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)

DATE : 02/02/23

Model	MCR-4S
Serial number	SN XXX
Registration	F-PXXX
Document number	Q EX NO 11 E
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Basic edition:

Pages	Date	Written by	Visa	Checked by	Visa
55	23/11/22	N.DOLEAC		E.FUMEY	

Amendments:

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 oil[1]

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 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

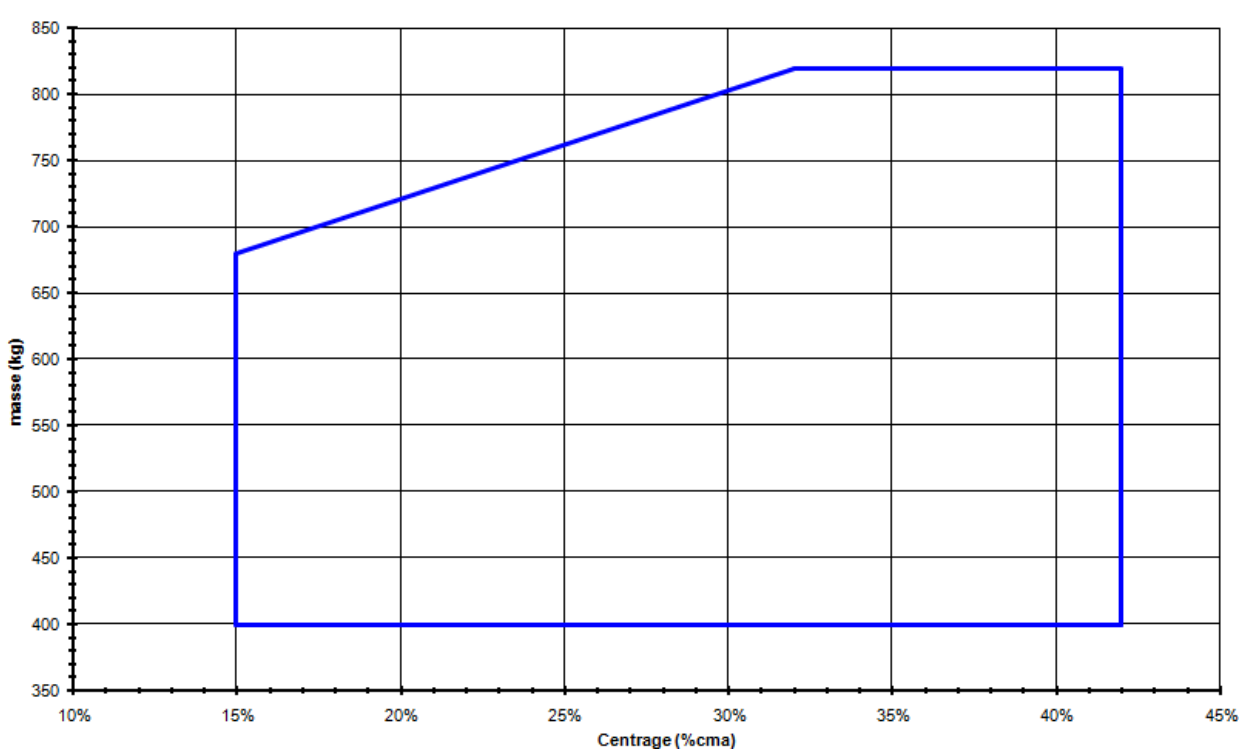
MASSES

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

BALANCE

Balance range: 15% to 42% of MAC[2]

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):

	Flaps	
Bank angle	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:

	Flaps	
	0°	17°
Bank angle		
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 °F	50 122	50 → 90 122 → 194	90 → 110 194 → 230	110 → 130 230 → 266	130 266
Cylinder head temperature (CHT)	°C °F	60 140	60 → 80 140 → 176	80 → 110 176 → 230	110 → 135 230 → 275	135 275
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
MAP	Bar inHg	0.06 1.77	-	-	-	1,73 51
Fuel quantity	Litre	1				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 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 manoeuvers. 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 us 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)

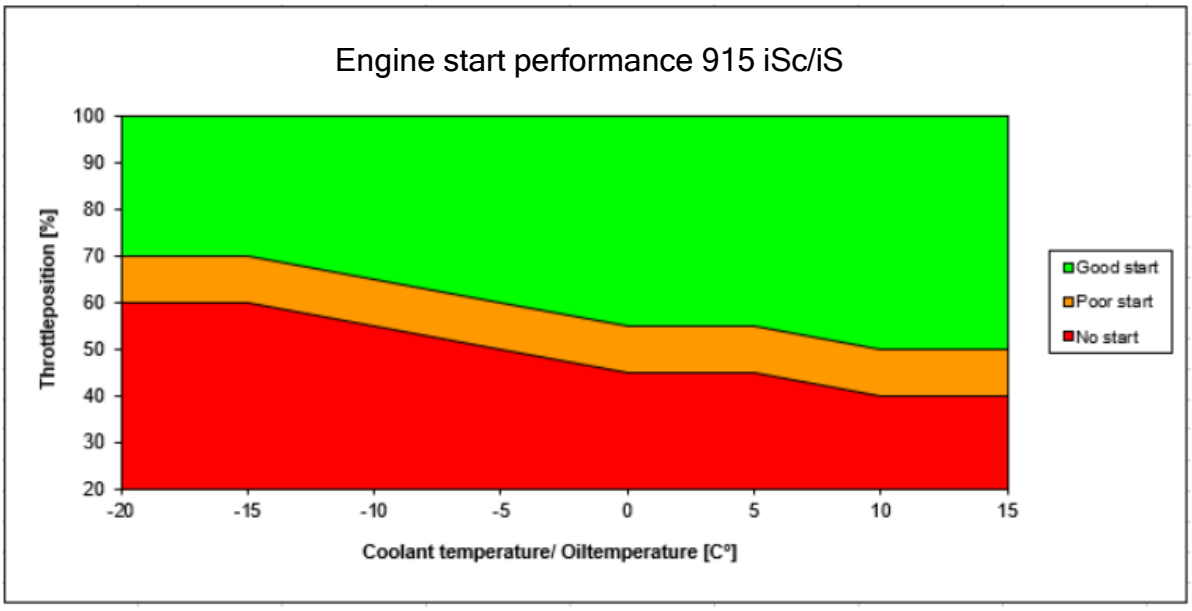
Engine: Rotax 914 UL/F

– 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 deviation100 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-off

Engine: Rotax 914 UL/F:

– Minimum engine speed full throttle	
○ Variable pitch propeller	**> 5500 RPM**
○ 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	
○ Variable pitch propeller	**> 5500 RPM**
○ 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 = Vi +2/-3 km/h

STALL SPEEDS

Mass 820 kg (MTOW with parachute) :

	Flaps	
Bank angle	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 taiilwind
-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: Vi = Vp = 235 Km/h - 127 kts km/h

Rotax 915 iSc/iS:

Consumption[3]

	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 i A 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

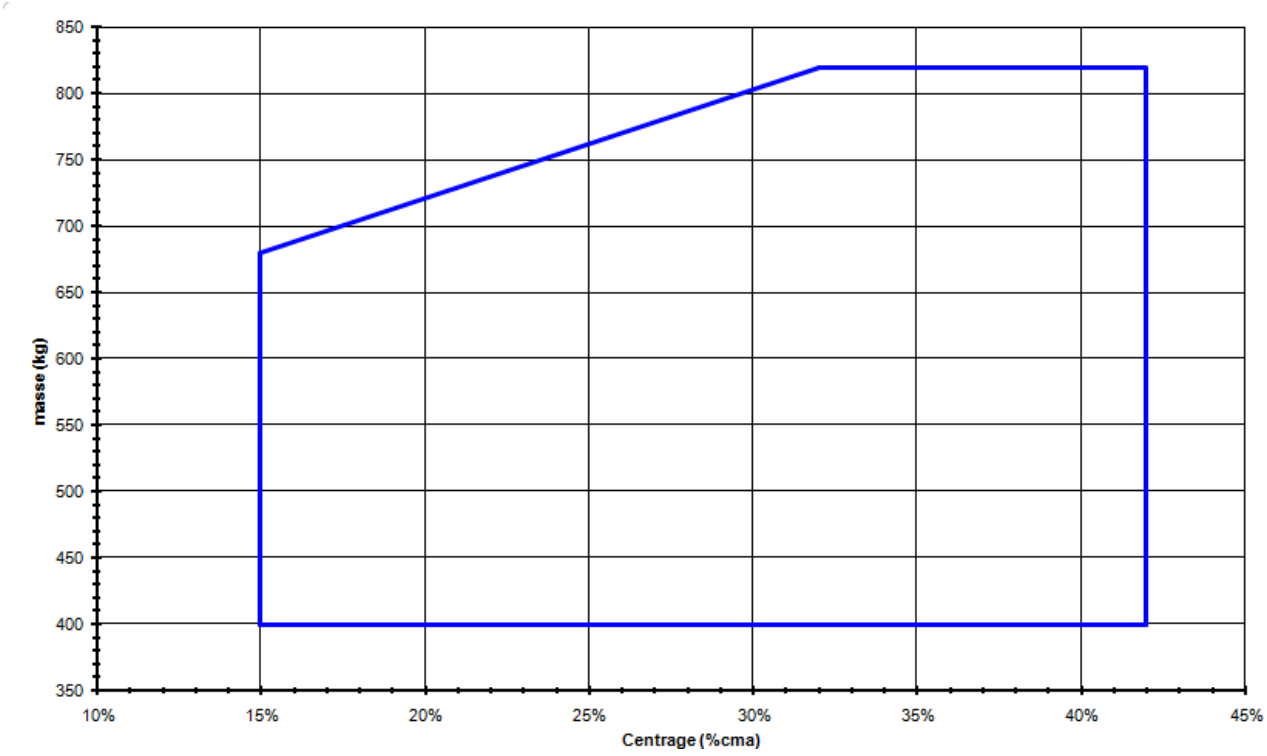
This section contains the payload cases in which the aircraft can be safely operated.

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 MAC[4]

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 M EX 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
Example	30/06/2003	1	Use in Aerial Surveillance

INSERTED SUPPLEMENTS

Use in Aerial Surveillance

Example	– 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 29 → 73 PSI
Cooling liquid :	**50 → 120 °C**	

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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	Flaps 17°	**136 km/h - 73 kts**
	Flaps 30°	**126 km/h - 68 kts**