

Super PETREL

EDRA AERONÁUTICA Ltda.



Operation and Maintenance Manual

SUMMARY

This handbook refers to the Super Petrel biplane and was elaborated to supply all the necessary information for a safe and economical flight of your aircraft. Nevertheless, information about the engine and any other equipment not fabricated by this company will never prevail over information supplied by their own producer.

The topics are divided in the following sections:

Section I - General Information: general information about the aircraft.

Section II - Operational Limits: limit factor specifications, flight procedures and regimes in which the aircraft can be operated. The limitations must not be exceeded under any conditions.

Section III - Emergence Procedures: problems that may compromise security and the necessary procedures to correct them.

Section IV - Normal Procedures: normal operational procedures.

Section V - Performance: performance values and the necessary orientation to achieve the maximum output.

Section VI - Weight and Balance: weight and ballast distribution.

Section VII - Maintenance and Conservation: maintenance and conservation procedures that must be carried out by the owner and maintenance and inspection plan.

Section VIII - Trailing, Assembly and Disassembly: orientations about assembly and disassembly.

INDEX	1
OPERATION AND MAINTENANCE MANUAL	1
SUMMARY	2
INDEX	3
GENERAL INFORMATION	5
I.1 - Aircraft Description	5
I.1.1 - Introduction.....	5
I.1.2 - Configuration.....	5
I.1.3 - Structure.....	5
I.1.4 - Landing gear.....	5
I.1.5 - Controls.....	5
I.1.6 - Power plant.....	6
I.1.7 - Fuel system.....	6
I.1.8 - Electric system.....	6
I.2.1 - Cockpit accesses.....	6
I.2.2 - Seat adjustment.....	6
I.2.3 - Seat belt adjustment.....	6
I.2.4 - Controls operation.....	7
OPERATIONAL LIMITS	8
II.1 - Flight Limits	8
II.2 - Marks & Placards	8
II.3 - Speed Limits	8
II.4 - Weight Limits	8
II.5 - Engine Limits	8
II.6 - Fuel Limits	9
EMERGENCY PROCEDURES	10
III.1 - Introduction	10
III.2 - Emergency Procedures	10
III.2.1 - Engine fire.....	10
III.2.2 - Power loss during take-off.....	10
III.2.3 - Power loss in flight.....	10
III.2.4 - Engine overheating / oil pressure loss.....	11
III.2.5 - Landing gear failure.....	11
III.2.6 - Water infiltration.....	11
NORMAL PROCEDURES	12
IV.1 - Pre-Flight Requirements	12
IV.2 - Pre-Flight Check	12
IV.3 - Refueling	14
IV.4 - Engine Start Procedures	14
IV.5 - Engine Operation	14
IV.6 - Engine Check	14
IV.7 - Ground Operation	14
IV.8 - Water Operation	17
PERFORMANCE	18
WEIGHT & BALANCE	19
VI.1 - Introduction	19
VI.2 - Weights	19
VI.3 - Balance	19

SERVICES	21
VII.1 - Introduction	21
VII.2 - Generalities	21
VII.3 - Fuselage	21
VII.4 - Controls	21
VII.5 - Wings	21
VII.6 - Empennage & Tail Boom	22
VII.7 - Engine	22
VII.8 - Propeller	22
VII.9 - Landing Gear	22
VII.10 - Electric System	22
ASSEMBLY, DISASSEMBLY & TRAILLERING	23
VIII.1 - Introduction	23
VIII.2 - Aircraft Assembly/Disassembly	23
VIII.3 - Trailer Loading	25
VIII.4 - Trailer Connection	25
VIII.5 - Trailing Procedures & Cautions	25
APPENDIX I	28
Empty weight:	28
Gross weight:	28

SECTION I GENERAL INFORMATION

I.1 - Aircraft Description

I.1.1 - Introduction

The Super Petrel is an extremely versatile aircraft because of its operational characteristics and the easy way in which it can be disassembled and transported.

I.1.2 - Configuration

The Super Petrel is an amphibian seaplane with equilibrium floats attached to its lower wings. The ailerons are only in the upper wings and the empennage is conventional, with the horizontal stabilizer mounted half way up the tail fin.

The two seats are side by side with dual controls in an enclosed cockpit.

The engine is in pusher configuration, attached to the upper wing pylon. A fiberglass cowling encloses it.

I.1.3 - Structure

Two parts compose the fuselage: main fuselage and tail boom.

The main fuselage is molded in fiberglass and reinforced by fiberglass/PVC foam bulkheads.

The tail boom is molded in carbon fiber and has internal PVC foam reinforcements. Integrated vertical stabilizer made in classical construction with two fiberglass spars and PVC foam ribs. A fiberglass skin reinforces its root, and the whole surface is covered with fabric. The detachable horizontal stabilizer has the same type of construction as well as the control surfaces, and is sustained by stainless steel cables.

The upper wings structure have a round aluminum tube as main spar and PVC foam ribs. The tips and the leading edge are in fiberglass and the surface is covered with fabric.

The lower wings are built in the same way, the difference is that the aluminum main spar is replaced by a carbon fiber "C" channel, forming a "D" box when bonded to the fiberglass leading edge. The floats are attached to the wing's lower surface.

The struts are made of 6061-T6 aluminum profile.

I.1.4 - Landing gear

The main landing gear is equipped with oil pneumatic shock absorbers, hydraulic disk brakes, aluminum wheels and 11x4.00-5 tires & tubes with inner tubes. The free swivel nose wheel is equipped with 2.80x2.50-4 tires & tubes.

The landing gear retraction system is manually operated, through a "Johnson Bar". The operating load of the system is balanced by a gas spring.

I.1.5 - Controls

Plastic covered stainless steel cables operate the rudder, while rigid tubes, connected by pins actuate elevator and ailerons and cotter pins for easy disassemble.

The trim is electrically operated.

Controls range:

- | | |
|------------|--|
| - Ailerons | 30 degrees up, 15 degrees down |
| - Elevator | 30 degrees up, 20 degrees down |
| - Rudder | 30 degrees to the right
30 degrees to the left. |

1.1.6 - Power plant

The standard engines are a Rotax 912 UL-DCDI, with 80 HP, or a Rotax 912 ULS-DCDI, both of them 4 strokes, with double ignition, double carburation and mixed air/water cooling system. It has an incorporated reduction gear box, electric starter system and voltage rectifier (12 V).

The three blade propeller is made of carbon/epoxy composite and its pitch is ground adjustable.

1.1.7 - Fuel system

There are a 32,5 liters tank on each lower wing, moreover there is a 15 liters header tank located behind passenger seat (right side of the aircraft), total capacity is 80 liters. Wing tanks feed the header tank through a three positions fuel selector valve (right wing tank, left wing tank or shut off).

1.1.8 - Electric system

The electrical system is 12 V and incorporates the electrical starter and voltage rectifier.

The battery used is a YUASA YB14-A2 of 12 V, 14 Amps

The generator supplies 250 W DC.

Apart from the starter system, the basic electrical equipment are :

- Electric bilge pump.
- Electric trim.
- Electric Fuel Pump

I.2 - Aircraft Knowledge

1.2.1 - Cockpit accesses

Two big doors give access to the cockpit. Each one has two rotating seals, upper and lower, that can be opened from the inside or outside. It is possible to fly without the doors that are easily removed by taking out the pins and cotter pins.

1.2.2 - Seat adjustment

The pilot and passenger seat backs may be adjusted into three longitudinal positions. There are attachment pins in the seat backs that are incased in the seat pans, and drive pins in the seat pans, that are incased in the seat backs. Recline the seat back forward and then upward, to remove it from its positioning pins. With the seat back forward reclined, incase its pins in one of the other two seat pan positioning holes row, turn it to its resting position, automatically incasing the driving pins.

1.2.3 - Seat belt adjustment

The seat belt used in the Super Petrel is the 4 point type. Its adjustment must be done in the following way:

- 1 - Loosen the straps
- 2 - Connect the buckle
- 3 - Adjust the abdominal strap
- 4 - Adjust the diagonal strap

Never fly without the seat belt

1.2.4 - Controls operation

Stick and Pedals

The Super Petrel has conventional 3 axes dual controls. The stick controls roll and pitching while pedals control the yaw.

The brakes are actuated individually by pedals located only on the pilot's side of the cockpit (left).

Throttle

When moved forward it is increasing engine's power and when moved backwards it is reducing engine's power.

Choke

The choke is activated when the lever located on the upper part of the finishing plate, behind the seats, is pushed down. It goes back by the action of springs but even so push it back to confirm that it is in position when it's use is not necessary any more.

Landing Gear Retraction Lever

When the landing gear is retracted, the retraction lever will be in the horizontal position. Moving it about 90°, in direction to the instrument panel, the landing gear will be extended. Be sure that it is in its forward stop.

SECTION II OPERATIONAL LIMITS

II.1 - Flight Limits

It is only permitted to fly under VFR conditions.

It is only permitted to carry two persons and the maximum takeoff weight must never be exceeded.

When in solo flight, in the left side seat, the balance conditions must be observed.

Acrobatic maneuvers are not allowed, including intentional spins.

Cross wind over 15 knots on takeoff and 10 knots on landing should be avoided.

Avoid extending the landing gear in speeds higher than the ones used for landing approach.

In case of failures the best gliding ratio speed is 65 mph.

II.2 - Marks & Placards

The marks and placards are fixed in visible places to identify the aircraft through registration number, serial number, etc. Their locations are:

Panel: aircraft identification plate with: manufacture's name, serial number, manufacturing date, registration number and the following phrase: "This aircraft does not satisfy the airworthiness requirements, flight under self risk and only for leisure".

On Wings: the aircraft's registration number is painted on the top surface of the upper right wing and the bottom surface of the lower left wing.

Tail: it carries the inscription "EXPERIMENTAL".

II.3 - Speed Limits

The following speeds must never be exceeded:

Maneuver speed: 80mph.

Maximum recommended landing gear extension speed: 75mph.

Never exceeding speed (VNE): 112 mph.

II.4 - Weight Limits

The gross weight is 545 kg.

The limits for the CG range, taking as reference (datum) the main landing gear axle are:

- **Forward:** 30 cm forward the main landing gear axle.

- **Backward:** 19 cm forward the main landing gear axle.

Obs: for more details on weights and balance, see section VI.

II.5 - Engine Limits

Engine	Max. Power/rev.
Rotax 912	80,0 hp/5500 rpm
Rotax 912S	100,0 hp/5500 rpm

The maximum cylinder head temperature is 150°C (300°F).

These are the limits for oil pressure and temperature:

	Minimal	Normal	Maximum
Pressure 912	1,5 bar	5,0 bar	7,0 bar
Pressure 912 S	2,0 bar	5,0 bar	7,0 bar
Temperature 912	50 °C(120°F)	90-110 °C(194-230°F)	140 °C(284°F)
Temperature 912 S	50 °C(120°F)	90-110 °C(194-230°F)	130 °C(266°F)

II.6 - Fuel Limits

Never takeoff without the necessary fuel for the intended flight plus 30 minutes of reserve. The use of the electric fuel pump during take off and landing is mandatory.

SECTION III EMERGENCY PROCEDURES

III.1 - Introduction

Emergency situations are liable to happen with any type of aircraft. So always fly at a distance and height that will allow you to land if necessary and always carry in mind what to do if you face an emergency.

We will present the main problems that may occur and which procedures should be taken. They are orientations elaborated through practical experiences but should not be taken as rules to be followed, because of the particularity of each emergency as long as the pilot has the complete knowledge of his equipment's limits and characteristics.

III.2 - Emergency Procedures

III.2.1 - Engine fire

A remote possibility. If it occurs, turn off the magnetos and the master and follow the instructions for a forced landing.

III.2.2 - Power loss during take-off

During take-off, keep the landing gear down until the point where, in case of any failure, you may still land and stop on the runway. Beyond this point, retract the landing gear that will result in a better glide ratio also and if the surface where you will land is not smooth and compact enough, it will be better to land with the landing retracted.

Never forget that in case of power loss during take-off, you must immediately lower the nose to maintain speed, because of high thrust line inherent to pusher configuration, a sudden loss of power will make the aircraft to pitch up, tendency aggravated by the attitude "high nose" on take-off.

Never try to go back to the runway by making a low altitude turn.

Don't forget to turn off magnetos and master.

III.2.3 - Power loss in flight

Look for a safe place to land power off.

For this reason when flying always look for places where to land if necessary, and maintain an altitude that will allow you to reach them.

If you have enough height, try to find out the cause of the loss of power:

- Check the magneto switches verifying if they were turned off accidentally.
- Verify the fuel system. Certain problems may be solved or minimized by pumping the hand fuel pump.

After these checks, try a re-start. If it doesn't work, prepare for an emergency landing.

- Turn off the magnetos and master.
- Stabilize the airspeed at 65 mph.
- Choose the best place to land and check the wind direction.
- Plan the approach. Remember that an excess of height can be lost by sideslipping. So prefer to approach a little higher than normal for security
- Check seat belts and.
- Lower the landing gear only if you are sure that the surface is compact and without obstacles, if not, land on the belly.
- If it is possible to land with the landing gear down, touch first with the main wheels and after with the nose wheel and use the brakes if necessary.

III.2.4 - Engine overheating / oil pressure loss

If the temperature on the cylinders' head goes over 150°C (300°F) in flight, reduce power and lower lightly the nose to gain speed and in this way lower the temperature. If the temperature continues high, look for a place to land immediately.

In 4 stroke engines like the Rotax 912 and 912S, temperature and oil pressure are opposite proportional. A high temperature corresponds to a low oil pressure and low temperatures correspond to high oil pressure. If this relation does not occur it is possible that there is an instrument failure.

Be alert to the following engine limits:

-minimum oil pressure: 1.5 bar on 912 and 2,0 on 912S.

-maximum oil temperature: 140°C (285°F) on 912 and 130°C (266°F) on 912S.

III.2.5 - Landing gear failure

As the landing gear system is manually operated, a failure is very difficult to happen, but if it occurs, it may reach the main landing gear or only the nose gear.

In the first case, landing on the belly doesn't mean necessarily that damages will occur, especially if it will be done on a grass runway. The ideal would be to land on water.

In the second case, if the nose gear doesn't extend, proceed as in a normal landing, taking care to keep the nose high as long as possible, with stick back and a bit of engine power.

It is always good to remember that flare height for belly landing is lower than for normal landing. A hard landing may affect the hull's structure making necessary a very accurate inspection before taking-off again and specially landing on water.

III.2.6 - Water infiltration

During water operation it is possible some water infiltration. If it happens it can be eliminated using the electrical bilge pump.

If there is some damage to the hull and the water infiltration is above normal, turn on the pump and try to take-off as soon as possible; or in last case get as close as possible to the land, lower the landing gear and try to get the aircraft out of the water.

SECTION IV NORMAL PROCEDURES

IV.1 - Pre-Flight Requirements

Never take-off without first certifying that the aircraft's inspections and revisions are up to date.

Make a very careful pre-flight inspection.

Always keep an eye to the operational limits and emergency procedures.

Verify if yours and your airplane's documentation are in order.

IV.2 - Pre-Flight Check

A pre-flight inspection is of vital importance for your security and for the aircraft's integrity.

Follow the inspection list in the correct sequence, using fig. 3 as reference, and correct any fault detected that may put in risk the flight's security.

Pre-Flight Inspection List

1 - Nose

- Ballast
- Nose wheel leg and external retraction mechanism.
- Nose wheel compartment sealing.
- General hull conservation.

2 - Cabin

- Doors' hinges.
- Magnetos off.
- Bilge pump on and off.
- Electric trim switch working (it's necessary master on).
- Master off.
- Thermometer, tachometer and air speed indicator indicating zero.
- Altimeter adjusted to field elevation.
- Elevator and aileron controls (function, play and friction).
- Landing gear mechanisms (cables, pins, cotter pins, bolts, etc.).
- Throttle pulled back.
- Choke off.
- Seats (adjusted and fixed).
- Seat belts (adjusted and fixed).
- Fuel tanks (attachment, level, fuel quality and hoses).
- Landing gear internal retraction mechanism.
- Pedals.
- Brakes (oil level and leaks).

3 - Left landing gear

- Attachment.
- Tires.
- Broken clamps and oil tube.
- Leg's condition.
- Chock absorber.

4 - Left wings

- Wing-fuselage attachment.

- Struts and their attachments (pins and cotter pins).
- Pitot non-blocked up
- Wing rigidity.
- Wing covering.
- Aileron (movements, play and attachment).

5 - Left back side

- Hull's general condition.
- Tail boom fit.
- Engine's left side (with the top cowling removed) :
 - Oil and water radiator attachment.
 - Fuel pump and hoses.
 - A lubrication and coolant system hoses.
 - Exhaust tubes attachment.
 - Engine attachment.
 - Spark plug cables.
 - Left carburetor general attachment and controls.

"It is recommended to remove engine's cowling before the first pre flight of the day"

6 - Tail

- Flying wires (pins, cotter pins and general conditions).
- Rudder cables.
- Elevator mechanism (move the elevator to see the mechanism working through the inspection holes).
- Elevator connecting actuator (cotter pin).
- Electric trim plug's attachment.
- Rudder and elevator's articulation and attachment.

7 - Right back side

- Hull's general conditions.
- Propeller: general condition (also see section VII.8).
- Engine's right side (with the top cowling removed):
 - Oil and water radiator attachment.
 - Reduction gear box bolts with safety wires.
 - A lubrication and coolant system hoses.
 - Exhaust tubes attachment.
 - Engine attachment.
 - Spark plugs cables.
 - Water level in the expansion tank.
 - Right carburetor general attachment controls.

8 - Right Wings

- The same as the left wings
- Fuel tank cover (closed)

9 - Right Landing Gear

- The same as the left landing gear

10 - Cabin

- Electrical wiring (condition and attachment).
- Aileron controls (pins and cotter pins).
- Throttle and choke's mechanism (condition and attachment).

- Oil level.

IV.3 - Refueling

There are a 32,5 liters tank on each lower wing, moreover there is a 15 liters header tank located behind passenger seat (right side of the aircraft), total capacity is 80 liters. Wing tanks feed the header tank through a three positions fuel selector valve (right wing tank, left wing tank or shut off).

ATTENTION: Always drain the system and check fuel contamination before flight.

IV.4 - Engine Start Procedures

Never start the engine before making a careful inspection through the systems, specially the coolant and lubrication.

Verify the fuel's quality and quantity.

Pump the hand fuel pump until it becomes hard, or turn on the electric fuel pump until the engine runs, after that it should be turned off.

Check and see if the area around the aircraft is free.

Cold engine technique:

- Master ON.
- Magnetos ON.
- Choke engaged.
- Throttle full back.
- Press the START button until the engine runs, then close the choke and set the rpm through the throttle (it should be at 2000rpm).

Hot engine technique:

- Proceed as with a cold engine but don't use the choke, and push the throttle slowly forward.

On both cases, always check the oil pressure right after the start. If it do not reach the minimal pressure, turn off the engine immediately.

IV.5 - Engine Operation

The maximum limit of 5800 rpm, no longer than 3 min, must be observed (This limits are valid for 912 and 912S).

The maximum continuous regime is 5500 rpm. You must check all the engine parameters carefully when operating in this regime.

IV.6 - Engine Check

Check the idle that must be around 1400 rpm. To check the ignition, the engine must be running at 3800 rpm for the 912, and at 4000 for the 912S, then turn off the left magneto switch - the drop must not exceed more than 300 rpm for 5 seconds. Turn the switch back on and do the same with the right magneto.

IV.7 - Ground Operation

Taxi: it must always be done at low speed, keeping the stick back to alleviate the load over the nose gear. Turns must be done using the rudder; use the brakes only if necessary.

Take-Off Check: verify controls, instruments, engine (according to section IV.6), seat belts adjusted, necessary fuel for the flight and field pattern.

Take-Off: with back pressure on the stick, push the throttle forward, slowly, until it is against its front stop; once the nose gear starts raising, slowly reduce the back pressure on the stick, to keep the correct take off attitude. When sufficient speed has been reached (45 - 50 mph), the airplane will take-off by it self. Once airborne, release the stick back pressure a little bit, in order to reach 65 mph, the best climb speed. Follow the recommendations about engine operation.

Landing Gear Retraction: it should only be retracted when there is not enough runway in front of the aircraft for an emergency landing. Don't forget to use the brakes before retracting.

Power Adjusting: power must be adjusted according to the engine operation limits and recommendations and also in accordance to the flight attitude.

Landing Check: only extend the landing gear when the speed is bellow the recommended maximum for its extension (75 mph), checking if it is locked down, when in the downwind key position.

Landing: the approach must be made, power off or power on, at 60 mph. Check if the landing gear is down and locked. The touch down must always be done with the main landing gear, but be careful to avoid an excessive pitching angle, that could cause a collision of the back part of the hull against the ground. During the landing run try to keep the nose wheel in the air as long as possible, keeping the stick back. It doesn't need to use the brakes for directional control during landing roll.

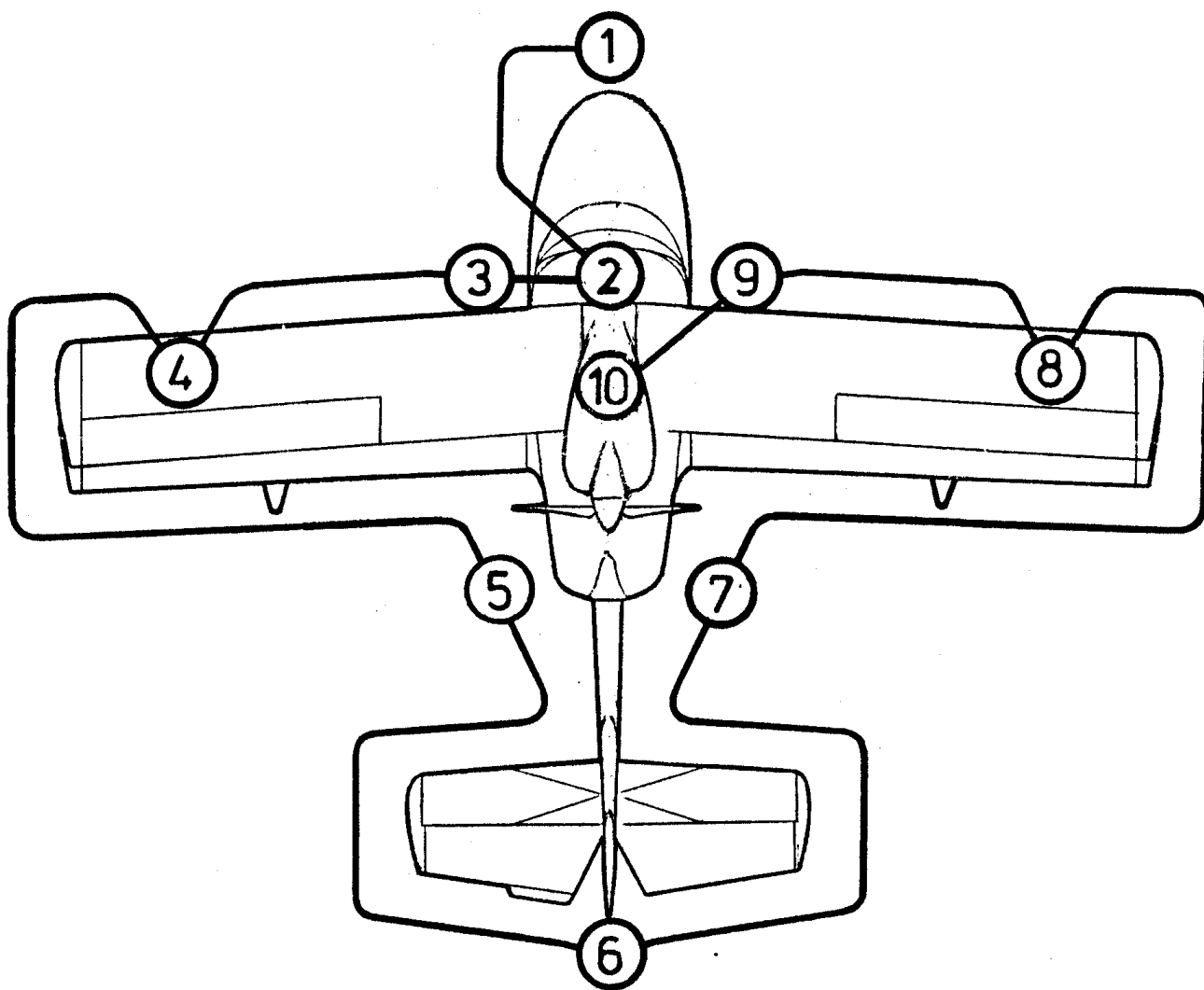


Fig.3 – Pre-flight Inspection Circuit

IV.8 - Water Operation

Taxi: it must be done with the stick full back. The maneuvers must be done using rudder and engine, when necessary. When there is wind the maneuvers are more difficult and require more attention.

Take-Off Check: it is the same as the take-off from land, but special care must be taken with wind direction and water flow, because take-off with cross wind may be very critical - the aircraft tends to head the wind. Observe if there are no immersed trees or any other obstacles that mean danger. Check the engine during the taxi. The landing gear must be retracted and locked.

Take-Off: keep the stick full back. Apply full power (gradually). Keep the wings leveled using the aileron control, and a straight course using the rudder control. The hull will soon climb in its step, when the stick back pressure must be relaxed. Then, increase back pressure on the stick, but right after relax the stick in order to allow the airplane to slide on the water surface. Use the stick to keep the airplane trimmed, until it reaches its take-off speed of 45 mph. Then move the stick afterward slowly, and the airplane will get off the water. Once out of the water, level the airplane to accelerate to 65 mph, the best climb speed.

Power Adjustment: power must be adjusted within the engine operating limits and recommendations and according to the flight attitude.

Landing Check: check if the landing gear is retracted and locked. Check the wind direction, water flow and surface and look for any immersed trees and obstacles. Never land with cross wind, always heading it.

Landing: into the water, even with the engine in idle, it will produce a certain thrust, so if you intend to stop in short spaces, the engine must be turned off as soon as the aircraft touches the water surface. The final approach must be at 60 mph. Make the flare close to the water, and keep an attitude with the nose slightly high. If the airplane floats, alleviate the stick back pressure, to avoid any climb. Touch the water in this attitude and keep the stick position until its complete stop.

Bilge Pump Use: whenever there is water into the aircraft, turn on the bilge to drain it.

Anchoring/Coming Out of the Water: when staying for a long time into the water, the aircraft should be anchored or moored. If the intention is to go out of the water with the aircraft, lower the landing gear (always at low speed) and look for a firm and flat place.

**SECTION V
PERFORMANCE**

<i>Super Petrel Technical Data</i>	
PERFORMANCE	
Cruise Speed (Km/h)	165
Max. Speed (Km/h)	175
V.NE. (Km/h)	180
Stall Speed (Km/h)	56
Climb Ratio (ft/min)	1.000
Glide Ratio	10:1
Service Ceiling (ft)	10.000
Take Off (ground/water) (m)	80/120
Landing (ground/water) (m)	120/100
Fuel Capacity (L)	80
Endurance (hours)	5:00
WEIGHT	
Gross Weight (kg)	315
Useful Load (kg)	230
Gross Weight (kg)	545
Load Factor (G)	4 / -2
DIMENSIONS	
Length (m)	5,97
Height (m)	2,26
Wing Span (m)	8,90
Wing Surface (m ²)	15
Seats	2
Landing Gear	Trigear/Retractable

SECTION VI WEIGHT & BALANCE

VI.1 - Introduction

Every aircraft has gross weight and CG ranges as limits that must never be exceeded, in order to assure its stability and performance characteristics.

Because of its side by side seating with pusher engine configuration, it becomes necessary to use, in certain situations, ballast to keep the CG in its range.

For this reason there is a water ballast tank located into the aircraft's nose that must be filled in function of the passenger's weight and other variables according to orientations given in this section.

Weight for (Piloto+Passenger) (kg)	Minimum Ballast (liters)
60	20
80	15
100	10
120	5
140	0

VI.2 - Weights

The gross weight, that is a structural limit, is 545 kg.

The empty weight that corresponds to the aircraft's structure weight (without fuel, removable ballast, passengers, and luggage) varies from aircraft to aircraft, according to the equipment installed and even manufactures tolerances.

Useful load is the margin between the empty weight and the gross weight and must be divided between fuel, passengers, removable ballast and luggage.

The table bellow represents the empty weigh, gross weight and useful load for the aircraft in its basic configuration, without any optional equipment. Empty weight and useful load are reference values because as we mentioned before, there can be differences between aircrafts.

Empty weight	315 kg
Useful load	230 kg
Gross weight	545 kg

VI.3 - Balance

The front and rearward CG limits are respectively 30 cm and 19 cm forward of the main landing gear with the aircraft leveled by the firewall forming a 7° with the vertical (fig. 4).

Equipment installation and even manufacturing process tolerances may alter the CG's position and the aircraft's empty weight.

So each aircraft that is produced has its weight and balance checked in order to determine the aircraft's weight and the relation between ballast and passengers weight.

A record with these figures (according to a model that can be seen in the next page) will follow with that aircraft and must always be kept on board. This record is specific for each aircraft in the condition it left the factory. If any equipment that affect the weight & balance will be installed or removed, it's a responsibility of the aircraft's owner to keep it up dated, fulfilling the cleared spaces of the form reserved to this objective.

This record brings also the following information:

- minimum occupants weight for full ballast;
- maximum occupants weight for full ballast;

- minimum occupants weight for empty ballast;
- maximum occupants weight for empty ballast;
- empty weight, gross weight and useful load.

SECTION VII SERVICES

VII.1 - Introduction

This section supplies all the necessary information about maintenance and conservation of your aircraft.

They are services and component exchanges that must be done periodically to avoid a possible failure that might affect flight safety.

The engine maintenance services must follow the manufacture orientations that are in the service and engine operation handbooks.

VII.2 - Generalities

Washing: after each operation in salt water it's very important to wash the whole airplane, in particular the landing gear, exhaust tubes, struts, cables and rods,.

Greasing: all the articulations, axles and sliding parts must be greased every 10 hours. The engine must be pulverized periodically with anti-corrosion lubricant.

VII.3 - Fuselage

The main fuselage does not require any special maintenance. However, avoid exposing it to temperatures above 140°F and drain the water accumulated inside the hull after every water operation.

VII.4 - Controls

The controls plus the engine are the most sensitive and important part of the aircraft and their conditions must be checked before every flight. Verify:

- Play: the commands are assembled with a minimum play, but after some operation time the plays could increase. If you notice that these plays are growing and becoming expressive, advice the manufacturer. It may be necessary to change certain parts. It is better to have this cost than to have a serious accident.

Attention: never take-off if there is any abnormal play in the system; it might lead to a very dangerous anomaly.

- Shape: all tubes used are strictly straight in shape. Care must be taken so that they remain like that. If any considerable torsion is noticed, never try to straighten the rod change it (some tolerance may be given if it is in stainless steel).

- Oxidation: some parts made of aluminum alloy may corrode, although being corrosion treated, when used in salt water (especially where there is friction). So, take special care with these parts and don't hesitate to change them. Keep them always very well lubricated.

- Cables: made of stainless steel, they should, by precaution, be changed every 400 hours.

VII.5 - Wings

Never leave the aircraft for a long time exposed to the sunlight, because even painted, the wing's fabric covering can suffer damage from the ultra violet rays. Small holes or even minor damages in the fabric can be easily repaired. If there is any bigger damage consult a specialist. Never fly with the wing's fabric unstitched. Never move the aircraft pushing it by the wings, specially the trailing edges.

Lower Wings

They do not contain any moving parts but are particularly susceptible to water and impacts. It is important to maintain their watertight condition so they must be checked every time they suffer any major impact.

Upper Wings

Check carefully ailerons, its hinges and controls.

VII.6 - Empennage & Tail Boom

The empennage's stainless steel cables must be changed every 400 hours.

Special attention should be given to the elevator's control rods, electric trim and hinges. If there is considerable play, the parts should be changed.

VII.7 - Engine

Because of its complexity and importance to the flight safety, it's necessary the operator be conscious that a very rigorous maintenance must be proceeded. For this, follow the Operator's Handbook instructions, issued by the engine's manufacturer.

VII.8 - Propeller

The Super Petrel is equipped with a three-blade ARPLAST propeller, manufactured in France, in composite material and with excellent characteristics and performance.

Always remember that composite blades do not resist certain impacts and take care that nothing touches the propeller when the engine is running. Vibrations during flight are usually caused by propeller damages.

VII.9 - Landing Gear

Inspect periodically the landing gear, checking the following items:

- Pins and cotter pins attachments
- Turnbuckles on the nose gear retraction and extension cables safety wired
- Screws and bolts tightening
- Retraction disc axle's bearings attachment
- General conditions of axles and tubes

The tires, because of the main landing gear suspension system, may have more wear-out in the inner side. When this wear-out is significant, the position of the tires should be inverted on the wheels.

The recommended pressure for the tires is:

Nose: 20 to 24 PSI

Main: 28 to 32 PSI

If the shock absorbers require calibration they should be removed from the aircraft and handed over to a specialist, because it will demand a certain practice.

VII.10 - Electric System

The battery solution's level should be checked periodically and, if necessary, filled with distilled water.

In case of electric failure, verify if the fuse is burnt. Find the cause and replace the damaged fuse with a new one.

& TRAILLING
SECTION VIII
ASSEMBLY, DISASSEMBLY & TRAILLING

VIII.1 - Introduction

The Super Petrel, exploring it's easy of assembling and disassembling, to become even more versatile, may count, if desired, with a highway transport trailer. So, after used, it can be quickly disassembled and taken home to be stored in the garage.

VIII.2 - Aircraft Assembly/Disassembly

Two elementary cares must be taken during assembly/disassembly process:

- Never, under any condition, force a fitting or groove
- After disassembled, put all pins and cotter pins back in places.

To disassemble, follow step-by-step the list given bellow. To assemble, follow the inverse order.

1. Empennage (fig. 5)

- 1.1 - Remove cotter pin and pin from the landing wires (1)
- 1.2 - Remove cotter pin from the elevator/actuator mounting (2)
- 1.3 - Disconnect the electric trim's plug (only in the left stabilizer)
- 1.4 - Remove cotter pin and pin from the flying wires (3)
- 1.5 - Rise the stabilizer's tip until the lower mounting becomes free (4) (the elevator will automatically be disconnected)
- 1.6 - Lower the stabilizer's root until the upper mounting becomes free (5)
- 1.7 - Move the stabilizer back until it becomes free from its forward support (6)

2. Wings (fig. 6)

- 2.1 - Open the engine's upper cowling and loosen the aileron's control (pin/cotter pin) (1)
- 2.2 - Remove the cotter pin and pin (2) that connects the lower wing to the "V" strut
- 2.3 - Ask somebody to lower the lower wing tip so that it will come free of the horizontal lock pins at its root. Rise the root to disconnect it from the vertical locking pins.
- 2.4 - Loosen and remove the pitot's bracket.
- 2.5 - Remove the pins and cotter pins (4 and 5) that attach the "V" strut to the upper wing and remove the strut.
- 2.6 - Remove the pin and cotter pin from the main strut/ upper wing attachment (6)
- 2.7 - Ask somebody to hold the upper wing so that you can remove the pin and cotter pin from the main strut/upper wing attachment (7). If it is difficult to remove the pin ask your auxiliary to move the wing up and down.
- 2.8 - Rest the main strut's tip on the floor.
- 2.9 - Remove the upper wing in the same way you did the lower one.
- 2.10 - Remove the main strut from the fuselage (removing the respective pins). The pitot tube must be removed from inside the strut.

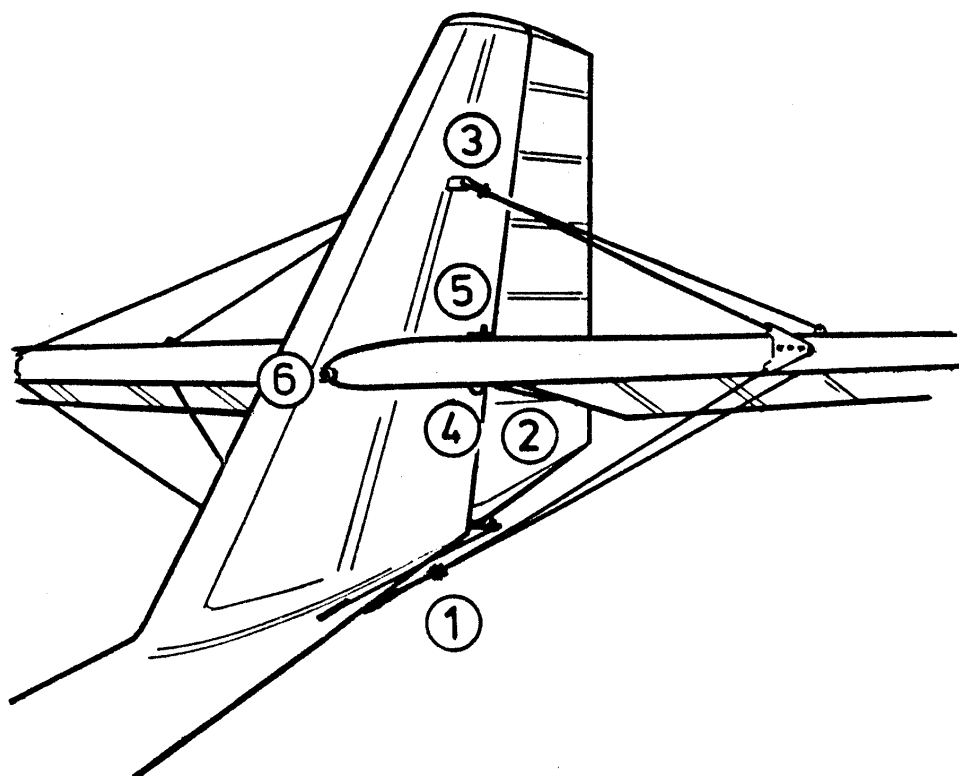


Fig.5 – Empennage Disassembly Sequence

& TRAILERING

VIII.3 - Trailer Loading

The sequence to locate the aircraft's parts in the trailer must be in the following order: 1° wings, 2° horizontal empennage, 3° fuselage.

Wings

The wings have individual pallets that accommodate them by the leading edge. The upper ones are accommodated with the lower surface turned outside and the tips to the rear side of the trailer. The lower wings with the upper surface turned to the outside and the tips turned to the front side of the trailer.

The lower wings are fixed to the trailer's structure by a support that is attached to the strut's mounting brackets and receives the attachment pin.

The upper wings are fixed in the same way and also receive a "V" strip that incases in the trailing edge and is attached to the trailer by pins and cotter pins.

Struts

The main struts must be involved in a plastic cover so that they don't stay in contact. Then they must be placed in the trailer center rail, just behind the nose wheel. The "V" struts must be placed inside the cockpit.

Empennage

There are two pallets with inside linen for the empennage.

Fuselage

To load the fuselage in the trailer, proceed as following:

- With the trailer attached to the vehicle or resting on the telescopic leg, loosen the wing bolts and rise the front part of the trailer, locking it in the reclined position with the appropriate support.
- Lower the ramp and locate the landing gear wheels in front their rails.
- Attach the hoisting cable to the nose wheel leg and tow the fuselage to inside trailer.
- Put the wedges behind the main wheels.
- Fix the wheels with the safety belts.
- Fix the propeller so that it does not turn and get damaged during transport.

VIII.4 - Trailer Connection

The trailer has a fast connection system. When disconnecting the trailer, leave it supported by its telescopic leg.

VIII.5 - Trailing Procedures & Cautions

Before conducting the vehicle and trailer, check and see if the connection is secured, test the rear lights, tires and aircraft parts attachments.

Drive at a moderate speed and always consider the extra weight and volume you are conducting when you by-pass another vehicle and when turning a corner.

& TRAINING

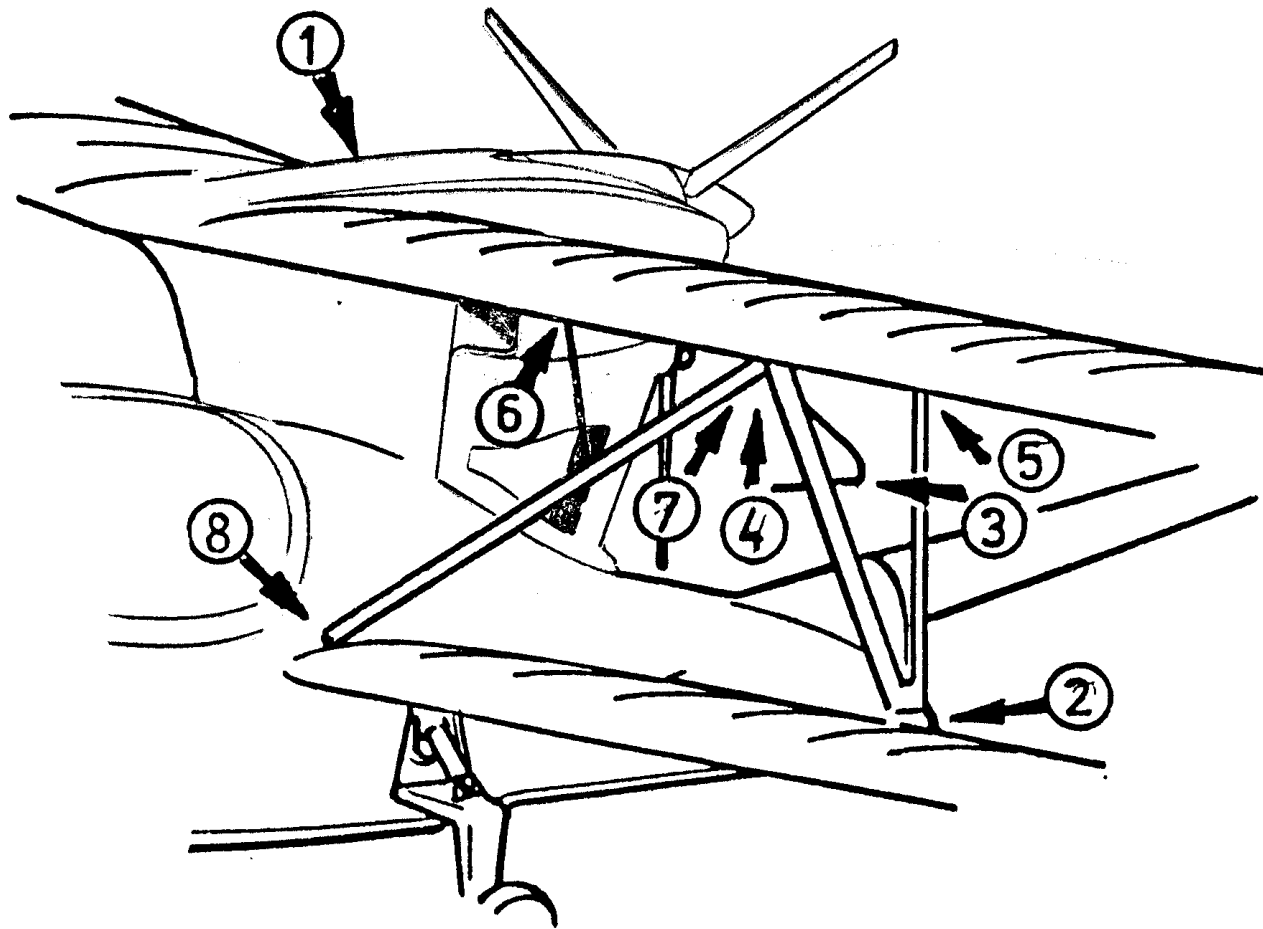


Fig.6 – Wings Disassemble Sequence

**THE COMPLIANCE WITH THIS MANUAL IS A PROTECTION OF YOUR RIGHTS.
REMEMBER: THIS AIRCRAFT IS "EXPERIMENTAL", SO IT IS OF THE OPERATOR'S
RESPONSIBILITY ANY RISKS THAT MAY OCCUR.**

Appendix I

WEIGHT & BALANCE SHEET

Acft. Model: _____ Serial Number: _____ Register: _____
 Optional Equipment: _____

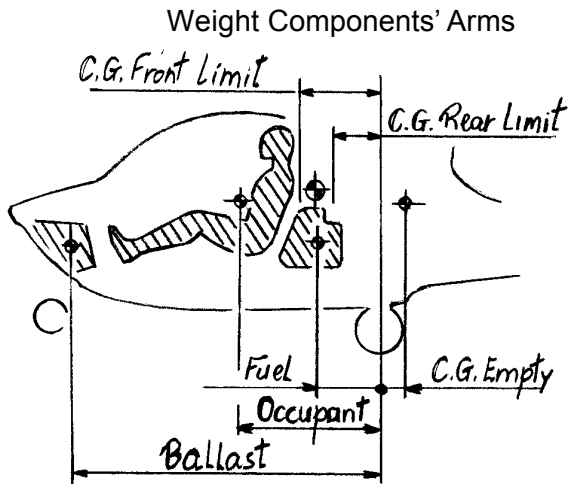
Empty weight: _____

Gross weight: _____

Useful load: _____

To calculate the C.G. position, divide the sum of moments, that is the product of weight x arm, by the sum of the weights.

C.G. position = $\Sigma M / \Sigma W$,



CONFIGURATION	WEIGHT (Lb.)	ARM (Inches)	MOMENT (Lb X Inches)
Empty Acft.		(0.5 at 1) *	
Fuel		8	
Occupants		30	
Water Ballast		77	
Baggage		6	
Total		>> <<	

* sugerido , a frente do datum

To the aircraft in question, the following weight limits must be considered:

	Occupants` Weight	
	Min.	Max.
Maximum Ballast	_____ lb	_____ lb
No Ballast	_____ lb	_____ lb

IMPORTANT: the weight of occupants, plus fuel, ballast and luggage, must not exceed the useful load of the aircraft in question.

This _____ aircraft was _____ weighed
 by: _____ Date: ____/____/____