Rotax 914 UL/F:

- Fuel tap	Closed
- Throttle setting	Fully open until engine stops
- Electric fuel pump	OFF
- Cabin heating and ventilation	Closed
- Airspeed	170 km/h - 92 kt

Prepare for a forced landing with an engine inoperative

Engine: Rotax 915 iSc/iS:

- Fuel tap	Closed
- Throttle setting	Fully open until engine stops
- ECU A and B	OFF
- Electric fuel pump	OFF
- Key selector	OFF
- Backup battery	ON

- Cabin heating and ventilation	Closed
- Airspeed	170 km/h - 92 kt

Prepare for a forced landing with an engine inoperative

Cabin fire

Extinguish the fire

Open ventilation to eliminate the smoke

In case of an electrical fire (recognised by the smell of burning insulation):

- Reduce cabin ventilation	
- Battery	OFF
- Backup battery	OFF

LAND QUICKLY

GLIDING

- Recommended airspeed	170 km/h - 92 kt
- Flaps	0°
- Glide ratio	16

FORCED LANDING

Planned forced landing with engine stopped

Choose a suitable site

Engine: Rotax 914 UL/F:

- Best glide ratio airspeed	170 km/h - 92 kt
- Belt / safety harness	Tight
- Electric fuel pump	OFF
- Throttle setting	Closed
- Magnetos	OFF
- Fuel tap	Closed
- Battery	OFF
Flaps:	
- An approach	Retract
- Runway / field ensured	As required
On short final	Vi = 117 km/h - 63 kt (Full Flaps)
- Flaps	30°
- Indicated airspeed	117 km/h - 63 kt
- Canopy	Unlocked

Engine: Rotax 915 iSc/iS:

- Best glide ratio airspeed	170 km/h - 92 kt
- Belt / safety harness	Tight
- Throttle setting	Closed
- ECU A and B	OFF
- Electric fuel pump	OFF
- Key selector	OFF
- Fuel tap	Closed
- Battery	OFF
- Backup battery	OFF
Flaps:	
- An approach	Retract
- Runway / field ensured	As required
On short final	Vi = 117 km/h - 63 kt (Full Flaps)
- Flaps	30°
- Indicated airspeed	117 km/h - 63 kt
- Canopy	Unlocked

Planned forced landing with engine running

Proceed as for a normal landing

Engine: Rotax 914 UL/F:

- Best glide ratio airspeed	170 km/h - 92 kt
On final	
- Flaps	30°
- Indicated airspeed	117 km/h - 63 kt
- Canopy	Unlocked
Prior to touchdown	
- Magnetos	OFF
- Fuel tap	Closed
- Battery	OFF

Engine: Rotax 915 iSc/iS:

- Best glide ratio airspeed	170 km/h - 92 kt
On final	
- Flaps	30°
- Indicated airspeed	117 km/h - 63 kt
- Canopy	Unlocked
Prior to touchdown	
- ECU A and B	OFF
- Key selector	OFF
- Fuel tap	Closed
- Battery	OFF

RECOVERY FROM AN UNINTENTIONAL SPIN

- Throttle	Reduce
- Flaps	Retract
- Rudder	Opposite spin direction
- Elevator	To neutral
- Aileron	To neutral

The aircraft must recover from the spin in less than one turn by performing the above manoeuvres. If it is not possible to recover from the spin, **activate the parachute**.

USE OF AIRFRAME PARACHUTE (IF EQUIPPED)

The use of the airframe parachute is a last resort to save the lives of the aircraft occupants. Its use could be justified in distress situations such as: mid-air collision, loss of flight controls, structural failure, pilot disorientation or incapacitation, or any other circumstances in which the pilot does not believe that an emergency landing can be made without serious damage to the occupants.

If necessary:

- Safety pin	Removed
- Fuel tap	Closed
- Pilots and occupants	Check tightening of safety harness
- Parachute handle	Take full hold and pull firmly
- ELT (if equipped)	ON
- Transponder (if equipped)	Code 7700
- Radio message (if equipped)	MAYDAY

Pilots and passengers should protect their faces and hold their bodies together.

After landing and analysis of possible damage and injuries, evacuate the aircraft as soon as possible.

In case of fire, do not use the parachute.

ALARM WARNINGS

IN FLIGHT

Engine: Rotax 914 UL/F:

– TCU red warning permanently active	Reduce speed / increase pressure manually
– Red TCU light is flashing	Reduce speed and increase pressure to maximum continuous speed.
– Orange TCU light is flashing	Reduce RPM and manifold pressure manually Stay within operating limits*.
– Orange light Battery	Switch off the power supply. Go to the nearest airfield.
– Red oil pressure light	Monitor oil temperature Prepare for a field landing with engine failure

* If the regulation of the intake pressure is no longer possible (variation of the PA), the servo motor of the turbocharger must be deactivated => turbo cut-off switch on OFF

Engine: Rotax 915 iSc/iS:

– ECU A and B lights on continuously	Reach the nearest landing strip, prepare for an engine failure landing.
– ECU A and B light is flashing	Possible flight to the destination.
– Single ECU light on continuously	Possible flight to the destination.
– Light of one ECU flashes + light of the other ECU on permanently	Possible flight to the destination.
– Single ECU light is flashing	Possible flight to the destination.
– Orange light Battery	Switch off the power supply. Go to the nearest airfield.
– Red oil pressure light	Monitor oil temperature Prepare for a field landing with engine failure

ON GROUND:*Engine: Rotax 915 iSc/iS:*

– ECU A and B lights on continuously	Unauthorized flight. Maintenance action required
– ECU A and B light is flashing	Unauthorized flight. Maintenance action required
– Single ECU light on continuously	Unauthorized flight. Maintenance action required
– Light of one ECU flashes + light of the other ECU on permanently	Unauthorized flight. Maintenance action required
– Single ECU light is flashing	Unauthorized flight. Maintenance action required

OTHER EMERGENCIES

Vibrations and erratic engine behaviour: likely causes

Engine: Rotax 914 UL/F:

– Contaminated fuel	Switch on the electric fuel pump
– Ignition: magneto switch	« L », then « R », then back on « Both »
– Admission pressure variation	Turbo cut-off switch on OFF

Select the position that gives the smoothest running and land as soon as possible on the closest runway.

Engine: Rotax 915 iSc/iS:

– Contaminated fuel	Switch on the electric fuel pump
– Turbo fracture	Search for a landing possibility
– Ignition test ECU : ECU switch on	A A and B B A and B

If flight with reduced performance is possible, fly to the nearest airfield, prepare for a cross-country landing

Coolant system failure

- If the coolant temperature rises abnormally, reduce the engine power setting to the minimum necessary, prepare for a field landing

Oil feed malfunction

If the oil pressure is low, look at the oil temperature. If the oil temperature rises (into the red), do not touch the throttle but contact the closest airfield and prepare to make a forced landing.

Icing

Avoid entering icing meteorological zones and change altitude.

Set heating system to de-mist and/or apply carb heat (if equipped).

Electric generation failure

If you see that:

- | | |
|-----------------------------|------------|
| - Charging light | ON |
| - Low battery warning light | Decreasing |

Then:

Switch off all non-essential electric equipment and join nearest airfield.

NORMAL PROCEDURES

INTRODUCTION

This section provides a checklist and detailed procedures for conducting normal use. Normal procedures associated with optional systems can be found in the "Supplements" section.

DAILY INSPECTIONS

Cockpit:

- Seats	Adjusted and locked
- Safety harness attachment	Checked
- Left and right-hand side elastics	In place
- Main wing axes	In place, pinned
- Ailerons system	In place, locked
- Flaps system	In place, locked
- Pitot tube	Connected
- Flight controls	Free
- Battery switch	ON
- Fuel quantity	Checked
- Fuel tank	Level checked
- Tank cap	In place, locked
- Battery switch	OFF
- Flight documents	Checked on board
- Loading: mass and balance, position of luggage	Checked
- Canopy cleanliness	Checked

Fuselage, left-hand side

- Left static	Clean, not obstructed
- Antenna fixation	Checked

Be careful not to injure yourself with the antennas

Elevator

- Surface condition	Checked
- Rudder	Cable joints and fastenings checked, no play
- Elevator	Cable joints and fastenings checked, no play
- Control axis	In place, tightened

- Tab-antitab control	In place
-----------------------	----------

Fuselage, left-hand side

- Left static	Clean, not obstructed
- Antenna fixation	Checked

Be careful not to injure yourself with the antennas

Right wing

- Condition and articulation of flap, aileron	Checked
- Sealing of the wing - fuselage connection	Checked
- Sealing of the wheelhouse - main gear trousers connection	Checked
- Wingtip status and (if applicable) navigation light	Checked
- Right main gear	Tire fixing, braking and inflation checked

Around engine cowling

Engine: Rotax 914 UL/F

- Engine cowling fixation	Checked
- Air intakes	Clean and non-obstructed
- Propeller cone	Fasteners checked, no play
- Propeller	Clean and in good condition
- Oil level	Checked*
- Purges	Done (absence of water and impurities)
- Exhaust tube	Checked fasteners
- Fuel tank venting (under fuselage)	Clean and unclogged

* For a good oil level reading, it is important to take the dipstick out and wipe it clean before putting it back in to take the reading.

Engine: Rotax 915 iSc/iS :

- Engine cowling fixation	Checked
- Air intakes	Clean and non-obstructed
- Propeller cone	Fasteners checked, no play
- Propeller	Clean and in good condition
- Oil level	Checked*
- Coolant level expansion tanks	Checked
- Coolant level overflow bottle	Checked
- Purges	Done (absence of water and impurities)
- Exhaust tube	Checked fasteners
- Fuel tank venting (under fuselage)	Clean and unclogged

* Before checking the oil level, turn the propeller several times by hand in the direction of engine rotation.

* For a good oil level reading, it is important to take the dipstick out and wipe it clean before putting it back in to take the reading.

Left wing

- Left main gear	Tire fixing, braking and inflation checked
- Pitot tube	Clean, not obstructed
- Wingtip status and (if applicable) navigation light	Checked
- Condition and articulation of flap, aileron	Checked
- Sealing of the wing - fuselage connection	Checked
- Sealing of the wheelhouse - main gear trousers connection	Checked

BEFORE FLIGHT INSPECTION

Repeat daily inspection.

NORMAL PROCEDURES AND CONTROL LISTS

Inside cockpit check

- Parking brake	Set
- Flaps	Up
- Seats	Adjusted
- Rudder pedals	Adjusted
- Safety harness	Tightened
- Flight controls	Free
- Trim deflection	Checked, take-off position
- Canopy	Closed not locked

Cold start-up (ROTAX)

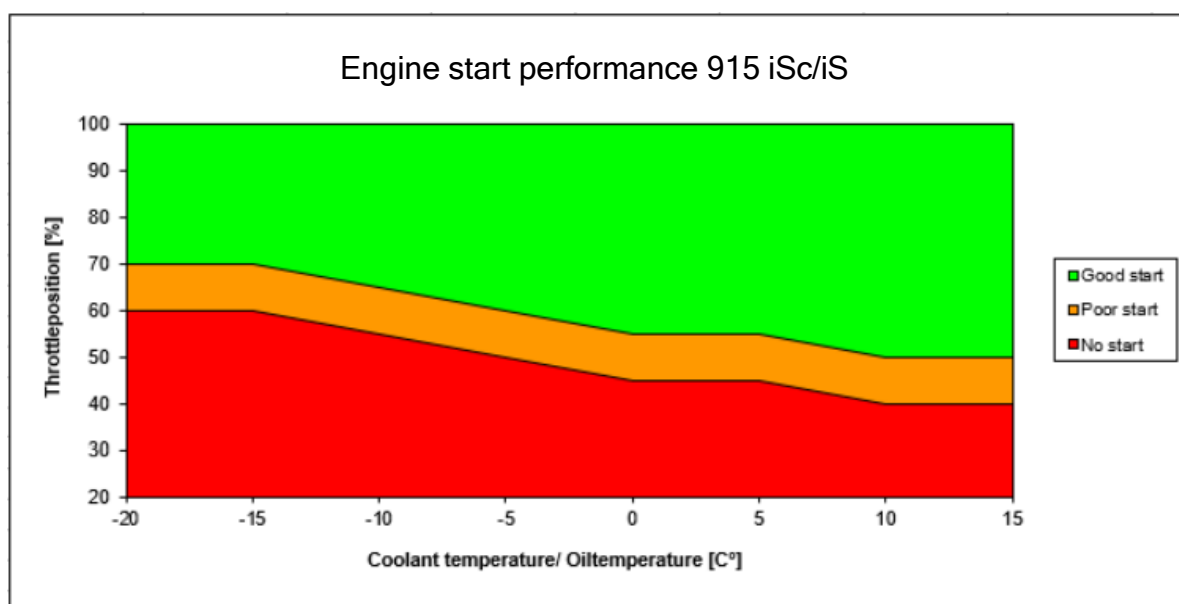
Engine: Rotax 914 UL/F

- Battery	ON
- Fuel tap	Verified functioning / open
- Fuel quantity	Noted
- Electric pump	ON
- Propeller (if variable pitch)	Full small pitch
- Throttle position	Full idle
- Choke	Pull
- Propeller area	Free
- Magnetos switch	« BOTH »
- Starter	ON, on demand

Engine: Rotax 915 iSc/iS

- Battery	ON
- Backup battery	ON
- Fuel tap	Verified functioning / open
- Fuel quantity	Noted
- Backup electric pump	ON
- Key position	Pump
- Propeller (if variable pitch)	Full small pitch
- Throttle position	Adjusted*
- Propeller area	Free
- ECU A and B	ON
- Key position	Start

* Use the chart to adjust the throttle according to the coolant temperature.



As soon as the engine is running

Engine: Rotax 914 UL/F

- Backup fuel pump	OFF
- Choke	Pushed back
- Engine	1600 RPM
- Oil pressure	In yellow zone within 10 sec
- Charge	Checked
- Canopy	Locked / Checked

Engine: Rotax 915 iSc/Is:

- Backup electric pump	OFF
- Engine	2500 RPM
- Oil pressure	In yellow zone within 10 sec
- Backup battery	OFF
- ECU A and B charge	Checked
- Canopy	Locked / Checked

Hot start-up

Engine: Rotax 914 UL/F

- Battery	ON
- Fuel tap	Verified functioning / open
- Fuel quantity	Noted
- Electric pump	ON
- Propeller (if variable pitch)	Full small pitch
- Throttle position	Full idle
- Propeller area	Free
- Magnetos switch	« BOTH »
- Starter	ON, on demand

Then proceed as for the cold start when the engine is running

Engine: Rotax 915 iSc/iS

- Battery	ON
- Backup battery	ON
- Fuel tap	Verified functioning / open
- Fuel quantity	Noted
- Backup electric pump	ON
- Key position	Pump
- Propeller (if variable pitch)	Full small pitch
- Throttle position	Adjusted*
- Propeller area	Free
- ECU A and B	ON
- Key position	Start

Then proceed as for the cold start when the engine is running

Taxi / Warming up

- Parking brake	Released
- Brakes	Tested
- Engine	2000 RPM

Then 2500 RPM until the temperatures reach the minimums

Point Fixe

Engine: Rotax 914 UL/F:

- Parking brake	Set
- Oil Pressure Temperature and CHT	Higher than mini
- Engine	3850 RPM
- Magnetos	"L", BOTH, "R", BOTH (maxi drop 300 RPM/ maxi deviation 100 RPM)
- Engine	4000 RPM
- Variable pitch propeller (if equipped)	Regulation check (Do not go below 3500 RPM)
- Idle	< 1600 RPM

Engine: Rotax 915 iSc/iS:

- Parking brake	Set
- Oil Pressure Temperature and CHT	Higher than mini (50°C)
- Engine	2500 RPM
- ECU	ECU A, OFF, ON, ECU B, OFF, ON (check +/- 250 RPM)
- Engine	MAX (>4700) RPM
- ECU	ECU A, OFF, wait 15s and check charge ECU A, ON ECU B, OFF, wait 15s and check charge ECU B, ON
- Engine	4500 RPM
- Variable pitch propeller (if equipped)	Regulation check (Do not go below 3500 RPM)
- Idle	> 1800 RPM

Before line-up

Engine: Rotax 914 UL/F:

- Magnetos	« BOTH »
- Flight controls	Checked
- Cabin (canopy, safety harness)	Checked (closed, locked)
- Oil and CHT pressure / temperature	In green arc
- Charge	Checked
- Trim	Set
- Altimeter	Checked
- Fuel tap	Open
- Fuel quantity	Checked
- Electric pump	ON
- Alarm panel	Check OFF
- Flaps	Full down then take-off position
- Compass	Checked
- Variable pitch propeller (if equipped)	Full small pitch

Engine: Rotax 915 iSc/iS:

- ECU A and B	ON
- Key position	Pump
- Flight controls	Checked
- Cabin (canopy, safety harness)	Checked (closed, locked)
- Oil and CHT pressure / temperature	In green arc
- Charge	Checked
- Trim	Set
- Altimeter	Checked
- Fuel tap	Open
- Fuel quantity	Checked
- Electric pump	ON
- Alarm panel	Check OFF
- Flaps	Full down then take-off position
- Compass	Checked
- Variable pitch propeller (if equipped)	Full small pitch

Take-offEngine: Rotax 914 UL/F:

- Minimum engine speed full throttle	
o Variable pitch propeller	> 5500 RPM
o Fixed pitch propeller	4600 → 4900 RPM depending model and setting
- Engine instruments and alarm panel	Checked
- Rotation	100 km/h - 54 kt
- Initial climb speed	Vx = 120 km/h - 65 kt
- Electric pump at 300ft	OFF
- Flaps	Up
- Climb speed	Vy = 140 km/h - 76 kt
- If variable pitch propeller	PA < 35.8
- If fixed pitch propeller	Engine < 5500 RPM

Engine: Rotax 915 iSc/iS:

- Minimum engine speed full throttle	
o Variable pitch propeller	> 5500 RPM
o Fixed pitch propeller	4600 → 4900 RPM depending model and setting
- Engine instruments and alarm panel	Checked
- Rotation	100 km/h - 54 kt
- Initial climb speed	Vx = 120 km/h - 65 kt
- Electric pump at 300ft	OFF
- Flaps	Up
- Climb speed	Vy = 140 km/h - 76 kt
- If variable pitch propeller	PA < 42
- If fixed pitch propeller	Engine < 5500 RPM

Climb

Continuous max power, set speed of 165 km/h up to 4000 ft

Cruise

See section 5 for regimes and performance.

Descent

– Fuel tap	Open
– Minimum engine speed	2400 RPM

Approach

- Cabin (safety harness)	Tightened
- Electric fuel pump	ON
- Flaps below 170 km/h (92kts)	Flaps 1 (17°)
- Speed	150 km/h (80kts)
- Alarm panel	Checked
- Altimeter	Set
- Brakes	Released
- Variable pitch propeller (if equipped)	Full small pitch

Final

- Flaps (Speed < 120 km/h - 65 kt)	Flaps 2 (30°)
- Speed	117 km/h - 63 kt
- Variable pitch propeller (if equipped)	Full small pitch

Go around

- Speed	> 100 km/h - 54 kt
- Flaps	Flaps 1 (17°)
- Speed	120 km/h - 65 kt
- Variable pitch propeller (if equipped)	Full small pitch

After landing

Engine: Rotax 914 UL/F:

- | | |
|----------------------|-----|
| - Flaps | Up |
| - Electric fuel pump | OFF |

Engine: Rotax 915 iSc/iS:

- | | |
|--------------------|-----|
| - Flaps | Up |
| - Backup fuel pump | OFF |

Engine cut-off

Engine: Rotax 914 UL/F:

- | | |
|--------------------------------------|---------|
| - Parking brake | Set |
| - Radio / Nav | OFF |
| - Let engine run 2 min at idle speed | Checked |
| - Anti-collision light | OFF |
| - Magnetos | OFF |
| - Battery | OFF |

Engine: Rotax 915 iSc/iS:

- | | |
|--------------------------------------|---------|
| - Parking brake | Set |
| - Radio / Nav | OFF |
| - Let engine run 2 min at idle speed | Checked |
| - Anti-collision light | OFF |
| - ECU A and B | OFF |
| - Key position | OFF |
| - Battery | OFF |

PERFORMANCES

INTRODUCTION

This section provides data approved by the airspeed calibration.

Stall speeds and take-off performance are additional non-approved information.

CALIBRATION OF THE AIR SYSTEM

$$V = V_i + 2/-3 \text{ km/h}$$

STALL SPEEDS

Mass 820 kg (MTOW with parachute) :

<u>Bank angle</u>	<u>Flaps</u>	
	0°	17°
0°	112 km/h - 60 kt	94 km/h - 51 kt
30°	121 km/h - 65 kt	101 km/h - 55 kt
60°	159 km/h - 86 kt	132 km/h - 71 kt

TAKE-OFF PERFORMANCES

Engine: Rotax 914 de 115 hp

- Take-off rolling distance: 400 m
- Take-off distance (15m height): 550 m

The take-off distances are to be increased by:

- 20% on a grass strip.
- 40% on a wet runway (take-off only)

They are to be reduced by:

- 10% for every 10 kts of headwind.

They can be extrapolated for intermediate masses by adding or subtracting 2.5% per 10 kg difference.

Engine: Rotax 915iS/c A of 141 hp

- Take-off rolling distance: 350 m
- Take-off distance (15m height): 500 m

The take-off distances are to be increased by:

- 20% on a grass strip.
- 40% on a wet runway (take-off only)

They are to be reduced by:

- 10% for every 10 kts of headwind.

They can be extrapolated for intermediate masses by adding or subtracting 2.5% per 10 kg difference.

MCR 4S Take Off Performance, 54knts take off, 76knts climb, Flaps 1

density alt	Temp	Power	50ft clear	-30%	-20%	-10%	0%	10%	20%	30%	40%	50%
			Tarmac	Flaps 2 VR 48knts	@650Kg	10knts headwind	concrete	tarmac	gras	High rough gras	wet gras	10Knts tailwind
-2 000 ft	19 °C	117, PS	422 m	119 m	136 m	153 m	170 m	187 m	225 m	243 m	262 m	281 m
-1 000 ft	17 °C	116,3 PS	441 m	131 m	150 m	168 m	187 m	206 m	247 m	267 m	288 m	308 m
0 ft	15 °C	115,6 PS	461 m	144 m	165 m	185 m	206 m	226 m	271 m	294 m	316 m	339 m
1 000 ft	13 °C	114,9 PS	483 m	158 m	181 m	203 m	226 m	248 m	298 m	323 m	348 m	372 m
2 000 ft	11 °C	114,2 PS	516 m	179 m	204 m	230 m	255 m	281 m	337 m	365 m	393 m	421 m
3 000 ft	9 °C	113,6 PS	552 m	202 m	231 m	260 m	289 m	317 m	380 m	412 m	444 m	476 m
4 000 ft	7 °C	112,9 PS	603 m	234 m	268 m	301 m	335 m	368 m	441 m	478 m	515 m	551 m
5 000 ft	5 °C	111,5 PS	653 m	266 m	304 m	342 m	380 m	418 m	502 m	544 m	585 m	627 m
6 000 ft	3 °C	110,2 PS	704 m	298 m	341 m	384 m	426 m	469 m	562 m	609 m	656 m	703 m
7 000 ft	1 °C	109,5 PS	754 m	331 m	378 m	425 m	472 m	519 m	623 m	675 m	727 m	779 m
8 000 ft	-1 °C	108,8 PS	805 m	363 m	415 m	467 m	518 m	570 m	684 m	741 m	797 m	854 m
					Flaps 2 Tarmac @650KG 10Knts Head	@700KG High Humidity	Tarmac @700KG	@800KG	5knts tailwind	Gras & @800Kg	Gras & 5 knts Tailwind	

CLIMB

Engine: Rotax 914 115 hp

At 140 km/h - 76 kt, Vzmax = 900 ft/min at 820kg up to 4 000 ft

Engine: Rotax 915 iSc/iS 141 hp

At 140 km/h - 76 kt, Vzmax = 1100 ft/min at 820kg up to 4 000 ft

CRUISE PERFORMANCES

Rotax 914 UL/F:

Consumption

	Rotax 914 UL/F of 113,3 hp / 84,5 kW
Maximum power	33 L/h
Maximum continuous power	27.2 L/h
75% Maximum continuous power	20.4 L/h
Specific consumption at maximum continuous power	276 g/kWh

Power

Rotax 914 UL/F of 113,3 hp / 84,5 kW			
% Power	Engine rotation speed (RPM)	Admission pressure (in Hg)	Performance (hp)
Maximum power (Take-Off)	5800	39.9	115
Maximum continuous power	5500	35.8	100
75%	5000	31	74
65%	4800	29	64
55%	4300	28	54

Cruise speed

Rotax 914 UL/F of 113,3 hp / 84,5 kW at 100% of maximum continuous power at Sea Level: $V_i = V_p = 235 \text{ Km/h} - 127 \text{ kts km/h}$

Rotax 915 iSc/iS:**Consumption³**

Rotax 915 iSc/iS of 140 hp / 104 kW	
Maximum power	47 L/h
Maximum continuous power	33 L/h
75% Maximum continuous power	26.5 L/h
Specific consumption at maximum continuous power	239 g/kWh

Power

Rotax 915 iSc/iS of 141 hp / 104 kW			
% Power	Engine rotation speed (RPM)	Admission pressure (in Hg)	Performance (hp)
Maximum power (Take-Off)	5800	51	141
Maximum continuous power	5500	42	135
75%	5000	36.5	106
65%	5000	31	92
55%	4500	30	78

Cruise speed

Rotax 915 iSc/iS of 141 hp / 104 kW at 100% of maximum continuous power at Sea Level: Vi = Vp = 250 Km/h - 135 kts km/h

³

See OPERATORS MANUAL FOR ROTAX® ENGINE TYPE 915 iA SERIES

LANDING DISTANCE

350 m

PERFORMANCE DEGRADATION

Rain and insect build-up on the air foils and fuselage reduce the stated performance by 4%.

MASS AND BALANCE

INTRODUCTION

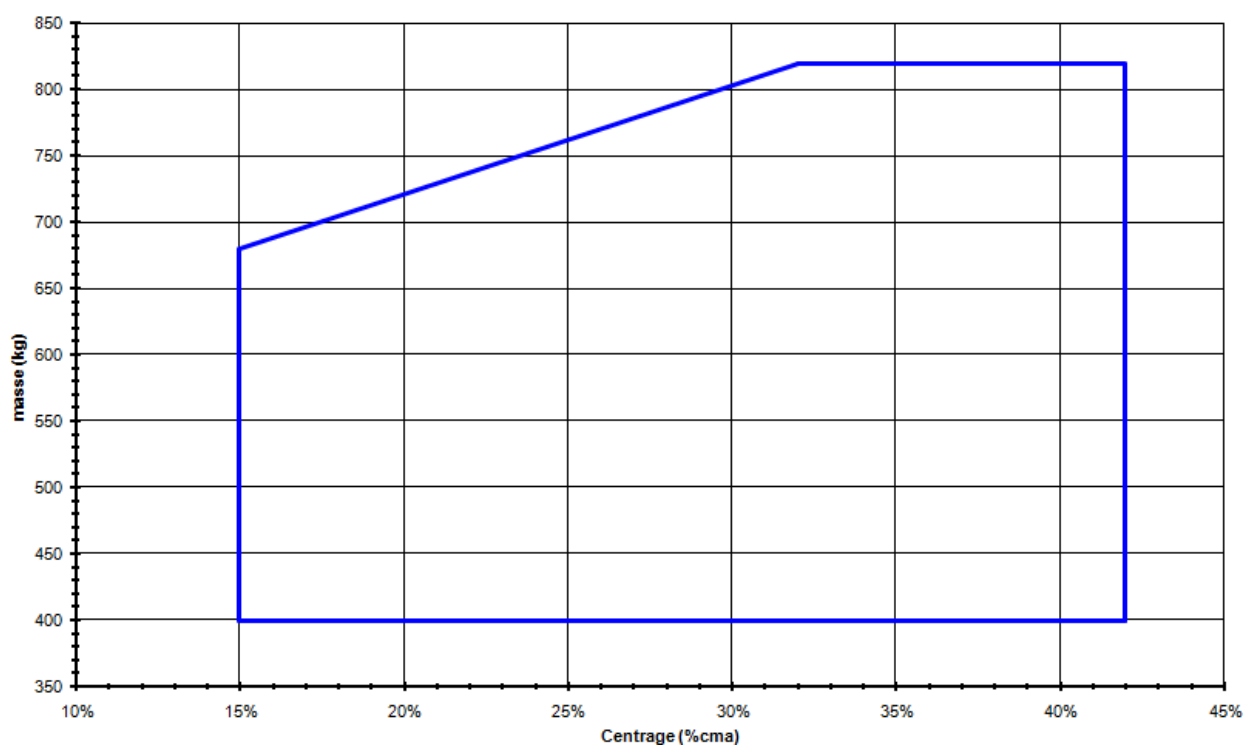
This section contains the payload cases in which the aircraft can be safely operated.

Procedures for weighing the aircraft and the calculation method for establishing the range of permissible payloads and a detailed list of all the equipment available for that aircraft and the equipment installed during the weighing of the aircraft are contained in the QEXNOPP.

DIAGRAM

Centering range: 15% to 42% of MAC⁴

The centre of gravity reference is located at the leading edge of the wing.



⁴

MAC: Mean Aerodynamic Chord - 960 mm

MASS AND BALANCE CALCULATION

The table below shows the average lever arms. It must be completed with the empty weight and the aircraft lever arm referred to in this flight manual. If possible, update the actual lever arms of the moving masses determined by weighing (see QEXNOPP procedure).

	Mass	Leaver arm		
	kg		m	
Empty mass		x		=
Pilot		x	0.155	=
Co-pilot		x	0.155	=
Luggage		x	1,550	=
Fuel		x	0.320	=
Rear seats		x	0.960	=

Total mass	
-------------------	--

Sum of moments

Calculation method

- Record the moving masses in the table above (shaded boxes).
- Calculate the total mass.
- Multiply the masses by their corresponding lever arms and transfer the result to the "moment" column.
- Calculate the sum of the moments.
- Divide the sum of the moments by the total mass. The result is the position in meters of the lever arm of the aircraft loaded at total mass M.
- Divide by 0.96 and multiply by 100 to get the result in % MAC
- Check that the calculated lever arm is within the C of G range defined by the graph on the previous page for the total mass M.

AIRCRAFT OPERATION, SERVICE AND MAINTENANCE

INTRODUCTION

This section contains the factory recommended procedures for proper ground handling and routine maintenance of the aircraft. It also identifies certain inspection and maintenance requirements that must be followed if the aircraft is to retain the performance and reliability of the new aircraft. It is wise to follow a lubrication and preventive maintenance schedule based on the weather and flight conditions encountered.

It is important to follow a rigorous maintenance cycle in accordance with the manufacturer's specifications.

The manufacturer should be contacted by notice of any modifications made to the aircraft that change the original definition of the kit.

INSPECTION PERIODS OF THE AIRCRAFT

See the latest maintenance manual (MEXNO03)

COMPLY WITH THE LATEST VERSION IN FORCE OF THE MAINTENANCE MANUAL MEX NO 03

MODIFICATIONS OR AIRCRAFT REPARATION



It is essential that the Airworthiness Authority and the manufacturer be contacted prior to any modification of the aircraft to ensure that the airworthiness of the aircraft is not compromised.

PARKING

- Parking brake	Set
- Canopy	Locked
- Canopy cover	Advised
- Main gear wheels	Chocked

Parking conditions

Park the aircraft outside only occasionally (especially in salty air conditions).

In order to protect the instruments when parking outside, protect the cabin with a canopy cover, especially in sunny conditions. Also remember to plug the static and dynamic connections.

After parking outside, inspect the aircraft thoroughly for corrosion and wash the exterior with fresh water, protecting the static and dynamic plugs.

Storage

Attachment to struts directly to the ground

Or canopy to ground anchor with if installed (TCI QPLPAC0)



DO NOT USE FLAP OR AILERON STRUTS WHICH ARE NOT DESIGNED FOR THIS PURPOSE.

CLEANING AND CARE

Clean all exterior and interior surfaces of the aircraft regularly.

Cleaning products should be appropriate for the surfaces being cleaned. Check before each cleaning especially for the canopy.

DISASSEMBLY-REASSEMBLY

It may be necessary to remove the wings and elevator, for example to store the aircraft, carry out maintenance, or load it into its transport trailer.

In this case, refer to document QEXNO12 - MCR-4S DISASSEMBLY PROCEDURE.

SUPPLEMENTS

INTRODUCTION

This section contains the appropriate supplements necessary to safely and effectively operate the aircraft when equipped with the various optional systems and equipment not supplied with the standard aircraft (to be completed by the operator).

MINIMUM EQUIPMENT LIST (MEL)

– Flight instruments:

- Airspeed indicator
- Altimeter
- Magnetic compass
- Skid indicator

– Engine instruments:

Engine: Rotax 914 UL/F:

- Tachometer
- Admission pressure indicator (if variable pitch propeller)
- Oil temperature
- Oil pressure
- Cylinder heat temperature (CHT)
- Fuel gauge
- Oil gauge

Engine: Rotax 915 iSc/iS:

- Tachometer
- Admission pressure indicator (if variable pitch propeller)
- Oil temperature
- Oil pressure
- Cylinder heat temperature (CHT)
- Fuel gauge
- Oil gauge

LIST OF INSERTED SUPPLEMENTS

	Date	Doc. N°	Inserted supplement title
<u>Example</u>	30/06/2003	1	Use in Aerial Surveillance

INSERTED SUPPLEMENTS

Use in Aerial Surveillance

<u>Example</u>	– No flight envelope limitation. – In the event of a problem with the camera's electrical installation, turn off the power to the system at the panel switch, pull the breaker and refer to normal procedures for further flight.
----------------	---

PARAMETERS 914 UL/F

Maximum Mass: TAKE-OFF – 820 kg (take-off distance = 550 m)
 LANDING – 820 kg (landing distance = 350 m)
 LUGGAGE COMPARTMENT: 40 kg

Engine: RPM max take-off – 5800 RPM
 RPM max continuous – 5500 RPM

Fuel: AVGAS 100LL or UL 91 (only)
 Total Capacity: 2 X 60 (or 2x100) L
 Total Usable Capacity: 118 (or 198) L

	Temperature	Pressure
Oil 914 UL/F:	90 → 110 °C 194 → 230 °F	2 → 5 Bars 29 → 73 PSI

Speed characteristics:

Configuration	Vi (km/h – kts)	Flaps	RPM (Propeller)	PA (Hg)	Max. Bank Angle
Rotation	100 km/h - 54 kt	17°	PPP	100 %	
Initial climb	120 km/h - 65 kt	17°	PPP	100 %	37°
Normal climb	140 km/h - 76 kt	0°	5500 RPM	100 %	37°
Best slope	120 km/h - 65 kt	0°	5500 RPM	100 %	37°
Best vario	140 km/h - 76 kt	0°	5500 RPM	100 %	37°
Cruise 100%	235 km/h - 127 kt	0°	5500 RPM	35.8	
Cruise 75%	176 km/h - 95 kt	0°	5000 RPM	31	
Cruise 65%	153 km/h - 83 kt	0°	4800 RPM	29	
Cruise 55%	129 km/h - 70 kt	0°	4300 RPM	28	
Descent VNO	250 km/h - 135 kt	0°	5500 RPM	/	37°
Approach level	170 km/h - 92 kts	17°	PPP – 4100 RPM		
Landing 5%	117 km/h - 63 kt	30°	PPP – 3100 RPM	20"	

Stall speeds (mass 820 kg)

Flaps	Vi (km/h – kts)
0°	112 km/h - 60 kt
17°	94 km/h - 51 kt
30°	87 km/h - 47 kt

Landing speeds (mass 820 kg)

Type	Flaps	Vi (km/h – kts)
Normal	30°	117 km/h - 63 kt
Flaps failure	0°	146 km/h - 79 kt

Speed limitations:

VNE	315 km/h - 170 kt
VNO	250 km/h - 135 kt
VA	229 km/h - 124 kt
VFE	170 km/h - 92 kt
Max. crosswind landing	20 kt
Best glide ratio	16

Reduced engine evolution:

Speed to be adopted in evolution (1,45 Vs)	Flaps 0°	162 km/h - 87 kts
	Flaps 17°	136 km/h - 73 kts
	Flaps 30°	126 km/h - 68 kts

PARAMETERS 915 iSc/iS

Maximum Mass: TAKE-OFF – 820 kg (take-off distance = 550 m)
 LANDING – 820 kg (landing distance = 350 m)
 LUGGAGE COMPARTMENT: 40 kg

Engine: RPM max take-off – 5800 RPM
 RPM maxi continuous – 5500 RPM

Fuel: AVGAS 100LL or UL 91 (only)
 Total Capacity: 2 X 60 (or 2x100) L
 Total Usable Capacity: 118 (or 198) L

	Temperature	Pressure
Oil 915 iSc/iS:	50 → 130 °C	2 → 5 Bars
Cooling liquid :	50 → 120 °C	29 → 73 PSI

Speed characteristics:

Configuration	Vi (km/h – kts)	Flaps	RPM (Propeller)	PA (Hg)	Max. Bank Angle
Rotation	100 km/h - 54 kt	17°	PPP	100 %	
Initial climb	120 km/h - 65 kt	17°	PPP	100 %	37°
Normal climb	140 km/h - 76 kt	0°	5500 RPM	100 %	37°
Best slope	120 km/h - 65 kt	0°	5500 RPM	100 %	37°
Best vario	140 km/h - 76 kt	0°	5500 RPM	100 %	37°
Cruise 100%	250 km/h - 135 kt	0°	5500 RPM	42	
Cruise 75%	187 km/h - 101 kt	0°	5000 RPM	36.5	
Cruise 65%	162 km/h - 88 kt	0°	5000 RPM	31	
Cruise 55%	137 km/h - 74 kt	0°	4500 RPM	30	37°
Descent VNO	250 km/h - 135 kt	0°	5500 RPM	/	
Approach level	170 km/h - 92 kts	17°	PPP – 4100 RPM		37°
Landing 5%	117 km/h - 63 kt	30°	PPP – 3100 RPM	20"	37°

Stall speeds (mass 820 kg)

Flaps	Vi (km/h – kts)
0°	112 km/h - 60 kt
17°	94 km/h - 51 kt
30°	87 km/h - 47 kt

Landing speeds (mass 820 kg)

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