PILOT OPERATING HANDBOOK

AIRCRAFT TYPE:

FPNA CAPE TOWN SERIES

(WITH ROTAX 912ULS ENGINES)

REVISION A

02-01-2010

WARNING ON USE OF MANUAL

WARNING!
USE OF THIS MANUAL FOR OTHER THAN REFERENCE TO PROPER PROCEDURES AND AIRCRAFT PERFORMANCE IS PROHIBITED. THIS DOCUMENT IS INTENDED TO PROVIDE TWO DIFFERENT TYPES OF INFORMATION: ONE, THE PROCEDURES TO OPERATE THE AIRCRAFT SYSTEMS AND TWO, SUGGESTED HANDLING CHARACTERISTICS AND WAYS OF HANDLING THE AIRCRAFT ON THE GROUND AND IN FLIGHT. IN EITHER CASE THIS SHOULD NOT BE CONSTRUED TO BE A TRAINING MANUAL, BUT MAY BE USED IN CONJUNCTION WITH AN APPROVED TRAINING CURRICULUM FOR GENERAL INSTRUCTION OR PART 141 SCHOOLS AS RECOGNIZED BY THE FAA AND THE LIGHT SPORT AIRCRAFT (LSA) STANDARDS. THIS MANUAL IS NOT TO BE USED AS A SUBSTITUTE FOR PROPER FLIGHT TRAINING FROM A QUALIFIED FLIGHT INSTRUCTOR AND THE RESPONSIBILITY OF THE PILOT TO BE CURRENT IN TYPE AND CLASS OF AIRCRAFT BEING FLOWN. DO NOT EXCEED THE AIRCRAFT LIMITATIONS LISTED IN THIS MANUAL. DO NOT FLY BEYOND YOUR SKILL LEVEL AND USE GOOD PILOT JUDGMENT AT ALL TIMES.

WARNING CONCERNING USE OF NON-AIRCRAFT GRADE PARTS

WARNING!
THE INFORMATION IN THIS MANUAL NEEDS TO BE FOLLOWED. IT IS NOT ACCEPTABLE TO MAKE CHANGES TO THE MATERIALS AND OR PHYSICAL FEATURES OF THIS AIRCRAFT. IN PARTICULAR, THE GRADES OF BOLTS THAT HAVE BEEN UTILIZED IN THE MANUFACTURE OF THIS AIRCRAFT ARE CRITICAL FOR ITS CONTINUING AIRWORTHINESS. NEVER REPLACE BOLTS WITH ANY OTHER SIZE OR GRADE. GRADE 8 BOLTS ARE NOT INTERCHANGEABLE WITH AIRCRAFT (AN) GRADE BOLTS. THE FATIGUE CHARACTERISTICS OF AIRCRAFT GRADE BOLTS ARE SUPERIOR TO OTHER BOLTS AND ALLOW LONGER SAFE SERVICE LIFE UNDER CYCLIC LOADS LIKE THOSE EXPERIENCED IN AIRCRAFT. THE LENGTH OF BOLT IS IMPORTANT. IF A SHORTER BOLT IS USED THE THREAD MAY ENCROACH ON THE LOAD BEARING AREA WHICH INCREASES THE STRESSES EXPERIENCED BY IT.

MANDATORY SERVICE BULLETINS

MANDATORY SERVICE BULLETINS
AS THE SERVICE HISTORY OF THE AIRFRAME EVOLVES, FPNA WILL FROM TIME TO TIME ISSUE MANDATORY SERVICE BULLETINS, WHICH DETAIL ANY CHANGES TO THE AIRCRAFT OPERATING INSTRUCTIONS, MAINTENANCE MANUALS, OR ANY OTHER DETAILS THAT FPNA, LLC DEEMS NECESSARY FOR THE OWNERS TO BE NOTIFIED OF.

THE WEB ADDRESS FOR SERVICE BULLETINS FROM FPNA, LLC IS:

HTTP://WWW.FPNA.COM

IT IS THE RESPONSIBILITY OF THE OPERATOR TO KEEP UP TO DATE WITH ANY ENGINE RELATED SERVICE BULLETINS AND ANY ROTAX DIRECTIVES THROUGH THE ROTAX WEBSITE.

THE WEB ADDRESS FOR ROTAX SERVICE BULLETINS IS:

HTTP://WWW.ROTAX.COM

Record of Revisions

Any Revisions of the present manual, except actual weighing data, must be recorded in the following table according to information from the Manufacturer. New or amended text in the revised pages will be indicated by a black vertical line on the left hand side of the page.

Revision Number	Affected Section	Affected Pages	Date	Approval	Date	Date Inserted	Signature

List of Affected Pages

Section	Page	Date	Section	Page	Date

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1 General Information

1.1 Introduction

This Pilot Operating Handbook has been prepared to provide pilots and instructors with information for the safe and efficient operation of the FPNA Cape Town Series aircraft.

WARNING!
THERE ARE INHERENT RISKS IN THE PARTICIPATION IN RECREATIONAL AVIATION AIRCRAFT. OPERATORS AND PASSENGERS OF RECREATIONAL AVIATION AIRCRAFT, BY PARTICIPATION, ACCEPT THE RISKS INHERENT IN SUCH PARTICIPATION OF WHICH THE ORDINARY PRUDENT PERSON IS OR SHOULD BE AWARE. PILOTS AND PASSENGERS HAVE A DUTY TO EXERCISE GOOD JUDGMENT AND ACT IN A RESPONSIBLE MANNER WHILE USING THE AIRCRAFT AND TO OBEY ALL ORAL OR WRITTEN WARNINGS, OR BOTH, PRIOR TO OR DURING USE OF THE AIRCRAFT, OR BOTH.

THE OWNER AND OPERATOR MUST UNDERSTAND THAT DUE TO INHERENT RISKS INVOLVED IN FLYING AN EXPERIMENTAL OR SPECIAL LIGHT SPORT AIRCRAFT, NO WARRANTY IS MADE OR IMPLIED, OF ANY KIND, AGAINST ACCIDENTS, BODILY INJURY OR DEATH OTHER THAN THOSE WHICH CANNOT BY LAW BE EXCLUDED.

THE SAFE OPERATION OF THIS AIRCRAFT RESTS WITH YOU, THE PILOT.

WE BELIEVE THAT IN ORDER TO FLY SAFELY YOU MUST MATURELY PRACTICE AIRMANSHIP. OPERATIONS OUTSIDE THE RECOMMENDED FLIGHT ENVELOPE SUCH AS AEROBATIC MANEUVERS OR ERRATIC PILOT TECHNIQUE MAY ULTIMATELY PRODUCE EQUIPMENT FAILURE. YOU ARE REFERRED TO THE OPERATING LIMITATIONS IN SECTION 2 OF THIS MANUAL.

THE AIRCRAFT WILL REQUIRE MAINTENANCE AS OUTLINED IN THE APPLICABLE MAINTENANCE MANUALS.

LIKE ANY AIRCRAFT, SAFETY DEPENDS ON A COMBINATION OF CAREFUL MAINTENANCE AND YOUR ABILITY TO FLY INTELLIGENTLY AND CONSERVATIVELY.

1.1.2 Definitions

Definitions used in the aircraft operation instructions such as **WARNING, CAUTION,** and **NOTE** are employed in the following context:

WARNING!
OPERATING PROCEDURES, TECHNIQUES, ETC. WHICH IF NOT FOLLOWED CORRECTLY, MAY RESULT IN PERSONAL INJURY OR DEATH.

CAUTION:
OPERATING PROCEDURES, TECHNIQUES, ETC. WHICH IF NOT STRICTLY OBSERVED MAY RESULT IN DAMAGE TO THE AIRCRAFT OR OF ITS INSTALLED EQUIPMENT.

NOTE: Operating procedures, techniques, etc. Which are considered essential to highlight.

1.2 Maintenance Procedures

Perform the following checks, inspections and maintenance according to the maintenance schedule below.

1. Check the airplane structure condition paying particular attention to the elements loaded in flight and during landing, this will include but not limited to wings, landing gear, elevator, Elevator attach points, vertical Stabilizer rivet points.
2. Inspect and Check all of the following: Check Floatation system, looking for cracks or deformation of materials. Look for separation and or de-lamination of materials. Check for proper and secure mounting of water rudders and mounting plates; Remove man hole covers check inside of each chamber and remove any accumulation of water.
3. Inspect and Check all of the following: Check mounting system of Floats to aircraft, and structural integrity of landing gear, and landing gear system
4. Retract and extend landing gear, and check for proper operations, and leaks in pneumatic gear system and hydraulic brake system. Check nose wheel steering.
5. Inspect and check all of the following: Check steering cables and water rudder cables grease all fittings, oil and or grease all cables. Replace parts as needed. Check Pneumatic pressure gauge indications, check landing gear lights and position of gear with lights. Check Landing gear up-lock for proper operation
6. Inspect the condition of the primary structural members and check the airframe main joints play. Oil all hinge points; pay particular attention to Vertical and Horizontal stabilizers, checking rivets, and surfaces for potential damage. (This is due to possible spray and debris from water takeoffs and landings.)
7. Check the engine condition according to Rotax engine Operator's Manual.
8. Inspect the engine mount system.
9. Check the engine cowling locks condition.
10. Inspect the propeller.
11. Check the locking of airplane components joints.
12. Check if the cockpit doors close properly.
13. Check the control surfaces condition and for correct motion.
14. Check the control systems for friction in linkage and excessive forces.
15. Inspect main and nose wheel landing gear and check the main gear brake operation.
16. Check the flight instruments condition and their correct operation.
17. Inspect the outer metal structure elements for absence of damage to the protective coating and for any indication of corrosion.
18. Check the fabric covering condition.
19. Clean and lubricate the bearings and hinge joints.
20. Check the control surfaces deflection.
21. Major inspection of all aircraft components and if necessary overhaul of components by FPNA representative.

Maintenance schedule is given in the table below:

Period of time or condition for maintenance work.	Work to do (see plan above)
In the beginning of the flight season	1 – 16
After every 25 flight hours	7
After every 50 flight hours	1-7
After every 100 flight hours	1 – 20
After hard landing causing landing gear damage	1 – 15
After a rough landing	1 – 12
At the end of flight season or before extended storage	1-20
After 1000 flight hours or 5000 landings	21

The period of time before the first overhaul is temporarily set to 1000 hours or 5000 landings – whichever comes first. A decision to continue the aircraft operation after 1000 flight hours should be made by the FPNA representative based on the results of the Major Inspection as defined above.

NOTE: In all matters concerning engine maintenance, refer to the Rotax engine operator's manual.

1.3 Airplane and Systems Description

The FPNA Cape Town is a two seat light airplane for primary training and or for recreational flying only. It is a high wing, strut braced monoplane of “classic” aerodynamic layout with closed cockpit, (optional) retractable landing gear on a Waterborne Float System, and a steerable nose wheel. It is equipped with a Rotax 912ULS tractor engine and a three blade, ground adjustable pitch propeller.

Performance of the airplane and its navigation and flight instruments make possible the airplane’s operation in day and night VFR, and optionally IFR meteorological conditions but NEVER into known icing, thunderstorms, or other sever meteorological conditions. The landing gear and thrust-to-weight ratio make possible the airplane operation from fields (airdromes) of sealed and unsealed runways; grass strips are also possible (land airfields are with optional retractable wheels) Float only systems are intended for Water use only!

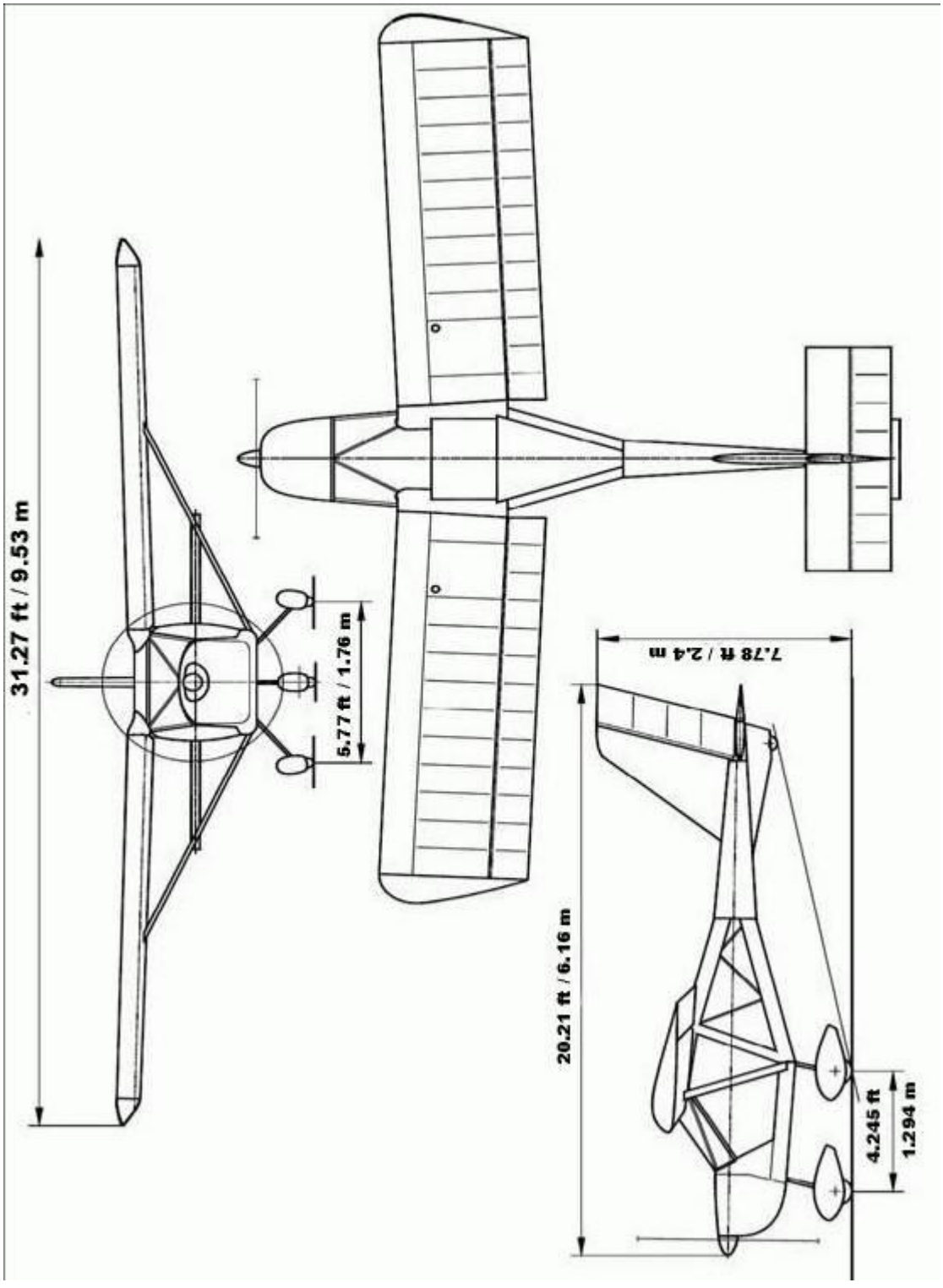
The airplane is equipped with either the *Waterborne Float System* straight float or amphibious float system configuration.
With customer request, a quickly deployed parachute recovery system may be installed on the airplane. The system is used for saving the pilot(s) aboard in emergency in-flight situations.

1.3.1 Basic Specifications of the Airplane

Specifications	
Power Plant	100hp 912ULS
Length, m/ft	6.1 / 20
Height, m/ft	2.4 / 7.9
Wingspan, m/ft	10.1 / 33.2
Wing area, sq. m/sq. ft	13.9 / 150
Wing loading	6.6 lbs per sq. ft
Power loading	10 lbs per hp
Seats	2
Cabin length m/inches	1.6 / 61.2
Cabin width m/inches	1.3 / 50.4
Cabin height m/inches	1.1 46.8
Empty weight, kg/lb Straight Floats (Water Only) Amphibious Floats (Land and Water)	 360 / 795* 397 / 875*
Max. Gross weight, kg/lb	650 / 1430
Useful load, kg/lb Straight Float (Water only) Amphibious Aircraft (Land and Sea)	 288 / 635* 253 / 555*
Fuel capacity, standard, l/gal	90 / 23.9

Design Loads	+4/-2 (w/150% margins)
*Basic empty weight will vary based on options selected.	
Performance: (sea level, gross weight, standard day)	
Take off distance, ground roll, m/ft	60 / 197
Landing distance, ground roll, m/ft	80 / 299
Rate of climb at sea level, mps/fpm	5 / 1000
Cruise speed, kph/mph/knts	161 / 100 / 87
Range, km/miles at speed, kph/mph/knts	804 / 500 112 / 70 / 61
Endurance, hrs (rpm)	10 / 3700
Vne (never exceed), kph/mph/knts	209 / 130 / 113
Vso (stall, landing config) kph/mph/knts	59 / 37 / 32

1.3.2 Aircraft Three-View Drawing



1.3.3 Power Plant

The FPNA Cape Town is equipped with a four-cylinder four-stroke Rotax-912ULS,100HP carbureted engine produced by BOMBARDIER-ROTAX Inc. (Austria).

The engine has a flat-four layout, dry sump lubrication system with a separate 3 liter oil tank, automatic valve clearance adjustment, two carburetors, mechanical membrane fuel pump, double electronic ignition system, integrated water pump, electric starter, integrated gearbox with either a 2.273 or 2.43 reduction ratio.

The 912ULS come standard with full time carburetor heat. In operation the carburetor heater adds a small amount of heat to the body at its downstream end in order to keep the temperature of the body above the freezing point. The intention is that any ice formed will not adhere to the carburetor throat. Because the heater block is adjacent to the throttle spindle, some heat is also transferred through the spindle to the butterfly, to prevent a thick build up of ice on the butterfly, which can be a cause of rough running and possible engine failure. Because there is no significant heating of the intake air when hot coolant is circulating through the carburetor heater blocks, there will be a negligible loss of full engine power. Aircraft equipped with this device should never be flown in circumstances where a successful “no power” landing cannot be made in the event of engine failure. An optional system can be fitted with an intake pre-heater box, which improves the engine working environment, preventing carburetor icing in cold weather and raising the engine output in hot weather.

All engine systems (fuel, electric, cooling) are assembled in accordance with the Rotax-912 engine operation manual.

The standard propeller supplied with the aircraft is a three-blade, all carbon fiber, Warp Drive propeller with nickel leading edge, and ground-adjustable pitch. The blades are individually replaceable. Each blade is serial numbered so that if you lose a blade, for whatever reason, it is traceable and replaceable by Warp Drive using this number only. Each propeller comes with a lifetime “Guarantee of Satisfaction”.

NOTE: All information contained in the chart below is from ROTAX. Please see ROTAX operator’s manual.

Engine Manufacturer:	BOMBARDIER-Rotax-GmbH (Austria)
Engine Model	Rotax 912ULS
Engine Type:	Flat Four, Four Stroke
Max. Take-Off Power	100 hp
Time Limit At Full Power	5 min (5800)
Max. Revolutions (No Time Limit)	5500 Rpm
Revolutions At Idle	1400 Rpm
Max. Cylinder Head Temperature At Pick Up Point	135 ^{0}C (284 ^{0}F)
Oil Temperature Normal Maximum Minimum	 90 – 110 ^{0}C (190 – 250 ^{0}F) 140 ^{0}C (285 ^{0}F) 50 ^{0}C (120 ^{0}F)
Exhaust Gas Temperature Maximum At Take-Off Maximum	 880 ^{0}C (1620 ^{0}F) 850 ^{0}C (1560 ^{0}F)

Minimum	800 ^{0}C (1470 ^{0}F)
Oil Pressure Normal Maximum Minimum	 2.0 – 5.0 bar (29 – 73 psi) (above 3500 Rpm) 7 bar (100 psi) (at cold start, allowed for a short time) 0.8 bar (12 psi) (below 3500 Rpm)
Fuel Pressure Normal Maximum	 0.15 – 0.4 bar (2.2 – 5.8 psi) 0.4 bar (5.8 psi)
Fuel	See 1.3.5 bellow.
Oil	See 1.3.6 bellow.

1.3.4 Propeller

Propeller Manufacturer	Warp Drive Propeller Inc.
Propeller Type	Three Blade, Ground Adjustable Pitch, Tractor Type

1.3.5 Fuel and Fuel Capacities

Fuel Tank Capacity: 23.3 U.S. Gallons (90 l)
Useable Fuel Capacity 22.8 U.S. Gallons (89 l)

The Following fuels may be used:

Auto Gas	93 Octane or greater. Min RON 95 EN 228 Premium or Premium Plus
Aviation 100LL	See Rotax Operating Manual and restrictions

1.3.6 Oil

The engine has a flat-four layout, dry sump lubrication system with a separate oil tank of 3.2 quart (3 l) capacity. Any automotive oil of API classification “SF” or “SG” may be used.

1.3.7 Operating Weights and loading (occupants, baggage, fuel, ballast)

Maximum take-off weight 1430.6 lbs (650.1 kg)
Maximum landing weight 1430.6 lbs (650.1 kg)
Average Empty weight 825.0 lbs (374.2 kg)
The aircraft can carry up to 44 lbs (20 kg) of cargo (luggage) in the luggage container located behind the pilot seats.

1.3.8 Cockpit Doors

NOTE: IT IS PERMISSIBLE TO FLY THE AIRCRAFT WITH ONE OR BOTH DOORS REMOVED.

CAUTION: DO NOT TAXI OR ATTEMPT TO FLY WITH THE DOOR OR DOORS OPEN.

The cockpit doors consist of organic glass, attached to a metal tubular framework. The doors open upward. In their open and closed position the doors are retained with pneumatic cylinders. The doors can be locked in the closed position with a lock.

Both left and right doors have air scoops for ventilation, demisting of the glass, and visibility when landing in snow and rain.

Taxiing or flying with the door or doors open is prohibited.

Taxiing or flying with one or both doors removed from the Aircraft is an approved flight configuration.

Doors may be removed before flight. (See section 5 of the Maintenance Manual, FPNA Cape Town Series, for removal instructions)

1.3.9 Landing Gear Amphibious Models

The aircraft has tricycle landing gear with a steerable nose wheel. The main landing gear wheels are fitted with sealed hydraulic brakes.

Landing gear data:

Wheel base – 5.8 ft (1.8 m) (in parking attitude),
Wheel track – 4.3 ft (1.3 m),
Turning radius – 10.8 ft (3.3 m).

Main landing gear:

Tire – 600 X 6 - 6 ply Rating Tube Type Aircraft Tire.
Tire inflation – 23 psi or as marked on sidewall of tire.

Nose landing gear:

Tire 400 X5 - 4 ply Rating Tube Type Aircraft Tire Steering angle ± 30 degrees.
Tire inflation – 28 psi or as marked on sidewall of tire.

CAUTION:
NEVER EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM INFLATION PRESSURE MARKED ON THE SIDE WALL OF THE TIRE BEING USED ON THE AIRCRAFT.

1.3.10 Installed Equipment List

Minimum equipment REQUIRED for Day VFR Flights:
Required engine Instruments as per the Engine manufacturer, Airspeed Indicator, Altimeter, Fuel Gauges or other fuel tracking method.

Below are typical optional avionic configurations for the various types of aircraft offered by the manufacturer: It should be noted that the list above is all that is required for Day, VFR flights.

VFR Option: Altimeter, Airspeed Indicator, Compass, EIS with Alt/ VS/ Airspeed option, MicroAir 760N Radio, Lynx radio powered interface or similar radio interface, Lighter, Fuel Gauges (left and right tank), Emergency Locating Transmitter (ELT); ELT condition Indicator, Navigation and Strobe lights, Transponder option: (MicroAir T2000 with Mode "C" encoding altimeter), Appropriate lighting for night flight if night flight option is chosen.

Advanced VFR Option: Altimeter, Airspeed Indicator, Compass, Electronic Flight Instrument System: EFIS :(Dynon D-180 or GRT Horizon Series EFIS or TrueTrak EFIS or other similar EFIS), MicroAir 760N or later revision radio, Lynx Radio Powered interface or similar radio interface, Lighter, Fuel Gauges (left and right tank), Emergency Locating Transmitter (ELT) (Optional); ELT condition Indicator (optional), Nav and Strobe lights, Transponder option: (MicroAir T-2000 with Mode "C" Encoding Altimeter or the use of ADHARS for Altitude encoding or any TCO's Encoder, and appropriate lighting for night flight if night flight option is chosen. Optional avionic equipment is the Garmin SL-30, SL-40, PS-Engineering Intercom interfaces; Garmin GPS 296,396,496 with correct power data interfaces.

IFR Option: Castleberry A/I or similar type, Airspeed Indicator, GRT Electronic Flight Instrument Systems: EFIS Horizon Series with 429 Module, Garmin SL-30 Nav/ Com (Transponder to be determined) EIS, with Airspeed, Vertical speed, and OAT, Lynx radio powered interface or similar radio interface: marker beacons as needed, Compass, Emergency Locating Transmitter (ELT); ELT Remote condition indicator, Nav and Strobes, Fuel Gauges. And for IFR certification: Certified Rotax Engine, Body grounding Strap, Static Wicks, and all applicable instruments, gauges and electrical requirements of the USA FAA regulations for part 61, and 91 flight and operations.

Amphibious Float System: Our landing gear system is electrically activated and pneumatically deployed. Both the 1300 and 1600 Series use a 4-way toggle valve and features a "fail-safe" Co2 back-up system. Confirmation of gear extension and retraction is accomplished by means of reed switch activated position lights to assure safety and accuracy

Optional equipment is available in all cases as is a parachute recovery system. A generator may have to be upgraded to handle additional electrical loads. Any electrical changes and upgrades must be reviewed and approved in writing by the manufacturer, **FPNA, LLC**.

2 Operating Limitations

2.1 Stalling Speeds at Maximum Takeoff Weight (V_S and V_{SO})

NOTE: In level flight and during a turn stall approach warning is provided by the aerodynamic characteristics of the aircraft - shaking of the aircraft structure and the control yoke.

Stall speeds at Max Gross weight and AFT CG are as follows:

Vs0 (Stall with 0 degrees of Flaperons)	44 Mph / 38 Kts
Vs1 (Stall with 1st Position of Flaperons)	40 Mph / 35 Kts
Vs2 (Stall with 2nd Position of Flaperons)	37 Mph / 32 Kts

2.2 Flaperons Extended Speed Range (V_{SO} to V_{FE})

The positive flaperon operating range is 37 – 72 Mph / 32-63 Kts. as indicated by the White Arc on the airspeed indicator.

V_{FE}	Max. flaperon extended speed	72 Mph / 63 Kts	Do not exceed this speed with full flaperon deflection

2.3 Maximum Maneuvering Speed (V_A)

V_A	Max. maneuvering speed	93 Mph / 81 Kts	Do not make full or abrupt control movement above this speed. Under certain conditions the aircraft may be overstressed by full control movement.

2.4 Never Exceed Speed (V_{NE})

The Never to Exceed Speed is indicated by the Red Line on upper end of airspeed indicator.

V_{NE}	Never exceed speed	130 Mph 116 Kts	Do not exceed this speed in any operation. Structural damage may occur at or above this speed.

2.5 Best Angle of Climb (V_X)

V_x	Best Angle of Climb	56 Mph 49 Kts	Climbing at Vx will allow a pilot to maximize the vertical speed per unit ground distance. That is, Vx will allow you to maximize your climb while sacrificing the least amount of ground distance.

2.6 Best Rate of Climb (V_Y)

V_Y	Best Rate of Climb	65 Mph 56 Kts	Climbing at Vy will allow a pilot to maximize the vertical speed per unit time. That is, Vy, will allow you to maximize your climb while sacrificing the least amount of time.

2.7 Wind and Crosswind Limitations

Wind limitations for the FPNA Cape Town are as follows:

- Head Wind Up To 22 Mph / 19 Kts (10 Meters Per Second)
- Cross Wind Up To 9 Mph / 8 Kts (4 Meters Per Second)

WARNING!
IT IS HIGHLY RECOMMENDED THAT FOR TAKE-OFF AND LANDINGS CHOOSE A DIRECTION THAT IS EITHER DIRECTLY INTO THE WIND OR WITH THE LEAST CROSS WIND POSSIBLE. THIS WILL SIGNIFICANTLY SHORTEN TAKE-OFF AND LANDING DISTANCES AND INCREASE THE DEGREE OF SAFETY. FOR FLOATS, IT SHOULD BE POSSIBLE TO HAVE ONLY INTO-THE-WIND TAKEOFF AND LANDINGS. IF CONSTRAINED BY SHORE, EXTREME CAUTION IS ADVISED.

2.8 Service Ceiling

The service ceiling for the aircraft is 13,168 ft. (4,014 m)

2.9 Load Factors

Limit load factors for the aircraft at gross weight of 1430.6 lbs (650.1 kg) are as follows:

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

2.10 Prohibited Maneuvers

- All aerobatic maneuvers including intentional spins are prohibited.
- Flying in conditions where icing is possible is prohibited
- Flying in the vicinity of thunderstorms is prohibited
- Flying in areas of known severe turbulence is prohibited
- If equipped with floats or amphibious gear, takeoffs and landings in waves over 2 ½ feet are prohibited.

3 Weight and Balance Information

This section specifies the values of payloads approved for safe operation of the aircraft, as well as the weighing results and method of determining the permissible payload.

3.1 Center of Gravity (CG) Range and Determination

SAMPLE WEIGHT AND BALANCE PROBLEM

Standard Weight and Balance

Items	Weight		ARM		Moment
Empty Weight	662.00	Lbs X	58.76	In	38899.120
Total Crew Weight	609.22	Lbs X	63.00	In	38380.860
Baggage	44.09	Lbs X	86.60	In	3818.194
T/O Fuel	114.69	Lbs X	74.80	In	8578.812
Total weight (A)	1430.00	Lbs X	Total Moment (B)		89676.986
Total Moment (B) Divided By The Total Weight (A) Equals					**62.71 In**
	Must be between:				**5669.3 & 68.504 In**

Metric Weight And Balance

Items	Weight		ARM		Moment
Empty Weight	300.278	Kgs X	149.3	Cm	44816.637
Total Crew Weight	276.338	Kgs X	160.0	Cm	44214.010
Baggage	19.999	Kgs X	219.9	Cm	4397.756
T/O Fuel	52.023	Kgs X	189.9	Cm	9879.075
Total weight (A) >	648.637	Kgs	Total Moment (B)		**103307.477**
Total Moment (B) Divided By The Total Weight (A) Equals					**159.27 Cm**
	Must be between:				**144.00 & 174.0 Cm**

The position of the airplane's center of gravity depends on the weight of the pilot(s) and fuel aboard and can vary from 17-39% of the mean aerodynamic chord.

NOTE: The actual aircraft weight and balance will vary from the above sample please refer to the actual aircraft specific weight and balance data.

4 Performance

4.1 Takeoff and Landing Distances

Takeoff distance is the sum of the takeoff run and the distance flown from lift-off to an altitude of 50 feet / 15 Meters. The takeoff distance depends on the airfield elevation, air temperature, direction and strength of the wind. The available takeoff distance in any conditions must not be less than 820 feet / 250 Meters.

The landing distance is the sum of distance flown from an altitude of 50 feet / 15 meters to touch-down and landing run. It depends on airfield elevation, air temperature, and direction and strength of the wind. The available landing distance in any conditions must not be less than 820 feet / 250 Meters.

In case of landing with flaperons retracted the glide path is shallower, landing speed and landing distance slightly increase.

NOTE: Density altitude must be considered for all takeoff and landing calculations.

4.2 Rates of Climb

The airplane's rate of climb depends on ambient air temperature and take-off weight. Climb shall be performed at an optimum Vx speed of 56 Mph / 49 Kts or a Vy speed of 65 Mph / 56 Kts.

4.3 Cruise Speed

A suggested cruising speed in level flight is 81 Mph / 70 Kts
Cruise speed of 100 MPH / 94kts is considered Normal

4.4 RPM at Cruise

The engine speed at cruise is 4400 Rpm.
The engine speed at 100 MPH is roughly 5200 RPM. Be conscious of fuel burn

4.5 Fuel Consumption

Maximum flight endurance at economical engine speed at sea level, standard atmosphere and full fuel tank (23.3 gallon / 90 l) is approx 10 hours.
At 100 MPH, fuel consumption is roughly 5 GPH/ 17.0 LPH Be conscious of increased fuel burn

5 Emergency Procedures

5.1 Introduction

This section contains recommendations to the pilot for extreme situations during flight. However, these situations caused by airframe or engine malfunction are extremely rare provided that pre-flight inspections and checks are made regularly. Adequate training and preparations are needed as well as continued flight training and review to handle any and all situations that may arise.

5.2 Engine Failure

- In case of engine failure during the takeoff roll, keep the aircraft on the ground, stop the aircraft as soon as practical, switch off the engine ignition system and discontinue the take-off.

- If the airplane is at an altitude of up to 150 feet / 46 m, ***Fly the Plane!*** Land straight ahead or in the safest path in front of the aircraft, stop the aircraft as soon as practical; switch off the engine ignition system.

- If the engine fails during climb above 150 feet / 46 m, ***Fly the Plane!*** Find an area to land, establish best glide, set the airplane into a steady descent at a speed of 56 mph / 49 knts or any speed the pilot deems required to obtain a safe landing spot. Look for airfields or a clearing to land. Switch the ignition off and land the aircraft.

- If the engine fails during level flight, ***Fly the Plane!*** Establish best glide, find an area to land, check that the fuel valves are both in the on position, check that the magneto / ignition switches are in the on position, check electrical, try in-flight restart as per Rotax Manual, if in-flight restart does not work, set the airplane into a steady descent at a speed of 56 mph / 49 knts, switch the ignition off, estimate wind direction and strength, choose a place for landing and land (preferably into the wind).

- Under favorable flight conditions try to restart the engine (see paragraph 5.3).

- If at the moment of engine failure the aircraft is over terrain absolutely unsuitable for landing (mountains, rough country, ravines, water) and flight conditions do not permit restarting the engine in the air, the pilot, at his discretion may find that it is necessary to deploy the parachute recovery system (if installed see 5.2.1 below).

5.2.1 To activate the Parachute Recovery System (if installed):

- Switch the magneto / ignition switches off.
- Pull the emergency deployment handle to deploy the recovery system.
- If while descending on the parachute, the airplane begins to rotate, the pilot(s) should use the ailerons and rudder to try to stop the rotation.
- The pilot(s) should adopt a safe position to avoid possible injuries from impact in case of rough landing.

The minimum height of system deployment may be estimated using the following formula:

$$H_{min}=120+V_y$$

Where H_{min} = minimum height of system deployment and V_y = is the vertical speed of the airplane's descent.

WARNING!
MINIMUM HEIGHT SHOULD BE DETERMINED BY THE PARACHUTE MANUFACTURER AND NEEDS TO BE THOUGHT OF BEFORE TAKEOFF AND ANY FLIGHT. THIS IS PART OF THE PREFLIGHT PLANNING.

5.3 Restarting the Engine

To restart the engine in flight: (Refer to Rotax manual for complete checklist)

- Set the throttle to idle engine speed position
- Set the ignition switches to the on position
- Turn the key clockwise to the start position.

5.4 Fire

In Case of fire on board, the pilot(s) must act as follows:

- Shut off the fuel taps located up to the left and behind the left seat as well as located up to the right and behind the right seat.
- Switch the ignition **off**.
- Establish the airplane into a steady descent.
- Make an emergency landing.

NOTE: If a parachute recovery system is on board, thought should be given as to whether or not it should be deployed, the higher speed of the aircraft may put out any fire that exists. additionally smoke is a consideration; a rapid descent may be the best course of action. good training and thought of all situations is your best defense to such a situation.

5.5 Landing with the Engine Stopped

This airplane has no particular handling features during the landing with the engine stopped and flaperons up or down. Recommended speed at descent is 56 Mph / 49 Kts. Enter into a flare, and flare out at 1.5 feet / .50 m with landing speed of 38 Mph / 33 Kts. Maximum lift-to-drag ratio for the airplane is approximately 12 with flaperons up and 8 with flaperons down. The maximum horizontal distance which the airplane may travel while gliding with engine stopped in still air may be calculated by multiplying the altitude by the lift-to-drag ratio.

5.6 Spin Recovery

WARNING!
INTENTIONAL SPINS ARE PROHIBITED.

NOTE: In level flight and during a turn, the stall approach warning is provided by the aerodynamic characteristics of the airplane – shaking of the airplane structure and control stick.

A recovery from an unintentional spin of the aircraft can be accomplished by:

- Pushing forward the rudder pedal opposite the direction of the spin.
- Push the stick or control yoke briskly full forward.
- Reduce throttle to idle.
- When the rotation ceases, put the rudder in the neutral position.
- after reaching a speed of not less than 55 mph / 48 knts smoothly level off the airplane without exceeding the load factor of +4 g and the maximum allowed speed of 136 mph / 118 knts.

NOTE: This is only a possible solution and has not been proven or demonstrated. good and safe flying practices should not yield a spin.

5.7 Pitot/Static System Failure

5.7.1 Pitot Tube Blockage

Signs of such a failure:

- In level flight the airspeed readings do not change with speed changes.
- During descent airspeed readings will decrease and during climb airspeed readings will increase.

Pilot actions:

- Use alternate static source (if installed).
- inform the ATC officer.
- Do not use airspeed indicator readings.
- In level flight set the engine speed to 4100 – 4300 rpm. The airspeed in this case will be 62 – 68 mph / 54-59 knts.
- While descending reduce the engine speed to idle and set the sink rate to 13 fps / 4.27 mps. The airspeed will be approximately 68 mph / 59 knts.

NOTE: The above actions are only estimates your results will vary for your aircraft, as you become familiar with your aircraft you should discover this for yourself.

5.7.2 Static Tube Blockage

Signs of such a failure:

- Readings of the vertical speed indicator and altimeter do not change with altitude changes.
- Airspeed indicator readings are mostly unaffected.

Pilot actions:

- Do not use readings of the airspeed indicator.
- Check the airspeed by the tachometer readings only.

5.8 Radio Failure

If there is no radio transmission / reception make sure that:

- The radio is switched on.
- The frequency is set correctly.
- The headset is plugged into the radio set.
- Set the volume to maximum.

- Set the squelch to off.
- Check the radio reception at other frequencies.
- Follow all FAA procedures.

If the radio connection is lost the pilot(s) must continue to fly the plane, the loss of radio communications does not necessarily constitute an emergency. Follow FAA procedures for loss of communications and if in controlled airspace be extra vigilant. Be more vigilant for air traffic. Land at an airfield according to appropriate FAA regulations.

5.9 Flying In Dangerous Weather Conditions

Flying in dangerous weather conditions refers to flying in conditions when icing is possible, during a thunderstorm, dust storm, or strong turbulence. Pay attention continuously to flight condition changes. If flight conditions begin to deteriorate, make a decision in time to change the route or discontinue the flight.

WARNING!
FLYING IN CONDITIONS WHERE ICING IS POSSIBLE IS PROHIBITED

Having gotten into such conditions the pilot(s) must leave the hazardous area immediately, abandon the flight task, report to ATC and land at the nearest airfield or suitable place.

WARNING!
FLYING IN THE VICINITY OF THUNDERSTORMS IS PROHIBITED

Having noticed the thunderstorm in the area, estimate the available time, the direction of the thunderstorm approach and land at the nearest airfield or a suitable place. Tie the airplane down. The control surfaces must be secured with clamps or stops and the doors must be locked reliably.

WARNING!
FLYING IN THE AREAS OF KNOW SEVERE TURBULENCE IS PROHIBITED

Strong turbulence may be dangerous. Avoid it in flight. Make the decision in time to change the route or discontinue the flight. Having gotten into strong turbulence at low altitude, climb immediately to a higher altitude flying away from the source of the turbulence. During intensive turbulence, the airspeed must be 56 Mph / 49 Kts and the altitude must be at least 330 feet / 92 meters. Turns must be performed with bank angle not more than 30^0. In cases when flying into turbulence cannot be avoided, choose an open field and land without exceeding the limit values of speed and bank angle.

WARNING!
DO NOT FLY INTO A CLOUD

Having flown into a cloud, fly out of it, descending and checking the airspeed and bank angle. When the horizon line is obscured by cloud the bank angle may be checked by vertical orientation of the compass wheel.

5.9.1 Wind Shear Effect on the Airplane

Wind shear is the difference in wind direction and velocity at low altitudes in which the airplane may be suddenly shifted from the desired flight path. The wind shear is most dangerous when the airplane is either in the departure or at the final stage of flight, i.e. during climb out or final approach. Due to the increase of tailwind component and the decrease of headwind component near the ground the airspeed decreases, lift drops and the sink rate increases. Such a situation

may occur suddenly so the pilot should know when and where the phenomenon may be expected and must be ready to act accordingly to ensure safe flight and landing.

Most often wind shear is connected with:

- Passing fronts
- Forming of thunderstorm clouds
- Significant inversions at altitude of 150 – 650 feet / 46 – 199 meters.

When taking off and experiencing wind-shear, maintain climb attitude and be willing to give up airspeed for attitude and to maintain altitude, Feel the aircraft. Airspeed indications will fluctuate dramatically. ***TRULY FLY THE PLANE!***

When expecting wind-shear, slow the aircraft. The approach must be performed at a speed of 56 Mph / 49 Kts. The pilot must be ready to increase engine speed to full power and perform a go-around.

5.9.2 Wake Turbulence

Flying into the wake turbulence of another, especially larger, airplane may be dangerous. Wake turbulence is created by propeller slipstream, wingtip, and fuselage generated vortices. Flying into wake turbulence may cause complete loss of aircraft control. Most dangerous is the wake turbulence during takeoff, initial climb, final approach, and landing. Use at least a 2 minute wait period before taking off when a Turbo-Jet has departed. Proper training and knowledge of wake turbulence is important to flight safety and must be observed with light aircraft.

WARNING!
AVOID FLYING INTO WAKE TURBULENCE.

5.10 Landing off Airfield

In cases where landing other than at an airfield is imminent, the pilot should do the following:

- Select a suitable place for landing
- Select GEAR POSITION IF OPTIONAL RETRACTABLE GEAR IS ON AIRCRAFT
- Determine the wind direction looking at land features (smoke, trees, shadows, etc.)
- Make a suitable landing

Proper pilot training and decision making is needed in order to prepare for such an instance.

When landing where there is dense and high vegetation (crops, bushes, etc.), select the top of it as ground level for leveling off.

When landing on water Use the water surface as ground level for flaring. Use normal water landing techniques.

When landing in a forest select the densest part of the canopy as the landing site, selecting the tree tops as the ground level for flaring. The landing must be done by flaring with fully extended flaperons.

The above are only suggestions and have not been tested or certified. Quality training and currency are needed to make such a decision. The full flaperons suggested landing is for the slowest speed. One may find the circumstance requires a different configuration.

5.11 Landing Gear in Wrong Position

5.11.1 Landing Gear Won't Extend or Lower

Possible problem will be indicated by the presents of two blue lights and one green light. This indicates the mains are still in the up and locked position (Two blue lights) and the nose wheel is down and locked (One green light).

CHECK UP-LOCK RELEASE HANDLE POSITION - *DO NOT PULL*

If UP-LOCK is in the down position DO NOT PULL,

- Move LANDING GEAR SELECTOR switch to the UP position.
- Upon complete gear retraction (Three Blue Lights)
- Pull UP-LOCK Handle.
- Move LANDING GEAR SELECTOR switch to down position.
- Check for 3 green lights.
- Once gear position has been determined Push UP-LOCK down.

5.11.2 Landing Gear Will Not Retract or Raise

Possible problem will be indication on pressure gauge that retracts system does not maintain pressure or pressure pump is not running.

- Pull Air pump circuit breaker, or reset on/off switch WAIT 30 SECONDS
- Reset Air pump circuit breaker or turn on power switch Pressure should stabilize at between 80-100 PSI
- If gear is in the "Down position" (Three Green lights) landing gear should remain in down position.

CAUTION:
LAND ON THE LAND WITH EXTREME CAUTION! Should you decide to retract the gear it should remain in the UP and locked position due to the gear locks. ALWAYS VISUALLY VERIFY THE GEAR POSITION.

6 Normal Procedures

6.1 Pre-Flight Check

Make sure that any pre-flight planning for cross country flight and weather has been done before considering a flight. If flying locally check weather conditions, and any special notices to airmen (NOTAM).

Pre-flight inspection of the airplane should ensure that:

- The Covering Of The Wing, Tail And Control Surfaces Are Intact.
- The Windshield Glass And All Other Glazed Surfaces Are Intact.
- All Control System Stops And Pitot Tube Or Other Covers Are Removed.
- There Is No Water Blockage In The Fuel And Static Air Pressure Lines.
- The Fuel Tank Caps Are Closed Tight.
- There Are No Fuel Or Oil Leaks.
- Fuel Is Of The Correct Octane For The Engine Type.
- Fuel Quantity Has Been Checked Visually As Well As Via Gauges, And Is Sufficient For The Concerned Flight, And Meets All Applicable Rules And Regulations.
- Fuel Is Sampled From The Drainage Points.
- Fuel Filters Are Clear Of All Contaminations.
- Engine Oil Is At The Proper Level And Of Good Appearance.
- Coolant Levels Are At The Proper Level.
- All Belts and Hoses Are Secure And In Good Condition.
- Engine Cover Is Locked And Secured
- All Tie-Down Ropes Are Removed For Flight And Or Taxiing.
- All Lights Required For Flight Are Operable.
- Main And Nose Wheel Appear Properly Inflated (See Section 1.3.8 For Proper Pressure).
- All Logs and Required Papers for The Aircraft Are Checked And In The Aircraft.

WARNING!
IT IS STRICTLY FORBIDDEN TO FLY THIS AIRPLANE IF IT IS EVEN PARTIALLY COVERED WITH FROST, SNOW, OR ICE.

The pilot should inspect the interior of the cockpit and make sure that its equipment is intact and there are no foreign objects.

Sitting in the pilot seat the pilot should do the following:

- Set the parking brake
- .adjust and fit the harness and seat belts.
- Remove the securing pin from the recovery system deployment handle (if installed).
- Remove gust lock.
- Check the control stick or yoke for free and easy movement.
- Set the trim tab lever to the neutral position visually check the trim tab position.
- Compare the readings of air pressure on the barometric scale of the altimeter with the true value for the airfield (the big arrow of the altimeter should be pointed to zero before that) – error must not exceed 0.03 psi / 75 ft.
- Check whether the engine control system is in good condition.
- Check the amount of fuel in the tank.
- Check the readings of the magnetic compass.
- Make sure the engine ignition switch is set to the **off** position.

6.2 Engine Starting Procedures

Before starting the engine:

- Set parking brake
- Turn master switch **on**
- Turn navigation lights **on**
- Set the throttle in the idle position
- Set the choke lever as needed
- Clear area of anything that might be hit or may come in contact with the propeller during engine start-up.
- Turn both magnetos / ignition switches **on**.
- Open door and announce "**clear prop**".
- Engage the starter to start the engine.
- Look for oil pressure (minimum based on engine type. Refer to Rotax engine manual.)
- Use choke as need from this point on. (refer to Rotax engine manual.)
- Turn aircraft electronics **on** as needed.

NOTE: The engine manufacturer's operator's manual should be followed for the correct engine starting procedure.

6.3 Taxiing Procedures

6.3.1 Before Taxiing

The pilot should:

- Make sure the taxi way is clear.
- Flight controls are working correctly and are moving freely.
- Flaperons are in the **up** position.
- Engine instruments are indicating and indications are correct.
- Set trim to the neutral position and visually check the position of the trim.
  This aircraft is trim sensitive.
- Release parking brake.

6.3.2 Taxiing

The required speed for taxiing should be chosen depending on the taxiway condition, visibility and presence of obstacles. Direction of taxiing is controlled with the rudder pedals. To check the brakes, set the engine speed to idle, pedals in the neutral position, and pull the brake lever gently.

WARNING!
DO NOT APPLY THE BRAKES ABRUPTLY AT HIGH SPEED. THE AIRPLANE MAY GO NOSE OVER. DO NOT TAXI OR ATTEMPT TO FLY WITH THE DOOR OR DOORS OPEN.

When taxiing with cross-winds, the airplane tends to turn into the wind. If the wind is stronger than 22 Mph / 19 Kts, the airplane, during taxiing, should be followed by someone from the windward side near the wing tip.

6.3.3 Before Takeoff

The pilot should:

- Move straight to set the nose wheel into the neutral position and stop.
- Set the parking brake.
- Set trim to the neutral position and visually verify the position of the trim.
  This aircraft is trim sensitive.
- Check the primary controls by moving them from stop to stop.
- Run engine up as per Rotax engine manual and check engine parameters.
- Check both left and right magnetos / ignition switches for rpm drop of no more than 300 rpm.
- Check for minimum oil temperature. (120 degree f / 50 degree c).
- Check for smooth engine running and operation.
- Check and set flight instruments and radios.
- Set flaperons as needed. (suggested 1st position down for normal operations)
- Check the position of the flaperons and the elevator trim tab lever.

6.4 Takeoff Procedures

Once cleared onto the runway, (or if the runway is clear at an uncontrolled field), and no one is landing, taxi onto the runway orienting the airplane into the wind as much as possible.

6.4.1 Normal Takeoff

If the runway is clear, increase the engine speed gradually until the airplane starts moving and then increase the engine speed to takeoff power.

In the beginning of the takeoff roll, hold the yoke or stick in the neutral position. After reaching a speed of 28 Mph / 24 Kts raise the airplane nose to takeoff attitude by pulling the yoke or stick gently backwards. Maintain the direction of takeoff using the rudder.

Lift-off occurs at 43 Mph / 37 Kts. After lift-off accelerate the airplane at 3 – 5 feet / 1 - 1.5 Meters of altitude to a speed of 53 – 56 Mph / 46 – 49 Kts and then start the climb. Take-off without using the flaperons is the simplest method and has no peculiar features. The airplane easily maintains the direction during the takeoff roll.

If it is necessary to achieve a short takeoff run, the pilot should extend the flaperons one notch to the first position down. When choosing the flaperons setting, it is necessary to take into account the strength of the headwind. With a headwind of 18 Mph / 16 Kts or more, extending the flaperons is not recommended. There is no peculiar feature in the airplanes behavior with the flaperons extended.

At an altitude of about 500 feet / 152 Meters retract the flaperons maintaining the takeoff power of the engine.

6.4.2 Crosswind Takeoffs

Takeoffs can be safely accomplished without any flaperons up to the maximum demonstrated crosswind component. Takeoffs with extended flaperons are allowed with cross winds not exceeding 9 Mph / 8 Kts.

NOTE: Takeoffs with a crosswind exceeding 9 mph / 8 knts must be done without extending the flaperons.

The airplane tends to turn into the wind during takeoff so the yoke or stick should be moved to the windward side from the very beginning of the takeoff roll. This is necessary for maintaining equal loads on the main landing gear wheel and preventing the banking and turning of the airplane into the wind.

As the speed of the airplane and aileron efficiency increases, gradually return the yoke or stick to the neutral position and establish the proper crab angle for climb-out.

If the airplane starts to turn during takeoff, it will be necessary to stop this tendency by deflecting the rudder (pressing the pedal) to the side opposite the turn, that is, steering the plane while the nose wheel is on the ground with the rudder pedals, once the nose wheel leaves the ground use coordinate efforts of the ailerons and rudder to establish the proper crab angle for climb-out.

After lift-off, in order to prevent drifting, it is necessary to hold the yoke or stick shifted against the drift (i.e. maintain bank to compensate for the drift) and the airplane's tendency to turn should be compensated for by pushing the rudder pedal opposite to the bank.

When taking off with a crosswind the lift-off speed should be 3 – 7 Mph / 3-6 Kts higher than normal.

6.5 Best Angle of Climb (V_X)

Recommended speed at climb is 56 Mph / 49 Kts

6.6 Best Rate of Climb Speed (V_Y)

Recommended speed at climb is 65 Mph / 56 Kts

6.7 Cruise

During level flight the airplane is stable and easily controllable throughout the entire speed range and any operational center of gravity position. Level flight speed range is from 44 to124 Mph / 38 to107 Kts. The control stick force in pitch may be removed with the elevator trim tab deflection.

Steep turns are allowed at an altitude of not less than 1000 feet / 305 Meters or as is deemed necessary for safe operation of the aircraft by the pilot. The bank angle must not be more than 70 degrees.

Periodically check the amount of fuel remaining in the fuel tanks.

In turbulence, the airspeed should be slowed but not less than 56 Mph / 49 Kts , altitude not less than 500 feet / 152 m and turns should be made with a bank angle not more than 30 degrees.

6.8 Approach

After receiving airfield information and having obtained clearance from air traffic control (at a controlled field) you may begin your approach for landing. Caution should be given to make sure you have set the correct altimeter setting and obtained clearance before landing.

If flaperons are to be used for landing and at an altitude of not less than 500 feet / 152 meters set the flaperons in the landing position taking into account the strength of the wind.

NOTE: If there is a headwind of more than 18 mph / 16 knts, or crosswinds greater than 9 mph / 8 knts, it is recommended not extending the flaperons during approach to landing.

After entering into final, set the throttle to the idle position and descend at a speed of 60 – 65 Mph / 53-57 Kts. Watch the altitude, bank, and drift and be prepared to add power as required to make the landing area.

When below the glide slope and flaperons are being used, DO NOT RETRACT THE FLAPERONS as this will cause some loss of altitude. Correcting a low altitude on approach should be corrected by increasing engine power.

6.9 Normal Landing

For floats in any landing always add at least three verifications that the gear is in the state required for the landing. Downwind, base, and final are the minimum points to check. Extreme care should be taken to understand the correct state of the gear position.
Landing can be made with or without flaperons and depends on weather conditions. While becoming familiar with the aircraft it is suggested that you do use flaperons and plan the landings for a relaxed rollout. Do not try very short field approaches for example, until you are familiar with the flight characteristics of the aircraft with and without the use of flaperons. Consider an approach speed without flaperons of 65 Mph / 57 Kts. When using flaperons consider an approach speed of 60 Mph / 53 Kts. Crosswinds should always be a factor when deciding to use or not use flaperons. With or without the use of flaperons use trim as needed. With the use of flaperons, controls may seem heavy and you may not be able to trim out all of the additional pressure on the controls.

Enter the flare at 15 – 20 feet / 4-6 Meters and flare out at approximately 1.5 feet / .50 meter. Stick or yoke movement should be energetic but smooth and continuous until touch-down. Touch the main gear down first, then the nose gear remembering to always use the rudder pedals to steer the nose of the aircraft.

NOTE: When landing the aircraft, do not touch down on the nose wheel first.

During the landing watch the ground far enough down the runway to avoid the effect of ground rush. Consider using a point 50 – 65 feet / 15-19 Meters ahead and 10 – 15 degrees to the left from the longitudinal axis of the airplane.

During the flare attention should be shared between the following:

- Height and vertical speed.
- Drift and bank angle.
- Direction of flight.

Maintain direction during the landing run with the rudder by use of the rudder pedals.

If brakes are used, then use brakes in the second half of the landing run. Do not apply brakes abruptly as soon as the airplane touches the ground because it may cause the airplane to nose over and or may cause skidding.

Retract the flaperons at the end of the landing run for more effective braking; however if possible retract flaperons AFTER clearing the runway.

In the case of landing with the flaperons retracted, the glide slope is more shallow and landing speed and distances are somewhat greater.

6.10 Crosswind Landings

Crosswind landings should not be attempted if the crosswind component is higher than 9 Mph / 8 Kts. Do not use flaperons during crosswind landings.

As a crosswind landing is more difficult it is RECOMMENDED to choose an into-the-wind direction as much as possible for landing.

Lateral wind component:

- Causes drift to the airplane in the air.
- Turns the aircraft into the wind on the ground.

During the approach apply a little bank opposite to the wind direction to compensate for drift and use the rudder to maintain the direction. When entering into the flare, start to decrease the bank slowly so that when the airplane touches the ground the wings are level.

If just before touch-down there is a drift, turn the airplane with rudder pedals towards the drift to lessen the side load on the landing gear.

6.11 Short Field Takeoff and Landing Procedures

If it is necessary to achieve a short field takeoff run the pilot should extend the flaperons one position down. When choosing the flaperons setting it is necessary to take into account the strength of the headwind.

Note: With a headwind of 18 mph / 15 knts or more, or crosswinds greater than 9 mph / 8 knts, extending of flaperons is not recommended.

There are no peculiar features in the airplanes behaviour with flaperons extended.

At an altitude of about 500 ft / 152 meters retract the flaperons, maintaining the takeoff power of the engine.

For short field landings, the use of flaperons is not required. If used, caution must be used to insure there is no cross wind in excess of 9 Knts. Additional landings with the use of flaperons should be practiced prior to use during a short field landing as the aircraft will float extensively if the pilot is not familiar with the use of flaperons. The use of full flaperons is not recommended. In all cases when using flaperons the controls will have a heavy nose-down pressure, which is normal and this cannot be trimmed out. This heavy nose-down pressure is caused by the change in the center of pressure while using flaperons.

NOTE: Seek adequate instruction in the use of flaperons and their characteristics. Flaperons are different than flaps.

6.12 After Landing

After landing clear the runway and taxi in for parking.

Before stopping the engine, set the minimum stable engine speed with the throttle and let the engine cool down for 1 to 2 minutes.

Set the engine speed to idle and turn off the radio and transponder. Turn the magneto / ignition switches to the off position. Turn off all lights and other equipment on switched systems. Turn the ignition key to its initial off position.

6.13 Post Flight Inspection

After each flight, visually check:

- The fuel tanks and engine for leaks of fuel or oil
- Weld seams of the power plant
- Condition of the propeller blades
- Condition and inflation of the tires
- Landing gear spring for deformations and cracks
- The condition of the fabric covering the wing and tail and control surfaces
- After a flight in humid conditions or winter check the transparent tubes leading to barometric instruments for water or ice blockage
- Refuel if necessary

6.14 Balked Landing Procedures

6.14.1 Go-Around

Go-Around procedure is possible from any altitude with flaperons either up or down. Apply full throttle, climb at a speed of 55-60 Mph / 48-53 Knts, and at an altitude at least 500 ft / 152 Meters retract flaperons leaving the engine at full throttle, repeat circuit and approach patterns.

6.15 Information on Stalls and Spins

6.15.1 Stall Speed

The stall speed at maximum take-off weight, flaperons set in the second notch / 3rd position, and engine at idle is 34 Mph / 30 Knts, with retracted flaperons it is 40 Mph /35 Knts. Stall speed during a turn with flaperons retracted and bank angle of 60° is 53 Mph / 46 Knts, with bank angle of 30° it is 44 Mph / 38 Knts.

6.15.2 Spin Recovery

WARNING!
INTENTIONAL SPINS OF THE AIRPLANE ARE PROHIBITED.

NOTE: In level flight and during turns, stall approach warning is provided by the aerodynamic characteristics of the airplane - shaking of the airplane structure and control stick or yoke.

NOTE: To recover the airplane from a spin (unintentional spin), push the rudder pedal forward opposite to the direction of spin and then push the stick or control yoke briskly full forward. Return throttle to idle. When the rotation ceases put the rudder in neutral position and after reaching a speed of not less than 55 mph / 48 knts smoothly level off the airplane without exceeding the load factor of +4 g and the maximum allowed airspeed of 136 mph / 118 knts.

7 Aircraft Ground Handling and Servicing

Extended storage of the airplane is possible either in a hangar or in the open. In the latter case the airplane should be parked in a place equipped for airplane tie-downs and the aircraft should be covered. When parking the airplane, take into consideration the prevailing wind direction. The airplane should be parked with its nose into the wind whenever possible.

7.1 Servicing Fuel, Oil, Coolant

Refer to the engine manufacturer's documentation for information concerning servicing fuel, oil and coolant.

7.2 Tie-Down Instructions

Parking the aircraft in any open area must provide safe airplane tie-downs for any strong wind conditions.
The airplane is to be securely tied at three points:

- Both wing strut tie-down fittings.
- The tail wheel.

NOTE: Do not pull the tie-down lines too tight it will overload the wing structure and cause deformation.

When keeping the airplane in the open air do the following:

- Secure the wheels with chocks from both sides.
- Fix the elevator, rudder and ailerons in neutral position with gust lock.
- Cover the Pitot tube with a protective cover.
- Cover aircraft with a soft cover.
- Particular attention should be given to protection of the airplane from corrosion by keeping the protective coatings intact.

7.3 Care Of the Aircraft Surfaces

Good care of the fabric covering of the wings and tail is important for maintaining the airplanes high flight performance and reliability. To keep the fabrics covering in good condition do the following:

- Regularly clean the covering of dust, dirt, moisture and snow (in winter).
- Protect it from scratches.
- Avoid contact of the covering with oil products, solvents, alkali and acids.

WARNING!
DO NOT FLY THE AIRPLANE IF ITS FABRIC COVERING HAS EVEN THE SLIGHTEST TEAR. REPAIR IT FIRST.

The canopy is made of an acrylic or similar material and should be cleaned as follows:

- Wipe it using a clean soft piece of cloth soaked in soapy water or cleaner suitable for use on acrylic material.
- Oil stains must be removed with cotton wool soaked in kerosene.

Note: Do not use petrol, solvents or acetone. – Use of these products will cause the glass to cloud.

8 Required Placards and Markings

8.1 Airspeed Indicator Range Markings

Airspeed is indicated in miles per hour and if present, knots on the inner scale. The airspeed indicator has colored arcs that indicate aircraft speed ranges.

White	**Flaperon Extended Speed Range**	**V_{SO} - V_{FE}**	**36 – 72Mph / 31-63 Kts**
Green	**Normal Speed Range**	**V - V_A**	**44 – 92 Mph /38-80 Kts**
Yellow	**Smooth Air Speed Range**	**V_A - V_{NE}**	**92 – 136 Mph /80-118 Kts**
Red	**Never Exceed Speed**	**V_{NE}**	**136 Mph / 118 Kts**

8.2 Operating Limitations on Instrument Panel

8.3 Passenger Warning

THIS AIRCRAFT IS A SPECIAL-LIGHT SPORT AIRCRAFT AND DOES NOT COMPLY WITH THE FEDERAL SAFETY REGULATIONS FOR STANDARD AIRCRAFT.

8.4 Aerobatics and Spins

No Aerobatic Maneuvers Or Intentional Spins Permitted.

8.5 Equipment Placards and Markings

Required placards and markings are positioned next to the engine control they refer to including:

- Throttle
- Brake
- Elevator trim control
- Pilot and copilot PTT controls
- Parking brake
- Engine choke
- Fuel shutoff valves open - close
- Flaperons position
- Ignition switch
- Landing light, strobe light, and navigation lights on and off settings
- Ignition switches
- Alternate static source on and off
- 12 volt auxiliary voltage supply
- Cockpit heat
- EIS or EMS warning
- Low charge warning
- Gear Up (blue lights)
- Gear Down (Green lights)
- Power On /Off (pneumatic pump power switch)
- Lock / Unlock (Gear Up-lock Handle)
- Up / Down (Rudder retract Handle)

8.6 Miscellaneous Placards and Markings

Additional placards will be present within the cockpit and on the exterior of the airframe.

- Always pre-flight aircraft.
- No smoking.
- Seatbelts must be worn at all times.
- The pilot operation hand book shall be on board the aircraft and the occupants must be familiar with its contents.
- Operate in accordance with limits and procedures detailed in the pilot operating handbook.
- No flights into clouds or known icing conditions.
- Door opening.
- Fueling grounding point
- Fuel drain points
- Fuel octane warnings on fuel tank
- Aircraft manufactures data plate
- Special light sport or experimental placard

9 Supplemental Information

9.1 Familiarization Flight Procedures

New pilots should allow sufficient time with a trained instructor to become familiar with the aircraft.

9.2 Pilot Operating Advisories

None

10 FPNA CAPE TOWN CHECKLISTS

10.1 Engine Start

- ☐ Preflight inspection complete
- ☐ Passenger Briefing
- ☐ Seatbelts and Harness adjusted and secure
- ☐ Doors Closed and Locked
- ☐ Gust Lock Removed
- ☐ Parking Brake Set
- ☐ Fuel Selectors – ON
- ☐ Avionics – OFF
- ☐ Autopilot – OFF
- ☐ Lights – ON (as required)
- ☐ Fuses Checked / Circuit breakers in
- ☐ Pneumatic Pump power – ON
- ☐ Landing gear position switch – as appropriate
- ☐ Landing gear up-lock handle- down / lock
- ☐ WATER Rudder position – as appropriate
- ☐ Choke – ON
- ☐ Master Switch – ON
- ☐ Mag Switches – ON
- ☐ Clear Area Around Aircraft
- ☐ Engage Ignition
- ☐ Choke – OFF
- ☐ Check For Oil Pressure

10.2 Pre-Taxi and Taxiing

- ☐ Avionics – ON
- ☐ Navigation lights- ON
- ☐ Power Backup switch - ON
- ☐ Water rudder position- as appropriate
- ☐ Listen to Weather Source (ASOS, AWOS, ATIS)
- ☐ Brake Test
- ☐ Instrument Check
- ☐ Controls Check

10.3 Before Takeoff

- ☐ Brakes Set
- ☐ Seatbelts and Shoulder Harness Fastened
- ☐ Flight Control – Check
- ☐ 1st position flaps down – or as needed and desired
- ☐ Fuel Selection – ON
- ☐ Trim Set
- ☐ Increase Power to 3,600 RPM
- ☐ Check BOTH Mag switch operations
  - Left Mag OFF- Drop of no more than 300 RPM
  - Right Mag OFF- Drop of no more than 300 RPM
  - DIFFERENCE SHOULD NOT BE MORE THAN 100 RPM
- ☐ Oil Pressure - Check
- ☐ Oil Temp 120+ Degrees F / 50+ Degrees C - Check
- ☐ Engine Instruments in Green
- ☐ Charge Lamp - Check
- ☐ Throttle Idle - Check
- ☐ Flight Instruments Set and Check
- ☐ Auto Pilot – OFF (if applicable)
- ☐ COM/Nav Set
- ☐ Flaps Set
- ☐ Doors Closed and Locked
- ☐ Lights – ON as needed
- ☐ Water Rudders- UP for take off
- ☐ Brake – OFF
- ☐ Proceed to Hold Short Line
- ☐ Make Departure Announcement
- ☐ Check For Aircraft Landing, and On Base Or Final

10.4 Normal Takeoff – Flaps / No Flaps

BE CAREFUL OF ROTATION TO NOT HIT BACK OF FLOATS

- ☐ Runway Centerline Aligned
- ☐ ENSURE WATER RUDDERS UP
- ☐ 1st position Down Flaps / 0 position flaps (up)
- ☐ Increase Power Smoothly To Full Power

- ☐ Rotate 30+ MPH / 27 Kts// NO FLAPS 35 + MPH / 29 knts
- ☐ Liftoff 50+ MPH / 44 Kts// NO FLAPS 55+ MPH / 49 KTS
- ☐ Climb 60+ MPH / 52 Kts// NO FLAPS 65+ MPH / 56 KTS
- ☐ Monitor Engine Gauges

10.5 Short Field Takeoff – One Notch Flaps

(Do Not Use Flaps with Headwinds Over 18 MPH / 15 Kts)

- ☐ One Notch (10 Degrees) Of Flaps
- ☐ ENSURE WATER RUDDERS UP
- ☐ Use All Available Runway
- ☐ Hold Brake And Apply Full Power
- ☐ Check Engine Gauges
- ☐ Release Brake
- ☐ Rotate As Soon As Possible
- ☐ Climb 65+ MPH / 56 Kts
- ☐ At 200 Ft / 61 M Slowly Retract Flaps

10.6 Before Landing

- ☐ Fuel Selectors - Check
- ☐ Seat Belts – ON
- ☐ Auto Pilot – OFF
- ☐ ENSURE WATER RUDDERS UP
- ☐ Check Landing surface
- ☐ Check Gear Position
- ☐ Check pneumatic pressure (Normal range 80-100)

10.7 LANDING ON WATER

CHECK GEAR POSITION – Gear should be up!

- ☐ **GEAR UP!!! (Put Gear position switch to UP)**
- ☐ ***Check Landing Gear light indicators*** **(3 BLUE lights)**
- ☐ **Check Water Rudder UP**
- ☐ **Land into the wind**

10.8 LANDING ON LAND

CHECK GEAR POSITION – Gear should be down!

- ☐ **TO EXTEND** THE GEAR
- ☐ **Up lock** LIFT (unlock) lever between seats
- ☐ Gear position switch **to DOWN**
- ☐ **Gear Down** (CHECK FOR **3 GREEN** LIGHTS)
- ☐ Up lock push down (repositioned for gear retraction)
- ☐ Lights – ON as required
- ☐ ENSURE WATER RUDDERS ARE UP

10.9 Go Around

- ☐ Full Power
- ☐ Climb 65+ MPH / 56 Kts
- ☐ Retract Flaps At 200 Ft / 61 M With Positive Rate

10.10 After Landing

- ☐ Retract Flaps
- ☐ Water Rudders as appropriate
- ☐ Transponder to STBY
- ☐ Apply Brake Slowly

10.11 Shut Down

- ☐ Throttle At Idle
- ☐ Brake Set
- ☐ Avionics – OFF
- ☐ Mags – OFF
- ☐ Lights - OFF
- ☐ Backup Power switch - OFF
- ☐ Master – OFF
- ☐ Gust Lock Installed

11 Emergency Procedures Check List

11.1 ENGINE FAILURE (A-B-C)

- ☐ **A**ir Speed – 56/49 MPH/KTS
- ☐ **B**est Place to Land
- ☐ **C**heck List

11.2 ABOVE 1,500’ – TRY RESTART

- ☐ Fuel Valves – ON
- ☐ Throttle – Open ½ Inch
- ☐ Magneto / Ignition switches – ON
- ☐ Master Switch – ON
- ☐ Engage Ignition
- ☐ Use Choke as Needed

11.3 IF ENGINE WILL NOT RESTART

- ☐ Determine Best landing Area
- ☐ **CHECK GEAR POSITION**
- ☐ Brief Passengers
- ☐ Set Transponder To Squawk 7700
- ☐ Set Radio To 121.5 and Say MAYDAY 3 Times
- ☐ Maintain Air Speed 61/53 MPH/KTS
- ☐ ***FLY THE PLANE***

11.4 BELOW 1500' – PREPARE TO LAND

- ☐ Determine Best Landing Area
- ☐ **CHECK GEAR POSITION**
- ☐ Brief Passengers
- ☐ Fuel Valves – OFF
- ☐ Throttle – IDLE
- ☐ Magneto / Ignition switches – OFF
- ☐ Flaps - AS NEEDED
- ☐ Master Switch – OFF
- ☐ ***FLY THE PLANE***

11.5 LANDING GEAR IN WRONG POSITION

11.5.1 LANDING GEAR WON'T EXTEND OR LOWER

Possible problem will be indicated by the presents of two blue lights and one green light. This indicates the mains are still in the up and locked position (Two blue lights) and the nose wheel is down and locked (One green light).

CHECK UP-LOCK RELEASE HANDLE POSITION - *DO NOT PULL*

If UP-LOCK is in the down position DO NOT PULL,

- ☐ MOVE LANDING GEAR SELECTOR switch to the UP position.
- ☐ Upon complete gear retraction (Three Blue Lights) Pull UPLOCK Handle.
- ☐ Move LANDING GEAR SELECTOR switch to down position.
- ☐ Check for 3 green lights.
- ☐ Once gear position has been determined Push UPLOCK down.

11.5.2 LANDING GEAR WILL NOT RETRACT OR RAISE

Possible problem will be indication on pressure gauge that retracts system does not maintain pressure or pressure pump is not running.

- ☐ Pull Air pump circuit breaker.
- ☐ Reset Air pump circuit breaker Pressure should stabilize at between 80-100 PSI
- ☐ If gear is in the "Down position" (Three Green lights) landing gear should remain in down position.

CAUTION:

LAND ON THE LAND WITH EXTREME CAUTION!

Should you decide to retract the gear it should remain in the UP and locked position due to the gear locks.

ALWAYS VISUALLY VERIFY THE GEAR POSITION.